

shortwave magazine

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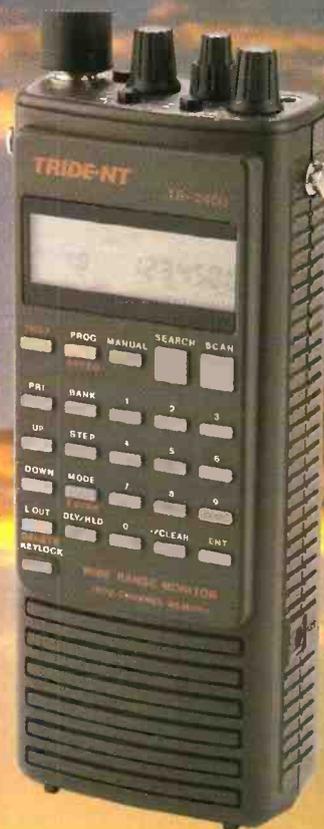
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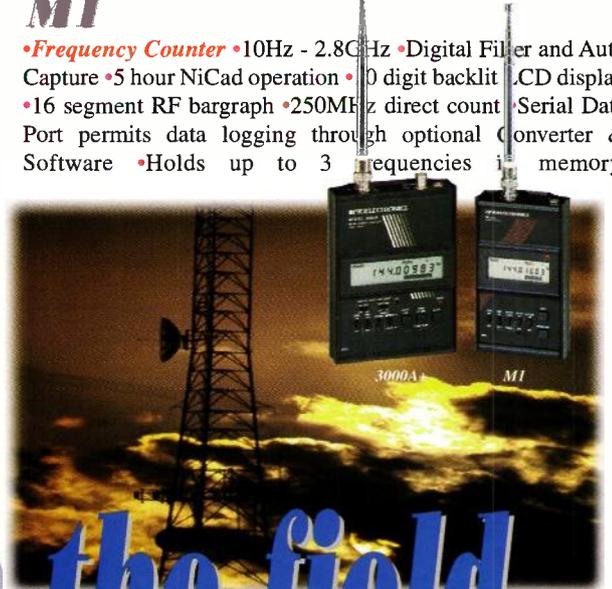
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Cover Subject

The Niederhorn television transmitter in the Berner Oberland. Signals have been received in the UK via DXTV. Photo: The Hamer-Smith Swiss Collection.

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-check out these winter warmers

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Good Listening

SWM SERVICES

Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £28 in Europe and £30 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 £42(UK) £47 (Europe) and £51 (rest of world).

Components for SWM Projects

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

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 0121 - 384 2473.

Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are £2.30 each, photocopies are also £2.30 per article, plus £0.50 for subsequent parts of serial articles.

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

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Technical Help

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

editorial

Another year starts! I trust that you have all made your New Year resolutions - hopefully one of them is to get the most out of your favourite hobby.

I have just returned from Denver, Colorado, having been with Brown Owl on 'granddaughter inspection duties'. I was interested to hear the announcement made at the start and finish of each flight prohibiting the use of any electronic equipment, including portable CD players and lap-top computers, below an altitude of 10000 feet. I was also slightly amused that they found it necessary to emphasise that tampering with or destroying the smoke alarms in the toilets was against Federal Law. The flight between Washington and Denver in both directions was on the new B-777 - in my view the 'Windows 95' of the aircraft world. Still, the damped loo seats were interesting to watch in action! Doubtless Godfrey Manning will have something to say about the fact that the designers seem to have forgotten an engine or two.

Massive paper increases have compelled us to increase the price of your favourite magazine from this issue. You can avoid the increase by taking out a subscription. Kathy has agreed to hold subscription rates for at least the next three months. Be assured that we only take such steps when it is really necessary and that we are as committed as ever to bringing you the best listening magazine bar none.



Dick Ganderton G8VHF

letters



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

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

Dear Sir

Being in my 70s and a long term reader of your magazine and the three others mentioned, I feel I must write to you and say how heartily I support Harold McIntyre's letter and point of view, expressed in the SWM October issue.

Whilst I am only a lowly s.w.l. and constructor, I would also include the following in his ban - packet, RTTY, satellite, FAX, TV, WXSAT and a few other exotic methods of communication - I wonder what happened to the telephone?

I construct and listen to other amateurs talking on their 'wireless' sets and do it all myself - no fancy electronic aids, and have been perfectly happy to do so for years!

In view of this constant drift away from amateur radio that is slowly taking place, plus the inevitable rise in price over the years, I regret to inform you that I will not be renewing my subscription this year.

In closing I ask, does anybody seriously trawl through the columns of 'LM&S', churning out who listens to what on which day?

Good luck to H. McIntyre, a man after my own heart, for daring to introduce a long awaited 'beef', but, sadly for me, the interest matter does not justify the price of SWM.

D. Preston
Wallasey
Merseyside

We are sad to hear that you will not be renewing your subscription. At SWM we try hard to 'be all things to all men'. On the whole we believe that we produce a balanced publication covering aspects of the hobby that a very broad range of readers wish to read about. The feedback that we receive does indicate that we have got it just about right. There will always be, however, those readers who want other topics covering. We do our best to reflect our readers wishes, but, it is not possible, to please everybody all of the time. And yes, there are many readers who do 'trawl through the columns of LM&S' every issue. Since the current subject matter does not interest you, perhaps you could write and let us know what your specific interests are. - KN.

Dear Sir

In response to Mr D. Evans (SWM December), I have recently purchased an AOR AR1500E and am new to scanning. As a 15 year old and, a previous games console owner and current PC owner, I have had experience with several magazines. All of the console magazines do not contain information on scanning related products. The PC magazines concentrate on business software and therefore there is no room for scanning related articles in either.

So, it is important that SWM does introduce a section that will deal with computer software. There are already small sections devoted to airband, scanning, etc. but another section on computer software would not discredit the magazine at all. If some readers do not like the section, I doubt if they would stop buying the magazine over one small article.

Also, you already have a Junior Listener section, but how about a junior mail? I am sure that there are several younger listeners that may feel intimidated by the older readers' letters. This section would allow younger listeners to communicate on the subject.

SWM is the best magazine on the market with the widest range of subjects taste for everyone. Keep it up! These are my views. I hope that they raise questions and opinions of other readers and I hope that you consider them fairly.

Paul Sowden (age 15)
Wakefield
West Yorkshire

Instruction Manual for WIN-108

Dear Sir

I am writing in the hope that through your 'Letters' page, I could appeal to your readers for help in locating a copy of the Instruction Manual for a WIN 108 airband receiver. I recently bought one second-hand, but it didn't have a manual with it.

I have worked out most of the functions, but some still elude me, this is where the manual would be handy! I would be willing to either borrow one for photocopying or buying the manual. I will return the cost of postage to the sender.

I can be contacted at the following address using the following reference number: **Ian 2CB200, PO Box 1, Glasgow C69 6EF**. Please advise your readers to use the postcode, otherwise their manuals may get lost. Many thanks in anticipation.

Ian McCallum
Easterhouse
Glasgow

Can anyone help Ian with a manual for his WIN-108, we do have a very good track record for help such as this. So please assist if you can. - KN.

Dear Sir

I have been following with considerable interest the debate in the editorial pages centred around the balance between pure radio coverage and that given to the associated use of computers.

As an advisor for Information Technology, my work involves supporting schools as pupils develop their interest and understanding as they work with computers to support their work. There is an increasing awareness of computers. It is apparent too, through reading your magazine and Elaine Richard's column in particular, that many young people are interested in both radio and computers. As more sophisticated and reliable software is developed, it seems natural that the two technologies should come together, both are able to enhance other and stimulate growing interests.

I began my interest in radio through reading articles in your magazine. At the same time there was numerous advertisements for computer software to enable radio enthusiasts to develop their hobby further. In my work with schools, I know that there is considerable interest in using the computer to decode radio signals, weather satellite technology is just area, either through direct down loading of radio signals to tape for later interpretation or using weather dish aerials linked directly to the computer.

I would agree that with so many computer magazines it is essential that a balance between 'pure' radio users and those of us who use our radios with our computers. I believe that at the present time, the balance is about right. It is important that the full range

of information technology is used not only to support new interests and I believe that your magazine is doing just this. Long may it continue!

For those of us whom this is a new hobby we need impartial and sound advice. The local company Southern Scanning & Shortwave is one such company and have done much to develop my interest in radio and I would recommend it to your readers.

I should be pleased to hear from schools developing the two technologies to support work in the National Curriculum.

Colin Geatrell
Advisor Team Leader
Dorset Information Technology
Team
Wareham
Dorset

Dear Sir

It has been most interesting to see Feba Radio featured on recent News pages. We have supported Feba for many years and it is encouraging to see it receive editorial copy in a secular magazine.

Thank you also for Rich MacVicar's splendid article on Radio Alianza. I hear Rich regularly from HCJB. Considering we are at the lowest point in the 11 year sunspot cycle, reception from Ecuador is quite good on my small portable sets, (YB400 & ATS800). It was from hearing the EDXC feature in *DX Partyline* that I joined the World DX Club.

L. Mason
Hassocks, West Sussex

Inflight Radios & Other Electronic Gear

Dear Sir

I thought that I would put pen to paper following Colin Goodall's letter in the November *SWM*. I am always wary of electronic devices aboard aircraft. However, banning their use does not solve the potential EMC problems. Both avionic electronics and consumer equipment need to be designed with EMC in mind.

Of more interest to your readers, a friend of mine who recently travelled to the USA told me that Continental Airlines new 777 aircraft have a position (I believe 12) on the passenger headphone section which gives the cockpit communications audio. So you can listen to the pilots and ground without the need for airband radio. You are charged for headphones though so take your own (3.5mm stereo jack-plug).

Simon Lloyd Hughes GWONVN
Barry
S. Glamorgan

Having just travelled on United's 'super-hype' 777 I was not impressed with the in-flight 'entertainment' system. My own headphones didn't work in the 777's audio socket! - Ed.

To: dick@pwpub.demon.co.uk
Subject: Computer Articles

Mr McIntyre writes opposing Matthew Brutons eminently sensible suggestions from a previous letter. Mr McIntyre admits to knowing little about computers and not wishing to (which is, of course, entirely his right) but then proceeds to make several points which are entirely untenable.

Firstly he confuses general computer articles (which Darren specifically said should **not** be included in *SWM*) with those aimed at the use of computers as a tool in the s.w.l.'s armoury. This latter type of article was the type suggested by Darren and I believe such articles would be useful to a large number of readers, myself included.

Secondly the author makes the outrageous suggestion that young people only come into the hobby "to change things to suit themselves" and then leave when they get bored. This is extremely condescending of the

letters



author and indeed I would hope that anyone who joins our ranks would wish to contribute to the hobby and in so doing change it. This inverted ageist attitude is all too prevalent in our hobby and should be resected for the cancer that it is. Incidentally I am on the wrong side of 30 although I would still be happy to be called young!

Finally, Mr McIntyre clearly does not appreciate the possible role of computers in log keeping, utility decoding, spectrum analysis, information retrieval via the World Wide Web, a means of communications with such as *SWM* via the internet, satellite position prediction, mapping (for example *geoclock*) and m.u.f. prediction. Indeed all of these exciting **adjuncts** to the core interest of our hobby (ie. listening to and using radio) will remain firmly closed to him if he persists in his luddite attitude bolstered by inaccurate information. Do not misunderstand me, if Mr McIntyre does not wish to use computers to increase his enjoyment of his hobby then that is fine but let him give the same consideration to the substantial body of s.w.l.s that do not share his viewpoint.

Mark Brickley....via the 'net

STOP PRESS

F.G. Rylands G2VF

As we closed for press we learned the sad news that F.G. Rylands G2VF passed away on 9 November 1995.

He was well known to readers of *SWM* for his regular advertisements for his G2VF loop antennas and a.t.u.s and for his various kits.

The Very Heavy Radio

The Editorial Gremlins struck again with the review of the Drake R8A Communications Receiver. Those of you who have mastered the metric weights and measures will have realised immediately that this set does not really weigh over a quarter of a tonne! The real weight is - as stated in the Specification box - 5.9kg.

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.



rallies

1996
January 20: Computer Fairs (Northern) computer/rally fair and games fair is to be held at the G. H. Carnall Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at J4 off the M63 motorway. Doors open 10am to 3pm. The show is open to traders of both computer and radio backgrounds alike. There is easy access for disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, first 400 + free £2.25 mag or CD. **0161-627 2502.**

January 21: Oldham ARC Mobile Rally is being held at Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am (10.30am for disabled visitors). Event features the usual traders and a Bring & Buy stall. Morse tests available on demand. Talk-in on S22 via GB4DRC, commencing at 7.30am. Mobile contact prize, up to 2pm. Refreshments and free parking will be available. More details can be obtained by telephoning (01706) 846143 or 0161-652 4164.

February 4: The 11th South Essex Amateur Radio Society Radio Rally is to be held at the Paddocks, Long Road, Canvey Island, Essex. The paddocks is situated at the end of the A130. Doors open at 10.30am - features: amateur radio, computer and electronic component exhibitors, Bring & Buy, RSGB Morse testing on demand (two passport photos required), home-made refreshments, free car parking with space outside main doors for disabled visitors. Admission is £1. Further details from David G4UVJ on (01268) 697978.

February 11: The Northern Cross Rally is to be held at a new and better venue, the Thornes Park Athletics Stadium, Wakefield, just out of town on the Horbury Road. Easy access from M1 junc. 39 & 40 - well signposted and with a talk-in on 2m and 70cm. Doors open at 11am (10.30am for disabled visitors and Bring & Buy). Details from Dave G0FLX on 0113-238 3622.

February 17: Computer Fairs (Northern) computer/rally fair and games fair is to be held at the G. H. Carnall Leisure Centre, Lostock Road, Davyhulme, Manchester, immediately at J4 off the M63 motorway. Doors open 10am to 3pm. The show is open to traders of both computer and radio backgrounds alike. There is easy access for disabled visitors and a massive free car park, cafe and bar. Admission is £1.50 for adults, first 400 + free £2.25 mag or CD. **0161-627 2502.**

February 24: The Rainham Radio Rally is to be held at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. Talk-in on S22 GB4RRR. Doors open at 10am to 3.30pm. Disabled and wheelchair users from 9.30am. Admission is only £1.50, under 14s, free. There will be the usual mix of trade stands, Bring & Buy, many special interest groups, etc. There's plenty of off road parking, a licensed bar, food and refreshments available with an area to sit and eat and watch the world go by. Further details from Martin G7JBO on (01634) 365980.

February 25: The Barry Amateur Radio Society are holding their annual Radio and Computer Rally at the Barry Leisure Centre, Barry. Doors open at 10.30am (10am for disabled visitors). More information can be obtained from Brian Brown GW0PUP on (01222) 832253.

March 2: The Aberystwyth & DARS West Wales Amateur Radio & Computer Rally. Details from Katy GW0SFO on (01545) 580675.

***March 9/10:** The London Amateur Radio & Computer Show is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London N9. Doors open 10am to 5pm each day. There will be trade shows, lectures, a Bring & Buy, on-demand Morse tests (two photos needed), talk-in on 2m and 70cm, disabled facilities, priority admission for disabled visitors, bars, restaurants and ample free parking. **Steve White G3ZVW on 0181-882 5125.**

March 10: Wythall Radio Club will be holding their annual radio rally at Wythall Park, Silver Street, Wythall (near Birmingham) on the A435, two miles from junction 3 on the M42). Doors open 10.30am to 4pm. There will be all the usual traders in three halls and a marquee. Bar and refreshment facilities will be available. In addition there will be a Bring & Buy stall run by the club. Talk-in on S22. Admission only £1. **Chris G0EYO on 0121-430 7267.**

***March 17:** The largest single day amateur radio rally in the UK - the Norbreck Radio, Electronics and Computing Exhibition by the Northern Amateur Radio Societies Association at the Norbreck Castle Hotel Exhibition Centre, Queens Promenade, North Shore, Blackpool. Doors open at 11am (10.45am for disabled visitors). Over 100 trade stands, Bring & Buy stand, RSGB stand and book stall, club stands, amateur computer stands, construction competition, free car parking, free shuttle bus from car park, wheelchair access to all stands, radio talk-in on S22. Admission is £2, OAPs £1 and under 14s free. More information obtained from Peter Denton G6CGF on 0151-630 5790.

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

Editor

AVON

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

RSGB City of Bristol Group: last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. December 19 - Christmas party. Dave Bailey G4NKT. 0117-967 2124.

South Bristol ARC: Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. December 20 - 'Hair of the dog' by G0AWX, 27th - Greeting calls on GB4WAW by G7PKJ, January 3 - CW activity evening, 10th - Build your own?...under instruction by G4YTH, 17th - Bring & Buy - car boot sale, 23rd - Photographic equipment evening. For more information ring (01275) 834282 on a Wednesday evening.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). January 3 - EMC by Tim Haynes G8PTP, 17th - Annual dinner. Ivan Eamus G3KLT. (01296) 437720.

CLWYD

Conwy Valley ARC: 1st Wednesdays, The Studio, Penrhos Road, Colwyn Bay, Clwyd. January 3 - An interclub quiz with the Rhyll ARC at the Studio in Colwyn Bay. R. W. Evans GW6PMC (01745) 855068.

DEVON

Appledore & DARC: 3rd Mondays, 7.30pm. Appledore Football Clubroom. Dave Brierley G3YGJ. (01237) 476124.

Plymouth RC: Tuesdays, 7.30pm. The Royal Fleet Club, Devonport, Plymouth. December 19 - Sherry and mince pie evening, January 9 - Natter night and welcome back, 11th - Committee meeting, 16th - Presentation of the first calub call award certificates, 23rd - Business meeting and natter night. F. P. Russell on (01752) 563222.

Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. January 19 - Construction cup and contests. Peter G4UTO. (01803) 864528.

GREATER LONDON

Edgware & DRS: Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. January 11 - AGM (new Treasurer and Secretary must be elected), 25th - Informal meeting (pay your subs!). Rod Bishop. 0181-204 1868.

HAMPSHIRE

Horndean & DARC: 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. January 2 - Natter night, 23rd - Microwave communications by Mike Walters G3JVL. S. Swain (01705) 472846.

Southampton ARC: Mondays, 7pm. This club is now up-and-running after some years of inactivity. New members welcome. Harold McIntyre on (01703) 737715.

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. January 9 - Night on the air, 23rd - Talk. Barry Taylor. (01527) 542266.

HERTFORDSHIRE

Harpenden ARC: 1st Thursday of the month from September to May, at Aldwickbury School, Harpenden. January 4 - Images from space. Further details from Peter 2E1BDB on (01727) 860631 or John G4JOV on (01582) 765821.

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. January 16 - AGM. A. Messenger G0TLK. 0181-777 0420

Medway AR & TS: Fridays, 7.30pm. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham. Kent. December 22 - The club will be open, 29th - The club will be open, January 19 - Annual general knowledge quiz, 8.30pm. G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR. (01634) 710023.

NORFOLK

Norfolk ARC: Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. December 20 - Night on the air/construction QRP/Morse practice, 27th - Night on the air/construction QRP/Morse practice, January 3 - Night on the air/construction QRP/Morse practice, 10th - Tropo propagation by Jim G3YLA, 17th - Night on the air/construction QRP/Morse practice, 24th - Science for all by Arnold G3PTB. Mike G4EOL. (01603) 789792.

OXFORD

Oxford & DARS: 2nd and 4th Thursdays, 7.30pm. The Grove House Club, Grove Street, off Banbury Road, Summerown, Oxford. D.A. Walker G3BLS on (01865) 247311.

Vale of White Horse: 1st Tuesday of each month, 8pm at The Fox, Steventon. Ian White. (01235) 531559.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. January 4 - Chairman's discussion, a chance to put forward how you would like the club to be, 18th - Contesting discussion, a chance to suggest what contests the club should enter, all suggestions welcome. Ian Davies G7SBD, QTHR. (01743) 463711.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. December 21 - QSOs and sausage rolls, 28th - Committee meeting and club station on the air, January 4 - The Pitney TRF Receiver, Part 2 by G3PCJ, 11th - Antenna radiation patterns by G3MYM, 18th - Development of a 2-6m transverter by G7SDD, 25th - Club station on the air and committee meeting. Cedric White, QTHR. (01258) 473845.

SUFFOLK

Bury St. Edmunds ARS: 3rd Tuesdays, 7.30 for 8pm. Culford School. December 19 - Christmas social, January 16 - AGM. Kevin Waterson G1VGI, 20 Cadogan Road, Bury St. Edmunds, Suffolk IP33 3QJ. (01284) 764804.

TAYSIDE

Dundee ARC: Tuesdays, 7pm. Dundee College, Graham Street, Dundee. December 19 - Construction evening. Allan Martin GM7ONJ, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RP.

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. December 25 - Christmas greetings on the air, 1100hrs on 145.275MHz, January 8 - Winter social, 22nd - Projects, grouses, problems and solutions. Martin Rhodes G3XZO. (01789) 740073.

WEST YORKSHIRE

Denby Dale ARS: Wednesdays, 8.30pm. Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. Denby Dale ARS also provides RAE, Morse and Novice RAE classes and is a registered City & Guilds examinations centre for both the RAE and Novice RAE exams. December 20 - Xmas party. Further details from the examinations secretary Brenda G4OTE on (01484) 424776 or secretary Malcom McKenzie G8RWN, 9 Broomhouse Close, Denby Dale, Huddersfield, W. Yorkshire HD8 8UX or (01484) 861782 for club activities.

Keighley ARS: The Ingrow Cricket Club, Ingrow, Keighley. Thursdays, 8pm. December 21 - Christmas buffet, 28th - Natter night. Kathy G0RLO. (01274) 496222.

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

junior listener



HCJB

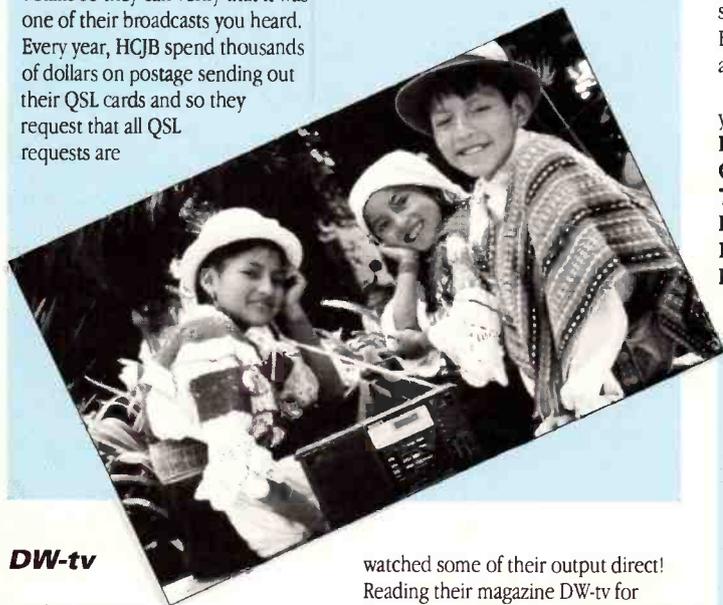
I've received a QSL and other information from HCJB recently. HCJB is an international Christian short wave radio station broadcasting from Quito in Ecuador. English is just one of fifteen languages they use, these range from Georgian to Kikongo and Nordic to Quichua! They issue six different QSL cards during the year and send out programme schedules and tourist information about Ecuador.

To receive a QSL card, you must include in your report the name of the programme you heard, the time in UTC that you were listening, the date and frequency the programme was heard on and some programme details so they can verify that it was one of their broadcasts you heard. Every year, HCJB spend thousands of dollars on postage sending out their QSL cards and so they request that all QSL requests are

accompanied by an IRC.

Programmes to look out for are **Ham Radio Today** on Wednesdays at 1730 on 15.490 (this is beamed to Europe so hopefully should be a good signal) and **DX Partyline** on Saturdays at 1730 on the same frequency. For a wider interest, programmes like **What's Cooking in the Andes** (1730 on Thursdays) and **Blues, Rags & Jazz** (Tuesdays at 1830) could be worth listening for.

The address for the English Service of HCJB is: **Box 1717-691, Quito, Ecuador.** Of course, you can E-mail them these days on: **english@mhs.hcjb.com.ec**



DW-tv

Some of you may have come across Deutsche Welle television on your cable channel. TeleWest Communications plc are re-broadcasting DW-tv on Channel 30 now (you can already watch RTL and SAT1). So if you live in London, Edinburgh, Bristol, Motherwell, or Tyneside this could be one to have a look at. Of course, if you are into DX TVing then you may already have

watched some of their output direct! Reading their magazine DW-tv for December (well the English bits of it) they have some interesting programmes planned. Some are news programmes, some are documentaries and others entertainment based. The magazine is really a listing of all the programmes for the month of December and also contains short features on some of the programmes. Contact DW for your copy if you are interested.

Mene Mene Tekel Parsin

Yes, the writing is probably on the wall for those who enjoy listening in to the emergency services. Apparently, a project is underway to completely overhaul the emergency communications of the police. The police service are looking at the logistics to moving to the new European TETRA standard for emergency service radios. Any changes will be implemented

between 1998 and 2003 and 'it aims to enhance the communications available to operational officers wherever they may be and to reduce dramatically the opportunities for their conversations to be overheard'. I don't imagine anyone will be surprised to hear this as it was bound to happen eventually.

TV and Radio Information

By TV and radio information I don't mean the Radio Times or other listings, but two little booklets called *Television Transmitting Stations* and *Radio Transmitting Stations*. The first, *Television Transmitting Stations*, is a joint BBC/ITC publication that lists all terrestrial television transmitters in the UK. In one section the transmitters are listed by region telling you which channels they use to transmit BBC1, BBC2, ITV and CH4, the antenna group, power and which BBC and ITV company that use them. In the second section the stations are listed alphabetically with the National Grid Reference, transmitter number, who the landlord is, the height of the antenna and on which page in the first section you will find them listed. Finally, it gives you some useful BBC and ITA addresses.

From reading this booklet, I think you can get a copy from either **BBC Engineering Information, White City, 201 Wood Lane, London W12 7TS** or **ITC Engineering Information, Kings Worthy Court, Kings Worthy, Winchester, Hampshire SO23 7QA**. I think I would include an s.a.e. (A5 size is

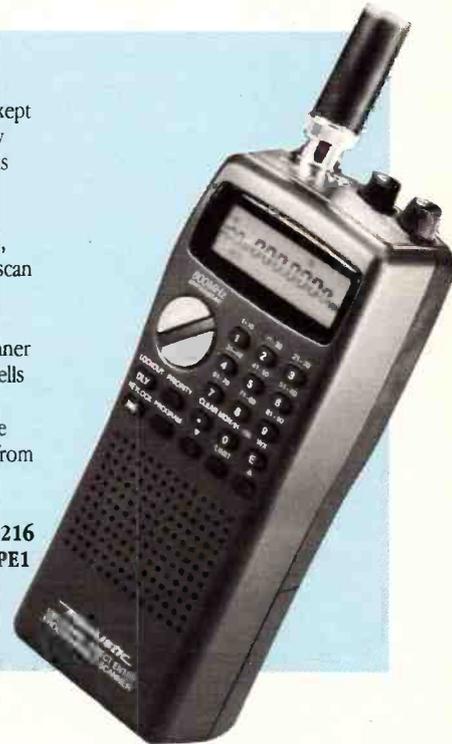
plenty big enough) with any request.

The second booklet is from the BBC. It lists all the domestic BBC radio transmitters as well as a variety of bits of information about them. I thought the section on local radio would be very useful to those who enjoy listening to these stations - especially when it's not your local station. It lists each radio station (for example Radio Bristol) and then tells you where its transmitters are. In this instance, they are Mendip, Ilchester Crescent and Bath using 95.5, 94.9 and 104.6MHz respectively as well as Mangotsfield and Taunton on 1.548 and 1.323MHz. The level of power that each of these transmitters use is also useful when you are trying to work out which of the stations transmitters you are picking up. Finally, at the back of the booklet they give the Grid Reference for every single one of the transmitters mentioned.

The address at the front of the booklet is: **BBC Engineering Information, Villiers House, The Broadway, Faling, London W5 2PA**. Again, I would include an s.a.e. with any requests for the booklet.

New Release

As always, Link Electronics have kept me posted when they have a new scanner in the shop (many thanks for that). The PRO-25 is a new release from Realistic with 100 channels covering 66-88, 108-174, 406-520 and 806-956MHz. It can scan at 50 channels per second in memory mode, or 100 steps per second in search mode. The scanner has all the normal whistles and bells that an enthusiast would expect from Realistic. The PRO-25 can be powered by dry cells, NiCads or from a 9V power supply. It comes complete with antenna, belt clip, plus manual. **Link Electronics, 216 Lincoln Road, Peterborough PE1 2NE.**



...and finally

Thank you to all who send me information for use in the column, may I wish you a very Happy Christmas and Peaceful New Year. Please keep all the information coming, news on contests, awards and other news of interest to the young or beginners in general most welcome.



Mr Analog at Hesing Technology

Iwatsu Electric Co. Ltd. announce a new series of economically priced oscilloscopes by the name of 'Mr Analog'. All units have a 150mm screen which provide a clear and distinct display. Currently the range comprises five models with bandwidths up to 100MHz and sensitivities down to 2mV/Div. Timebase sweep speeds range from 500ms/Div. to 20ns/Div. with an accuracy of $\pm 2\%$. Included is a timebase x10 multiplier to provide the fastest timebase speed of 2ns/Div. Full on-screen parameter display, frequency counter and cursor measurement capability makes this an attractive new family of instruments. For full details and current prices please contact, **Hesing Technology, 41 Bushmead Road, Eaton Socon, Cambs PE19 3BT. Tel: (01480) 386156, Fax: (01480) 386157.**

Morse Course

Morse code classes, to prepare for the RSGB Amateur Radio 12w.p.m. Morse test will commence Friday evenings 1800-1930 as of 12 January 1996 at Newbury College. Full details from the college, **Tel: (01635) 37000/35353** quoting course ref. 99208B. Or direct from **Ray Oliver G3NDS, Tel:(01672) 870892.**

Radio and TV News

Radio amateurs and TVDXers make use of **meteor shower** signal propagation for v.h.f. signal reflection achieving signal skip distances between 500-1700km. Apart from random Meteor Scatter which occurs daily there are several main intensive shower periods which will generally offer more scope for reliable signal pings. Courtesy of Neil Bone, of the British Astronomical Society here is the list:

- operates as follows -
 EESTI TV chs. Tallinn ch.R2; Parnu R4; Narva R2; Ruhnu R5.
 Privately operated Estonian TV using state owned transmitters - RTV - Narva R2; Haapsalu R3; EVTV Narva R2; Haapsalu R3 Kanal 2 - Kohtla-Nomme R1; Poltsamaa R1; Kundu R1.
 Estonia intend to end use of the low v.h.f.-f.m. Band 68-73MHz by the year 2005 and transfer all f.m. radio

| Name | Overall Period | Peaking dates |
|----------------|--------------------|--------------------|
| Quadrantids | January 1-6th | January 3-4 |
| Lyrids | April 19-25 | April 21-22 |
| May Aquarids | April 24-May 20 | May 4 |
| Cetids | May 7-June 9 | May 14-25 |
| Delta Aquarids | July 15-August 20 | Jul 28/29; Aug 6/7 |
| Perseids | July 23-August 20 | Aug 11-13 |
| Orionids | October 16-27 | Oct 20-22 |
| Taurids | Oct 20-November 30 | Oct 31-Nov 5 |
| Leonids | November 15-20 | Nov 17/18 |
| Geminids | December 7-16 | December 13/14 |

In November 1966 the Leonids MS produced a major and very intense storm and a similar performance is expected in 1998 or 1999. It's likely that there will be a marked improvement in activity this year onwards. The 1966 storm lasted nearly an hour and my experience was of an hour of Band 1 TV similar to a very intense Sporadic E opening - with the improved performance available some 30 years on it would be wise to check out Band 3 as well this time round!

Estonian TV - as a Sporadic E catch

services to the established 88-108MHz band.

'FM Interwave FM' is the first foreign language f.m. radio station to open up in Tokyo and will compete with six other f.m. services - those all in Japanese. English paper *The Japanese Times* has put nearly \$10 million into the project together with 34 local firms and have employed 6 European and North American DJs. Interwave intends opening April 1996.

LBC-1 in Beirut, Lebanon has just received nearly \$23 million to revamp

NOAA Marine Reception from ICS

ICS Electronics Ltd. have upgraded and improved their NOAA Marine WXSAT receive system for PC compatibles. The new model is somewhat un-imaginatively called the WS-4.

Particularly important is an improved antenna, which allows satellites to be received when they are close to the horizon, thus increasing the observation range. This compact antenna has two sets of four folding elements mounted on a 900mm stainless steel pole which

incorporates the standard 1in marine mounting 'thread' at its base.

ICS weather satellite systems were instrumental in *Nicorette* winning the 199 Fastnet Race by a margin of over 24hrs.

The WS-4 system comes complete including antenna, receiver, connecting cables and software, and is priced at £704.94 inc. VAT. For more details contact **Robin George, ICS Electronics Ltd., Unit V, Rudford Ind. Est. Ford, Arundel, West Sussex BN18 0BD. Tel: (01903) 731101, Fax: (01903) 731105.**



programming and the equipment installation. The station opened during the mid eighties civil war and will be the first official licence holder under new broadcasting law.

Scandinavian broadcaster SBS has applied to the Finnish broadcasting authority to establish a national commercial TV network and to rival existing commercial broadcaster Mainos TV which has the commercial TV monopoly for the country. SVT the Swedish broadcaster has asked the government to extend the broadcast charter period from the present four to ten years which will be considered by the authorities in March. The government is also to discuss the expansion of programme hours to 24 and the transfer of programmes to satellite.

Following a long court case over the Isle of Dogs Canary Wharf compensation case a judge has thrown out the claim stating that bad TV interference is not an actionable nuisance. The Canary Wharf building is 50 stories high and its construction caused severe local TV screening and poor reception.

With the departure of the Russian Army in Hungary the TV channels used to relay the Moscow 1st TV channel will be turned over to private investors to create a 3rd national TV network. The MTV-2 network will also be turned over to private enterprise for a 10 year period but the main MTV-1 network will remain as the state owned service. Radio Danubius, currently state owned is also to be flogged off to the private sector.

This year should see the first High

Definition TV station on air in the United States. The location and other technical details haven't been announced - it's backed by a consortium of US broadcasters and industrialists.

A fallback in advertising revenues has pushed Germany's RTL to cut back on local programme production, relying more on imported programming ex USA.

Both the States of Jersey (CI) Police and Department of Electronics for Jersey Airport are partnering an operational communications system based around a Motorola Tetra network. This is a test system which will be operational mid 1996, prior Motorola marketing Tetra systems Autumn 1997. The Jersey system will allow both organisations to have independent control of their own functions whilst allowing the Island's public safety groups to have leading edge technology. Tetra offers many communications features - speech coding; encryption; up to four channels per carrier and data transmission up to 28Kbits/sec.

Finally Belgium's VTM broadcaster may pull out of Flanders and go offshore to the UK in order to compete with the UK based VT4 service. VTM is unable to feature advertising breaks during programmes and reckons to be losing up to £20 million annually. VTM was offered an 18 year commercial monopoly across Flanders in 1989 but VT4 opened in 1994 decimating advertising revenue.

Roger Bunney

Two from Isoplethics

The ATU Gang

Newly available is a family by Jacksons Bros. budget-priced, single-gang variable capacitors developed for use in low and medium power antenna tuning and matching units. The LA/400 and LA/200 have 400pF and 200pF swings, respectively, with an air gap of 0.61mm. Testing is performed at 1.25kV. The LA1/100 has an air gap of 1.27mm and a swing of 80pF. It is tested to 2kV and is especially suited to open wire feeder tuners.

The LA1 range are available priced at **£11.90** each direct from Isoplethics **Hi Z Headphone Transformer**

High impedance headphones - as required for simple radio receivers -

crystal sets and single valve sets - seem to be no longer available. A new transformer that matches hi-fi low impedance headphones with minimum loss could well be the answer. The AOP-1 one of a new range developed by Isoplethics for valve applications can handle primary currents upto 25mA and audio powers upto 1.5W. Overall dimensions of 67 x 37 x 44mm include mounting lugs and solder tags.

The AOP-1 is priced at **£8.25**. Both of these products are available from **Isoplethics, 13 Greenway Close, North Walsham, Norfolk NR28 0DD. Tel: (01692) 403230,**

Rental via the 'Net

Livingstone rental announce what they claim to be the first electronic equipment catalogue on the Internet. All the information contained in the company's catalogue-on-disk for Windows is presented in the on-line implementation. The additional benefit of this method of retrieval, Livingstone believe is global access, via any computer that supports World Wide Web access. Updates are also instantly implemented.

Also offered is the facility to download the whole Windows catalogue direct or to request the paper or disk versions by post.

Users will derive optimum benefit from the service by using a Web browser that supports Tables. The Livingstone Rental Internet Catalogue is usable with any browser. The URL to the catalogue is <http://www.livingston.co.uk>

For further information contact **Graham Harris, Livingstone Rental, Livingstone House, Middlesex TW11 0LB. Tel: 0181-943 5151, Fax: 0181-977 643.**

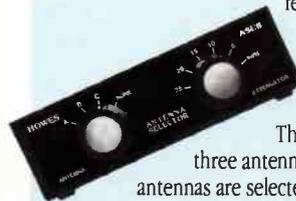


news



New ATU and ASU Kits from HOWES

The CTU9 Antenna Tuner is a new addition to the Howes range of antenna tuning units. It is a close relative of the popular CTU8 receiving model reviewed in December '94 SWM. It has all the features of its brother, but has the additional facilities of a bypass switch, a balun transformer and additional terminal posts for connection of balanced and unbalanced wire antennas.



The new ASU8 antenna selector enables up to three antennas to be used with a short wave receiver. Antennas are selected by a rotary switch. The unit includes an attenuator with 0 to 25dB attenuation in 5dB steps. In practice, the receiver's built-in attenuator often only provides the option of too little or too much attenuation. The ASU8's 5dB steps give it much more flexibility in the control of received signal levels.

Styling of the ASU8 is designed to compliment the CTU8 and CTU9 ATUs. Both kits come complete with case, printed and punched panels and all parts to build the unit. It is also available factory built.



The CTU9 costs £39.90 in kit form or £69.90 ready built. The ASU8 costs £27.90 in kit form or £49.50 ready built. Post and packing is £4.00 in either case (prices include VAT at 17.5%). **C.M. Howes Communications can be contacted at Eydon, Daventry, Northamptonshire NN11 3PT. Tel: (01327) 260178.**

Quantum Leap for Timewave

The new all mode DSP-599zx is a noise filter that combines a 'hyperspeed' d.s.p. processor with an alphanumeric display. Featuring quick select push buttons and optical encoders to wipe out noise. Make those hetrodyne disappear like magic, and the weak signals pop out of the noise.

Includes continuous filter tuning to 5.4kHz for modes such as a.m. broadcast, n.b.f.m. for v.h.f./u.h.f. and sophisticated data modes. The DSP-599zx is field upgradeable. The easy to read back-lit l.c.d. display provides a simple way to read, set and recall all of the setting.

The DSP-599zx costs **£349**, and is available from **Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01707) 662145, Fax: (01705) 690626.**

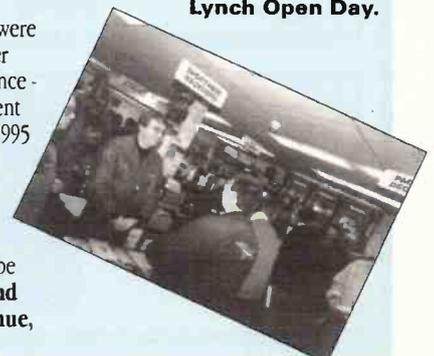


A Good Day Out at Martin Lynch and Son

The recent open day at the Martin Lynch and Son's Amateur Radio Exchange Centre, was very well attended. Radios and ancillaries, food and drink and raffle prizes were in abundance. Newly born Master Henry Lynch was also in attendance - although unlike his father he spent most of the time sound asleep. 1995 marked the first year of 'On-demand' Morse tests run by the RSGB. If you missed this annual event this time. Make sure it's in your Diary for 1996. Details can be obtained from **Martin Lynch and Son, 140-142 Northfield Avenue,**

Ealing, London W13 9SB. Tel: 0181-566 1120, Fax: 0181-566 1270.

SWM's Graham Tanner and a selection of regular contributors enjoy the Lynch Open Day.



Low e Electro

AOR W WOCKBUSTERS!

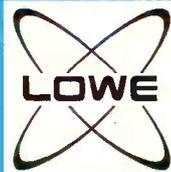
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- Signal strength ind

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|---|--------|
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| Watson Super Gainer | £19.95 |
| LoweScan resonant airband mobile antenna with mag mount base..... | £29.95 |
| LSA700 Discone 70-700MHz | £39.95 |
| LSA1300 Discone 25-1300MHz | £59.95 |
| LSA1500 Vertical, 25-1500MHz | £37.95 |

SCANNER BOOKS

| | |
|---|--------|
| UK Scanning Directory..... | £17.50 |
| Scanning Secrets | £16.95 |
| Airband Radio Guide by G Duke | £5.99 |
| Scanners 3 | £10.95 |
| Airwaves 95 | £7.95 |
| Understanding ACARS..... | £9.95 |
| World Aeronautical Communications Directory | £19.95 |

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R7100DC

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OOPS! We nearly forgot!

The lease expires on our Newcastle Airport shop this month and it is to be demolished to make way for a hotel!

We have therefore moved to a new site. Customers and visitors in the North East are welcome at our new premises at:

**Communications Centre
Drum Industrial Estate
Chester le Street, Co Durham
Tel: 0191-410 5555
Fax: 0191-410 5558**

1994

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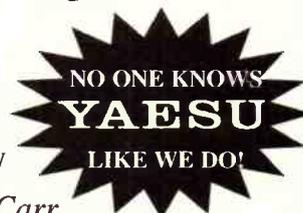


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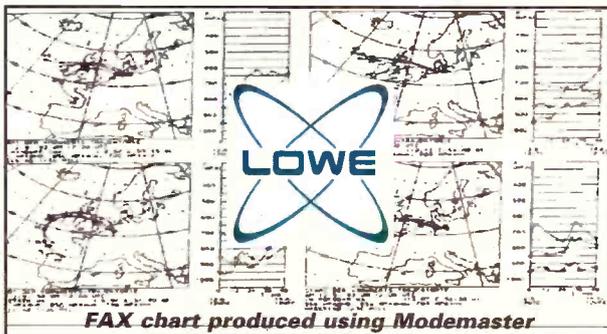
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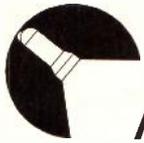
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A Day In The Life Of A Radio Inspector

The BBC World Service

Kilocycle Ken and Young Golly uncover some more interference problems.

"Mr Perkins," Young Golly read from the sheet. "We shouldn't have accepted this, he's complaining about reception of the BBC World Service."

"He's probably listening on the broadcast band," Kilocycle Ken said. "With the deregulation of broadcasting, that rich guy bought a frequency and got a contact with the BBC. I don't know how he makes money from it. Does it for love I suppose."

The complainant's address was a city council pensioner housing complex of semi-detached flats. Kilocycle Ken noted a copper wire antenna strung to a poplar tree. That wasn't usual these days. "Not the usual s.w.l.," he said.

"What is the usual?" Young Golly asked.

"There are plenty of active short wave listeners, not all just kids either. It takes skill to find the weak stations, the unusual ones."

Young Golly said, "I can

never understand why anybody can get excited listening on short wave for fun. I hated my compulsory monitoring training, listening to that tape with all the different types of signals."

"The h.f. bands are not what they used to be," Kilocycle Ken said. "The only people who seriously monitor now are the secret service."

Hard Way

"Satellites is the way to go," Young Golly said.

"You never came up the hard way. Like most old time radio inspectors, we were all radio operators who enjoyed the job, Morse men, listening to signals that were just sparrow farts! At Awarua Radio, at the bottom of the South Island, we regularly communicated with passenger liners while they were still in the Thames after leaving the London docks."

"In the good old days," Young Golly said sarcastically.

"Before I became a professional operator, I was a keen short wave listener on my three valve set which I made myself, plug-in coils, no digital read-out, just a 0 to 100 dial with pencil marks on it so I could remember where the stations were. I'd listen to anything, ships using Morse, I'd copy their telegrams. I listened on the amateur bands too, before I became an amateur myself. The Californian killowatt amateurs used 'phone, but there was a lot of Morse. A British guy in Tibet with the callsign AC4YN was the most famous amateur. The Australian short wave stations broadcast to their outback relaying ordinary broadcast programmes, like that radio serial, *Dad and Dave*. They don't make programmes like that anymore."

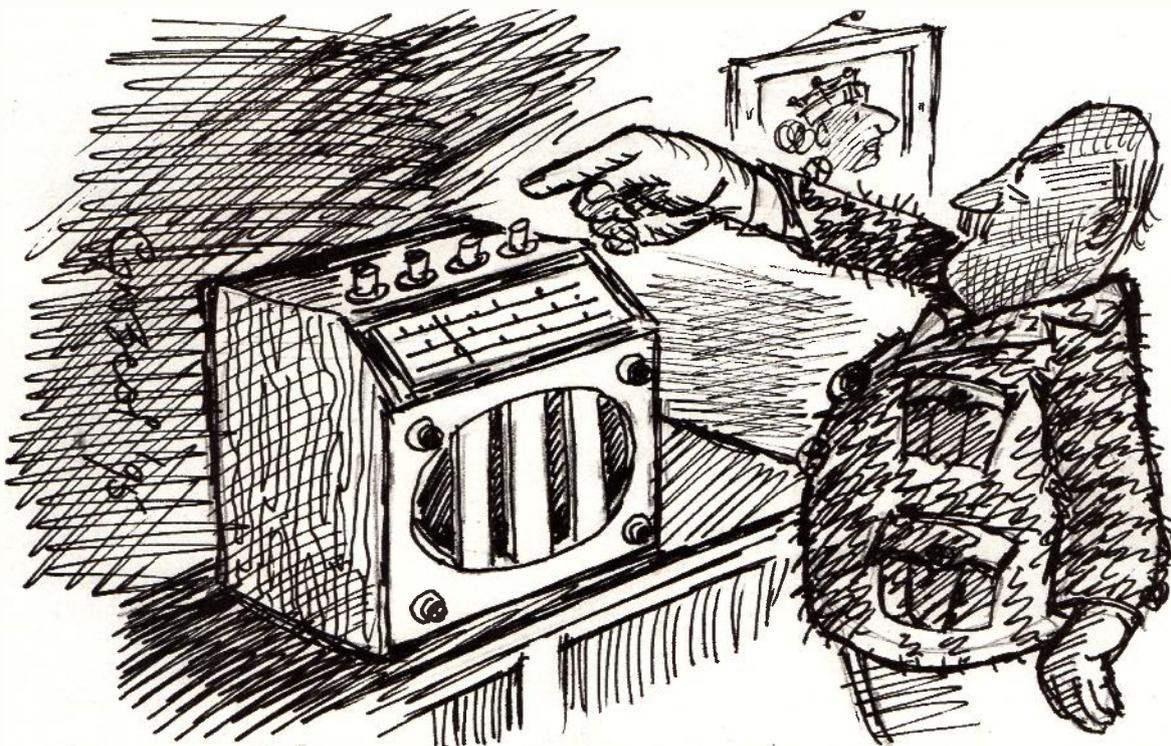
Young Golly sighed.

Kids Today

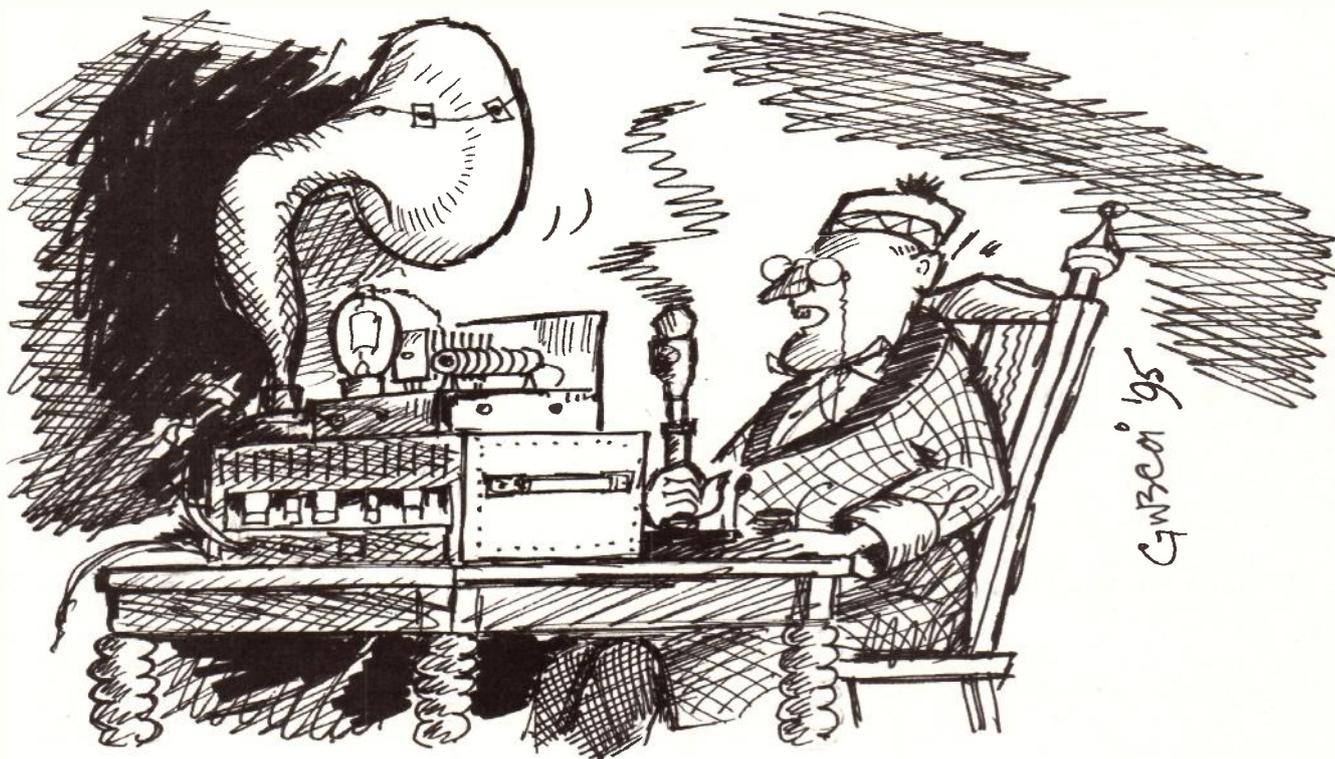
"I remember hearing on the American Armed Forces Radio a boxing match with Joe Louis fighting, sometime in the 1940s when I was a boy, I can't remember who he fought. I listened on 3MHz, on an Arc 5 aircraft receiver I got after the war, to the flying boats landing on Auckland harbour. And all those foreign languages, a thrill. You kids today miss so much, so blase, so sophisticated."

"Yeah," Young Golly said, bored.

"I didn't write away often, cost too much, threepence for an overseas letter in those days, but I had cards pinned to the wall. My mother used to complain about them ruining the wallpaper, but it was the best wallpaper as far as I was concerned! And I listened on the standard broadcast band to ZJV Suva, only 1920km away from here, but Fiji was exotic. In the late afternoon on the



Mr Perkins stabbed a button.



....Not all just kids either.....

broadcast band, signals rolled in from the Americas, like XERF Del Rio Texas. One of their preachers used to shout, 'Send one dollar and we'll pray for you'. You could even be sent a real diamond ring for five dollars. It was a 50kW clear channel station, came in as clear as a bell, but then there wasn't the electrical noise in those days."

"I thought we had cleaned up most of the noise with our interference regulations." Young Golly said.

"Still plenty out there, otherwise we'd be out of a job."

"That's a point," Young Golly agreed.

"Sacramento California used to come in loud and there was a station in Honolulu broadcasting from the Fish Bowl in Waikiki. There was also a programme, *Hawaii Calls*, broadcast from the Moana Hotel with Webley Edwards, Hawaiian music. You could hear the surf and the tradewinds, or was it just atmospheric noise?"

"Then there was 2UE Sydney, it transmitted all night. In those days all the New Zealand broadcasting stations closed down at 10pm, or midnight at the latest."

"If we don't get out of the

car we'll be here until midnight!" Young Golly said.

Ancient Radio

Mr Perkins was English. He might once have been in the army, a small grey moustache, red-faced, ramrod straight, wearing khaki serge trousers, a green duckshirt Harris tweed jacket with leather buttons.

The small flat was barely furnished, a narrow bed, neatly made, a copy of Queen Elizabeth II's coronation portrait on one wall.

The radio was an ancient valved Murphy in a mahogany cabinet, huge edge-lit dial, push-button band change switches.

Mr Perkins stabbed a button and tuned along the 31m band. "Listen to that noise, it's somebody using something!" he said, loudly.

Kilocycle Ken said, "The BBC World Service is available on the standard broadcast band, try 1386kHz."

"That's not the real BBC," Mr Perkins said scornfully. "The BBC should only be received on short wave, with crackles, whistles. BBC means Big Ben chiming through the static, announcements that they were broadcasting from Daventry,

the signal surging, but you knew you were listening to a station which was important, it meant something."

"Now they broadcast Megamix," Young Golly said rudely.

BBC News

"I listen to the BBC every day, get the news from Home, got a good financial programme, and at the end of it the announcer gives the London weather..... 'reporting from London on a cold and rainy evening'. Makes me almost cry."

"But there's no noise on the broadcast band," Kilocycle Ken said patiently. Always perfect reception, 24 hours a day, never have to change frequency as the h.f. stations change, small signals arriving short path direct, long path over the poles, bouncing off the ionosphere, multiple path reception, difficult. Sometimes it is impossible to receive on short wave because the transmissions are not beamed this way."

"It is a challenge," Mr Perkins said.

"So why complain about the interference, it is part of the game, if you like to call it that."

"It has been very bad lately,

external, local, around here, not the usual noises. I suspect the old woman next door is using hair curlers, mutton dressed as lamb, think she's got her eye on me."

Kilocycle Ken explained that radio inspectors didn't investigate short wave complaints, their job was to protect the local broadcasting stations, but nevertheless they would have a listen out.

"Don't tell the woman next door I'm complaining about her."

"Of course not," Kilocycle Ken said.

Young Golly said, "Mr Perkins reminds me of that television programme, *One Foot In The Grave*."

"The BBC gives him something to cling to," Kilocycle Ken said. "His past. Home."

Young Golly said, "Obviously he didn't make his fortune out here in the colony, if he ended up in a council flat."

"That could be the hell of it," Kilocycle Ken said sadly.



Ray Fautley G3ASG has always had a fascination for radio communication, ever since he was

Were You A VI Du

It wasn't surprising that the whole of the Second World War was spent in the radio industry testing and fault-finding equipment for the armed forces. Most of this period was spent at a shadow factory of Marconi's, W. T. Co. at Hackbridge in Surrey.

During this time, a radio friend asked me if I would like to swap my Home Guard out-of-working hours duties for something quite different, which he said was connected with radio. My curiosity fully aroused, so I jumped at it.

He asked me if I could read Morse, or if not, was I prepared to learn? Yes, was my answer to both questions as my Morse speed was not very high.

He gave me no idea of how this Morse reading could be used, and although after a few weeks of practice I managed to read up to twenty words a minute, I still had no idea what it was all for!

That is, until I received a visit at home from a somewhat serious gentleman who questioned me as to my place of birth and age, etc. This visit ended with me signing a paper which was connected with the Official Secrets Act.

I was told not to mention anything about this visit to anyone. Perhaps you can guess how my parents viewed these rather unusual happenings, especially as I was told not to discuss it with them.

Morse Signals

A little later, another visitor arrived who explained that I had been enrolled in the Radio Security Service (RSS) as a Voluntary Interceptor, or VI. This would entail my listening to Morse signals on a particular band of radio

frequencies at specific times and writing down what I heard.

To keep the service 'under wraps' as a civilian member of the RSS I would be given a Royal Observer Corps identity card and issued with an ROC uniform for use when attending the occasional VI local area group meetings. Thank goodness I was never asked to identify any aircraft!

It was at one of these

General Search

My job, as a VI, was called General Search (GS), which meant patrolling up and down the same 500kHz (kc/s) listening - for what? No information was given about what I was supposed to be listening for, so I wrote down everything I heard and hoped I was doing the right thing!

The morning following each evening watch, my log

“.....I was told not to mention anything about this visit to anyone.....”

group meetings that I met a pre-war amateur who had been a leading DX operator and a pathfinder in the 20s and 30s for the ten metre band - the late Nell Corry G2YL. She sent superb Morse and it was a hell of a job to keep up with her when she did the practice sending!

The relevant authorities would provide me with all the requisites including a radio set enabling Morse signals to be heard.

However, I had already built myself a superhet receiver, which included a tuned r.f. stage with plug-in coils and this turned out to be far better in performance than the sets issued to VIs at that time.

So, equipped with log and message pads, envelopes and postage stamps, I started to listen for two hours, four evenings a week, always on the same band, 7 to 7.5MHz (or rather Mc/s as it was then!).

sheets consisting of callsigns heard, preambles, 'chat', frequencies, times and any coded messages (recorded on the special message pads) were sealed in a "SECRET" envelope.

This envelope was then sealed inside another envelope which was sent to an address well etched into my memory, **PO Box 25, Barnet, Herts.** That's what the postage stamps were for!

It says much for the postal system during those terrible war days of persistent air raids and bombing. A log posted on say, Tuesday morning, would appear back on the front door mat on the Thursday morning, of the same week!

My log would have several different rubber stamp marks across the various callsigns such as 'SUSPECT', 'MORE PLEASE' or perhaps '2/345' or similar figures. Gradually I got to understand that 'SUSPECT'

meant that the famous 'Box 25' team at Barnet had probably not had this particular station reported before, 'MORE PLEASE' meant just that, try to find the same station again and report what it was sending.

The parts of my log stamped with a number, eg. 2/345, indicated that 'BOX 25' was aware of this particular service and already had it covered by other VIs whose job was known as Allotted Watch (AW). These VIs would listen for specific stations at specified times.

The messages copied were always in a code of some sort, often in five letter groups, sometimes in five figure groups and occasionally in mixed figure and letter groups.

After a few weeks of listening, I got to recognise some signals that were nearly always present, at the same time and on the same frequency, usually using the same callsign. These were mostly innocuous press stations sending in news reports to their various agencies, such as Reuters.

In time, I found to my surprise that I could 'pigeon-hole' various groups of operators by their 'fists', ie. by the way they sent their Morse signals. For example, I could recognise Russian operators by the way they sent figures, for they seemed to send rapid fire groups of dots with quite long dashes.

At the end of sending sessions, some operators would add various bits of extra personal information which, I think, probably helped in identifying them. This copy was referred to as 'chat'.

Some 30 years after the war had ended, so also ended the period of secrecy concerning the RSS and its operations. The following story of the importance of

about 12 years old, which has given him a profession and a life long hobby.

ing The War?



.....Somewhat serious gentleman.....

the VIs work, especially the General Search operators who listened to anything and everything, can now be told.

Radio Operators

In the beginning, many amateur radio operators who had been regularly communicating around the world using Morse code before the war were recruited into the RSS in various functions. In fact, it was a group of such amateurs who were members of the Radio Society of Great Britain (RSGB), together with a government department, that resulted in the formation of the RSS very early on in the war.

One of its functions was to attempt to locate enemy agents in this country who might use radio to contact their German authorities. It appears that very few actual spies were found by the VIs as these were located as soon as they arrived in this country by other organisations.

However, something a great deal more important than the location of a few spies was 'stumbled upon' (in the usual British bumbling way!) by the VIs listening all over the UK. It was the experience of a continually spreading network of German secret stations all over occupied Europe, as well as in neutral countries, with a few even in North and South America.

Messages between these stations were intercepted (quite unknowingly!) by the VIs and eventually the RSS, together with the famous Bletchly Park decoders put together details of the network. Many lives were saved by the information gained from 'listening in' to these stations.

Specific Instructions

When the invasion of occupied Europe drew near, VIs were given specific instructions where and what

to listen for after the news of the invasion had been made public. My own memory is that although I had no more knowledge of the invasion date than any other non-VIP, for the evening two hour watch before the invasion actually started, there was very, very little to listen to, except the well known news agency services. None of the 'suspicious' type of stations were received which seemed a bit odd, it was as if the ether had gone 'dead'.

Early the next morning the invasion actually started, followed very soon by its announcement on the BBC News. Why had the German services stopped transmitting, even before the invasion started? Was it a coincidence, or was it just me?

Future Re-Union

During 1979, the BBC produced a programme entitled *The Secret Listeners* about the formation of the

If you were involved in the war as a VI and wish to contact Ray, then write to him c/o the Editorial Offices, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

RSS and the activities of the VIs during the war. Transmitted on BBC2, it was a thirty minute documentary of which unfortunately I saw only about half.

Probably many ex-VIs never even saw it at all. Will the BBC ever give it another showing? I hope so because I think those of us still around who listened to all those 'dits' and 'dahs' so long ago could say 'That's what I did' in answer to the question 'What did you do in the war Daddy?'.

Finally, are there any of you out there who were VIs? I'd like to contact any of you still around. What about some sort of re-union some time in the near future? - while we're still able!

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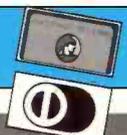


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Radio By Numbers

John Griffiths, our regular Scanning columnist, explains how radio has played more than a passing role in the murky world of espionage.

There is ample documentation to illustrate the fact that, on a daily basis, intelligence is gathered by ships, aircraft, satellites and listening posts throughout the world. If you've got it, then you can be certain somebody, somewhere, wants to know something about it.

Yet, despite all the technical advances of ELINT - ELectronics INTelligence - gathering, there is still a great need for HUMINT (HUMAN INTelligence). The fantasy world of authors like Ian Fleming and Tim Sebastian is reality for many thousands of people employed by organisations such as the well known and now defunct KGB, its military counterpart GRU, by DI5 and DI6 who are known in the UK, incorrectly, as MI5 & 6 by MOSSAD, the CIA, NSA and many, many more.

Organisations such as these provide careers for people and their nets are spread throughout the world. There are, however, other agents whose employment is never put on record and for whom a regular career ladder is something they will never set a foot on.

It is these people, known as traitors, spies who are recruited by 'the other side' for many and varied reasons who are the meat of this article. Without this army of ordinary agents, there is a certainty that the Intelligence Services would not function as efficiently as they do.

Numbers Stations

Changing tack slightly, you have almost certainly come across the many numbers stations operating in the h.f. spectrum. You don't even have to have a b.f.o. in order to pick-up many of these transmissions! These stations

are now the subject of amateur scrutiny via ENIGMA - The European Numbers Information Gathering and Monitoring Association, who, far from being any way in involved with the intelligence services of any country are just people, like myself, who are fascinated by the stations and banded together to pool what we knew.

I went further and delved into many books in order to discover if I could find out more. What I did, not only had me intrigued, it surprised me!

Radar Specialist

During the 60s, an ex RAF Flight Lieutenant by the name of Frank Brossard, who had been a radar specialist, worked in the Air Ministry. His work was involved with guided missiles and, quite obviously, he was handling very sensitive material indeed.

However, Brossard had problems. He was short of money and he liked to drink. It was these two factors which had the KGB approaching him to request that he make some 'drops' for them in return for financial reward. Brossard agreed. In all, he made nine such drops before he was caught in 1965. Sentenced to 21 years, it was later calculated that Brossard's Soviet connections had got very high quality information in considerable quantities indeed.

Brossard was instructed to make a drop, how, when, where, by a very easy code indeed. He would listen to Radio Moscow and when they played five songs in a row, such as 'Moscow Nights', 'The Volga Boat Song', he was to decipher the code on his pad, the result being his instructions. It was so easy that it probably escaped all but the most serious attention, and it certainly worked for

Brossard, as he was in Soviet hands for four years! It is just one example of how coded messages are sent.

Spy Kit

However, it isn't all one sided. In December of 1981 two Mexicans were stopped at Gatwick by Immigration. In their luggage was a wealth of very interesting stuff indeed, and very definitely a spy kit! Officers found Luis Garcia and Antonio Sanchez had over \$18 000, some false passports, a radio transmitter, code pads and instructions.

Whilst the unfortunate Mexicans were sentenced to seven years each, British Intelligence decided to use the radio to gather information of their own. With the aid of a Royal Navy warship on west Indies Station, the transmitted signal was DF'ed as was its reply. The triangulation pointed towards Havana, Cuba, and the text sent was identified as originating from a station calling itself RMA.

This was almost certainly a station operated by the DGI - Cuban Intelligence - which is almost a branch office of its KGB mentors. The text was sent in what is, to ENIGMA monitors, standard format of 95 x 5 letter groups. What the message was about, only British Intelligence knows!

Prime Catch

Sometimes, the murky world of the spy gets darker and Geoffrey Prime - who is still known as The GCHQ Spy - was no exception. Long before Prime got to GCHQ, he was 'employed' by the KGB, having approached a Red Army officer in Berlin while he was still in the RAF and offering his services. Prime was a good catch. Employed in the RAF

within SIGINT - Signals Intelligence - he provided the Soviets with good quality material. Yet there was much better to come.

After leaving the RAF, Geoffrey Prime was sent to East Berlin by his Soviet paymasters and underwent an espionage course. Once back in the UK, he was accepted by GCHQ at their London site, where he collated intelligence destined for Cheltenham. It was after Berlin that he gathered his spy kit together, comprising of a tape recorder, one-time deciphering pads and a short wave radio receiver. Prime would receive the numbers text from his controllers, decipher it on his pads and act upon it. It is simple enough if you know the formula.

In the fullness of time, Geoffrey Prime transferred to Cheltenham GCHQ and was given higher security clearance as well as being made Head of Section. This pleased his KGB handlers immensely and, summoning him to Vienna, he was asked to defect - being rewarded, if he did, with the rank of KGB Colonel and all that went with it. Prime refused. After all, he had much better conditions in the UK.

However, Prime did not tell his handlers of his worries. A 'spy catcher' trial in the US had exposed two spies and Prime felt it was too close to home for him. On his return to the UK he resigned from GCHQ - but not before handing over 500 photographs of highly sensitive documents indeed to his KGB mentors.

Prime, though 'retired' from GCHQ, and, in effect, from the KGB, was again asked to come to Vienna where he was paid for his previous work and also asked to rejoin GCHQ. Once more he refused. In 1981 he was asked to come to Potsdam, where £4000 exchanged hands and the



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....Very definitely a spy kit.....

request to return to his old job made again. This time, however, Prime had other worries.

It is well known that Prime's interest in young girls brought the spotlight on to him. A paedophile, he had catalogued a massive 'library' of home address and telephone numbers, which he intended to follow up. He did, however, lose control and attempted to attack a young girl. The girl screamed, Prime panicked and he quickly left the scene. Not before the intended victim had had a good look at him, however.

West Mercia Police were also on the lookout for a 'pest' and Prime seemed to fit the bill for it. Interviewed, he probably put his espionage training to good use and fooled the police. It got him off - but the strain

proved too much and he made a confession to his wife about his deviancy and his activities as a spy. In November of 1982 Geoffrey Prime was given 38 years in jail, 34 for his espionage and four for his attack.

The depth of the damage done to Intelligence was never fully revealed. As a result, GCHQ now give staff a polygraph as well as frequent positive vetting during recruitment and also during service.

Unique Method

So, these number stations carry messages which are certainly intended for spies, all over the world. With the range of short wave transmissions, the cheapness of equipment, it is

- KGB - Komitet Gosudarstvennoi Bezopastnosti. State Security Directorate
- GRU - Glavnoye Razvedyvatelnoye Upravleniye. Military Intelligence
- CIA - Central Intelligence Agency
- NSA - National Security Agency
- GCHQ - Government Communications Head Quarters

obvious that number stations will be continuing their unique method of contact. After all, a cheap Russian made Selena Vega 215 can easily pick-up RCS. You certainly do not need the 'super-duper' mini radios used by the likes of James Bond!

If you listen in to the honey-voiced ladies on the air - like the sensual 'Lincolnshire Poacher', who gets her name from the signature tune played before broadcasts, or the exotic Yankee Hotel Foxtrot with her endearing vocal inflections - who knows who you are listening to? DI5? DI6? NSA? DGI? KGB?

The fact that you are intercepting a coded message to someone is, at least for me, something of a thrill. What it means is beyond

me, but within ENIGMA, we must surely have amateur cryptographers and analysts who may well have broken the codes! It's a pity there is no way to find out if we have!

As a monitor, I sit, sometimes for hours, trying to search for alterations in the messages which signify change. Finding an alteration may well mean that a different pattern is about to begin. Sometimes, when stations go off the air for no reason, you wonder if they've been 'silenced'. For me, and I'm sure for many other ENIGMA monitors, it is an adjunct to short wave listening that is, like the messages themselves, a little bit out of the ordinary.

To many others, perhaps crouched over a radio in some freezing attic or in some domestic location with a pen and a pad at their side, the numbers mean something very different indeed.....

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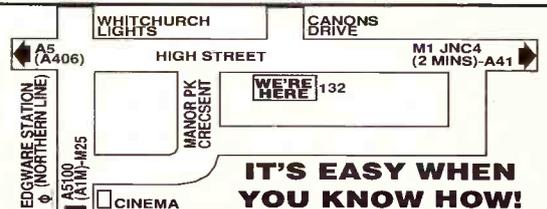
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The 'Command' Sets *Revisited*

More historical radios. Ben Nock G4BXD, takes a look at the Command series of receivers and transmitters that originated in the USA in the mid 1930s.

The well known 'Command' series of receivers and transmitters has been well documented over the years but the more recent members of the collecting/restoring game might be interested in a few points regarding these sets. Designed by the Aircraft Radio Corporation of the USA they began life around 1936/37. After a series of short run production units of a RAT/RAV set built for the Navy the more well known Command series evolved. In 1940 Command sets with the nomenclature ATA and ARA for transmitters and receivers appeared, these were all finished in black

crackle paintwork. After May 1940 the Signal Corps bought the same sets with the nomenclature SCR-274N, the N indicating Navy. These sets were supplied both in black crinkle and plain aluminium finish. From 1943 onwards the US Navy acquired an improved version, the AN/ARC-5, finished in black. The receivers, the various models virtually identical save for the frequency determining components, covered from 190kHz to 27MHz in seven ranges. The receiver had its power dynamotor fitted to the rear of the set, this is the main item often missing on surplus examples. A 30-40MHz version was constructed in the UK

from a BC-455, it was designed to receive the UK instrument landing signals being used at the time in the UK. The option, however, was never taken up by the US users.

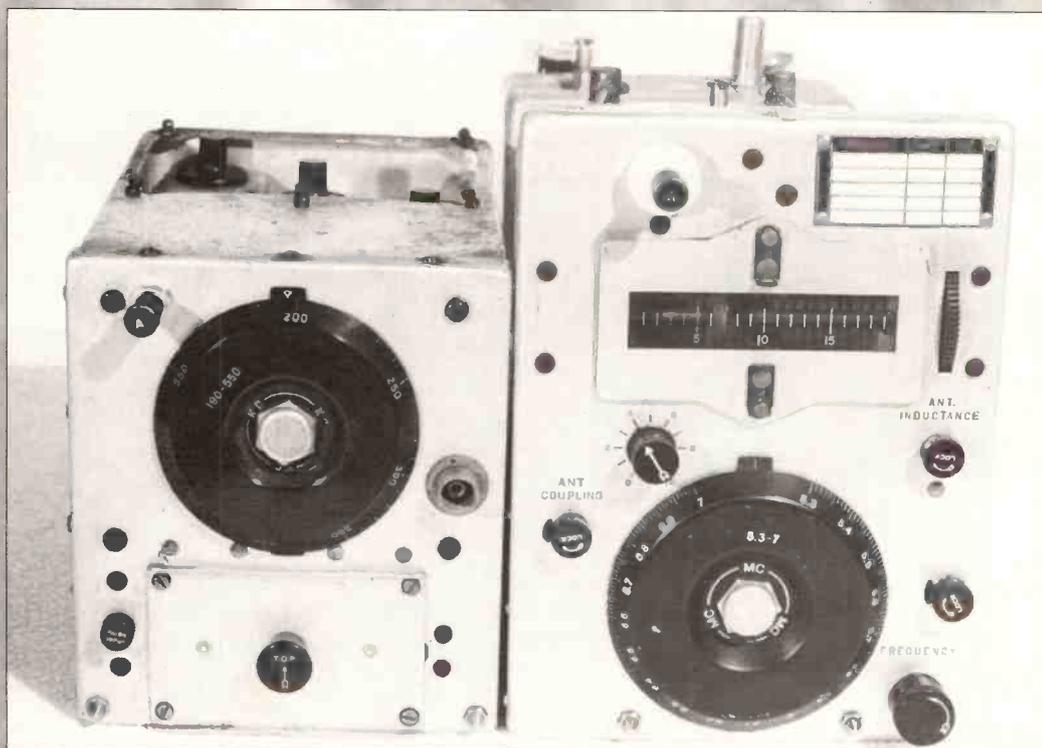
What's Inside?

The receivers use six valves in a conventional superhet design, r.f. - mixer/oscillator - two i.f. stages - Detector/b.f.o. - a.f., and have the minimum of controls, tuning, antenna tuning, b.f.o. on/off and rf/i.f gain. These controls could be remotely operated from the control box. The transmitter is of a simple robust design, a triode acting as a master oscillator drives a pair of

1625s, this is an 807 valve with a 12V heater on a 7 - pin base. The oscillator operates in a Hartley configuration and there is the added refinement of a magic eye valve. This is used to check dial calibration against a crystal fitted in the set. There are no buffer valves or multipliers, the oscillator drives the p.a. directly. It must be said that the sets were expertly designed, the stability of the oscillator is excellent in itself but added to this is the fact that there is very little pulling of the oscillator frequency by either the p.a. or antenna loading. The p.a. on the ATA and SCR-274N units were amplitude modulated on the screen grids only where as the ARC-5 units had anode and screen modulation applied. The r.f. output of the units varied depending upon model and frequency coverage, but was never much more than 20W.

Variants and Accessories

The photographs show a BC-458-A transmitter, external and internal views, along side a BC-453-B receiver of the same series for comparison. The under view of the



Left to right, BC-453-B receiver, BC-458-A transmitter.

Command transmitter BC-458-A underside view showing the ganged v.f.o. and p.a. tuning mechanism.

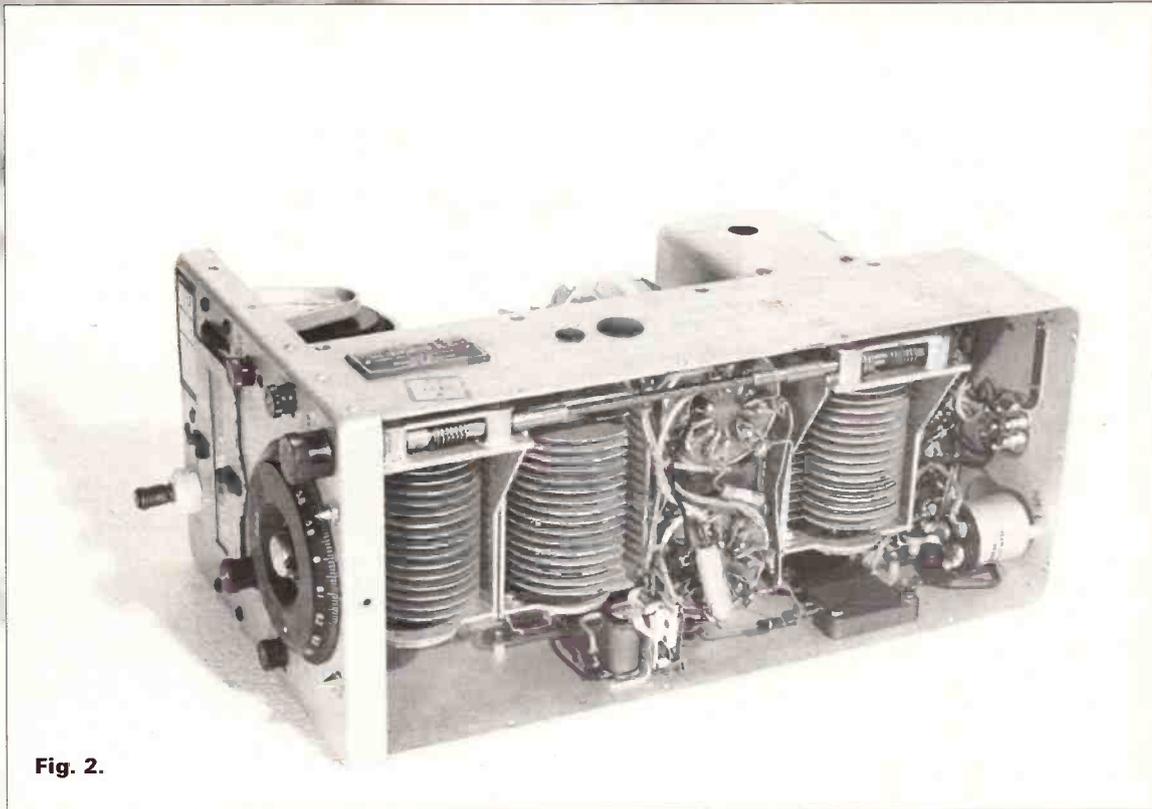


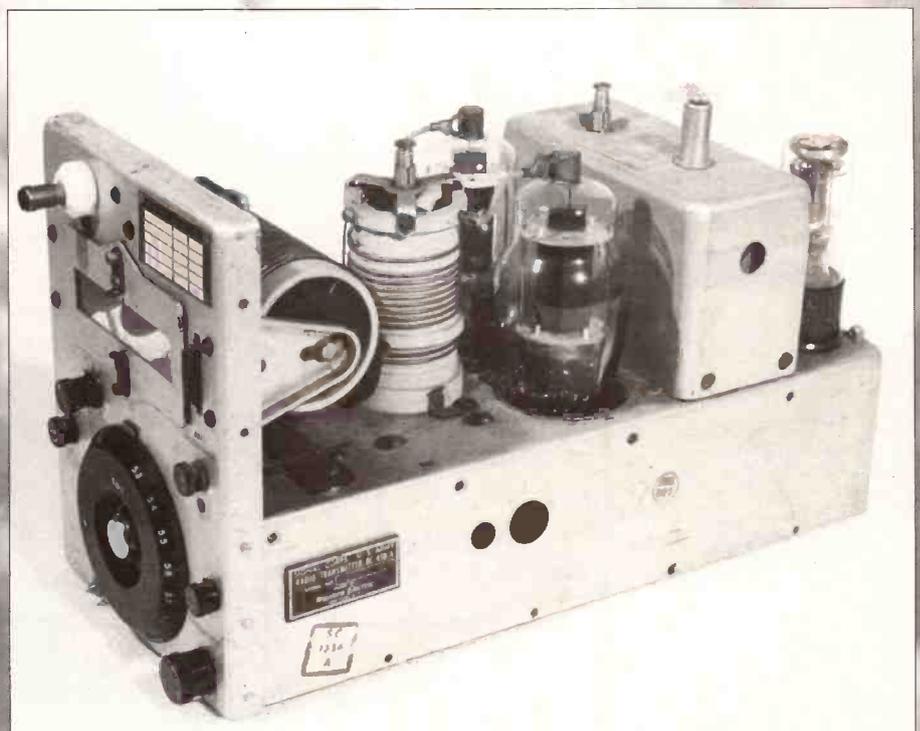
Fig. 2.

transmitter shows the oscillator tuning capacitor near the rear of the set, the two large valve bases in the centre being for the 1625s. The p.a. tuning capacitor is situated nearest the front of the set, the relay in the centre switching the p.a. cathodes and oscillator h.t. A further relay mounted behind the front wall connected the antenna to the transmitter on transmission. A typical full station set-up could comprised three receivers, the BC-453-B (190-550kHz), a BC-454-B (3-6MHz), a BC-455-B (6-9.1MHz), one to four transmitters, BC-696-A (3-4MHz), 457-A (4-5.3MHz), 458-A (5.3-7 MHz) and a 459-A (7-9.1MHz). As many as eight receivers could be installed in certain situations. Also fitted would be a control box (BC-450-A) that contained the receiver frequency indicators - the receivers being remotely tuned from the

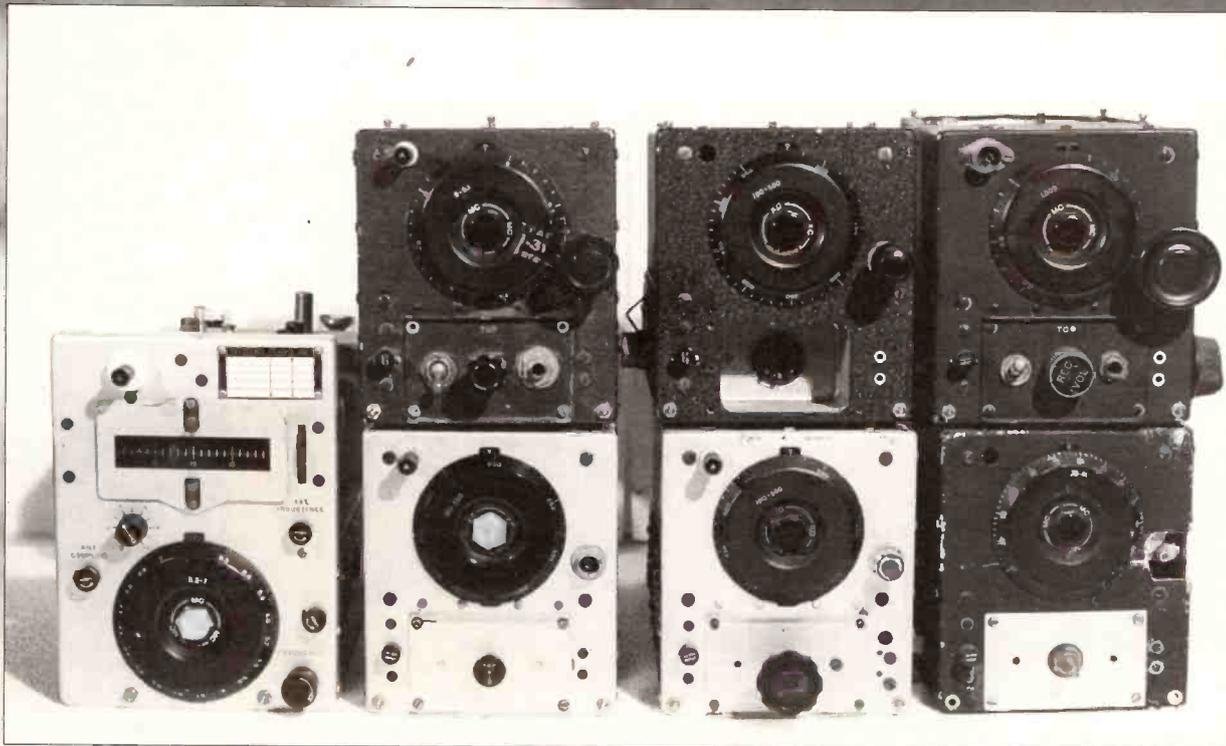
control box, an antenna relay unit (BC-442-A), a radio control box (BC-451-A) and a modulation unit (BC-456-A) which also housed the h.t. dynamotor supplying power for the transmitters. A number of mounting plates for various combinations of receivers and transmitters were also available. The transmitters, like

the receivers, had very few controls, the transmitter has a frequency adjustment and an antenna loading and tuning. p.a. tuning was mechanically coupled to the oscillator tuning so that the p.a. was always in tune with the oscillator at all frequencies. The sets, despite the very high quality and simplicity of design and use,

were short lived. The WWII conflict saw them widely used in all forms of aircraft but the rapid advancement of technology and the increasing demands upon frequencies and operation saw the development of more sophisticated equipment with even the use of the British v.h.f. radios to take the place of the command set



A well preserved example of the Command Transmitter from Ben's collection. Note the early serial number.



A range of command sets. From left to right they are:
 BC-458-A,
 5.3-7MHz;
 BC-453-B,
 180-550kHz;
 BC-453-B,
 180-550kHz;
 BC-455-B,
 25-4-10MHz;
 BC-455-A
 4-8-10MHz;
 ARA
 CBY-46125,
 130kHz-45A
 CBY-46104,
 1-8-10MHz

in certain roles. For anyone who would like to try and fire up a Command transmitter, the 7-pin plug on the rear connections are shown in

Table 1:

| Pin | Function |
|-----|---|
| 2 | oscillator h.t. (200V), |
| 3 | grounded to transmit, |
| 4 | ground, |
| 5 | ±12V (assuming the set has been changed over from the original 24V requirement) |
| 6 | p.a. screen grid either modulated or straight h.t., |
| 7 | (centre pin) - p.a. h.t. modulated or straight (400V). |

For c.w. use the actual p.a. h.t. supply is keyed ! The receiver, again assuming the 12V mod has been done, will need 12V at about 1A and 200-250V h.t. at 40mA. If the 3 - pin dynamotor plug is still in place on the rear drop of the set then the pin nearest the rear is ground, looking from the front the left hand pin is l.t. and the right h.t. If the control box controls have not been added to the front of the set you will

need the connections from the 8 - pin plug behind the lower front panel as shown in

Table 2:

| Pin | Function |
|-----|---|
| 1 | ground via a 50kΩ pot |
| 2 | ground |
| 4 | audio o/p |
| 5 | ground via a s.p.s.t. switch (closed - b.f.o. off, open - b.f.o. on). |

These sets, despite their age and simplicity are a pleasure to use. Considering the small and simple p.s.u. required for the receiver one of these sets could prove an interesting talking point located on any modern day collector's shelf.

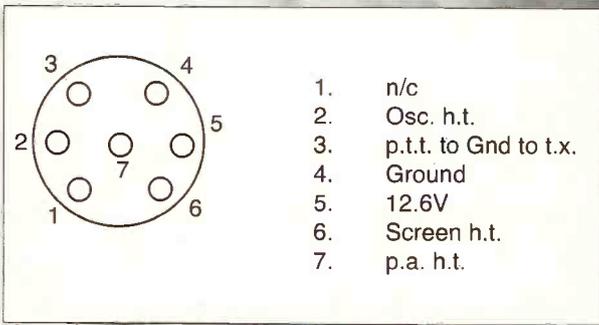


Fig. 2: Power supply socket AR-5 Command transmitter

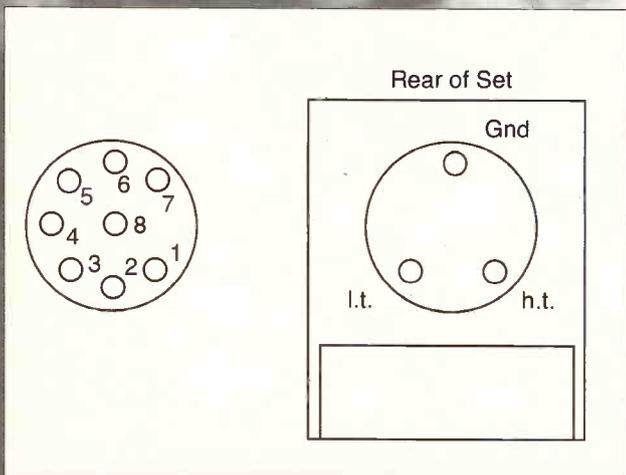


Fig. 1: Power connections and facilities for the Command series receivers.

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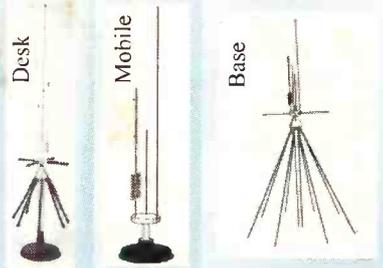
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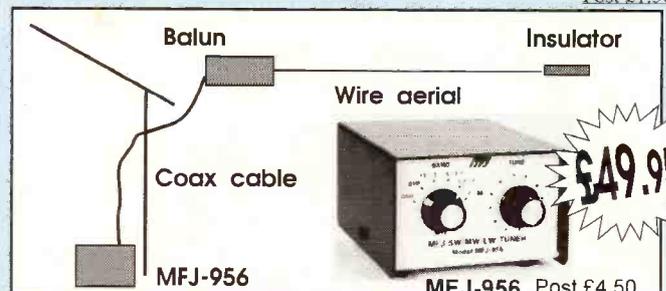
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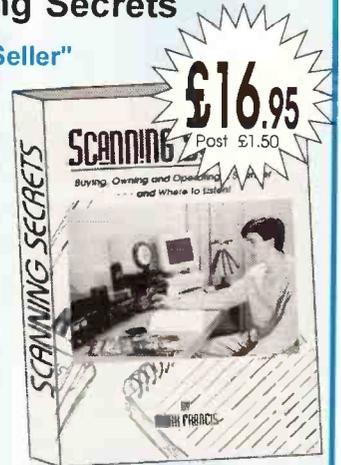
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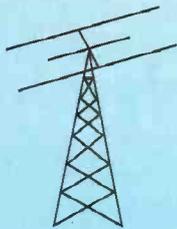
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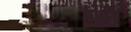
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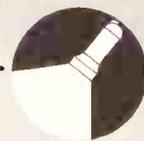
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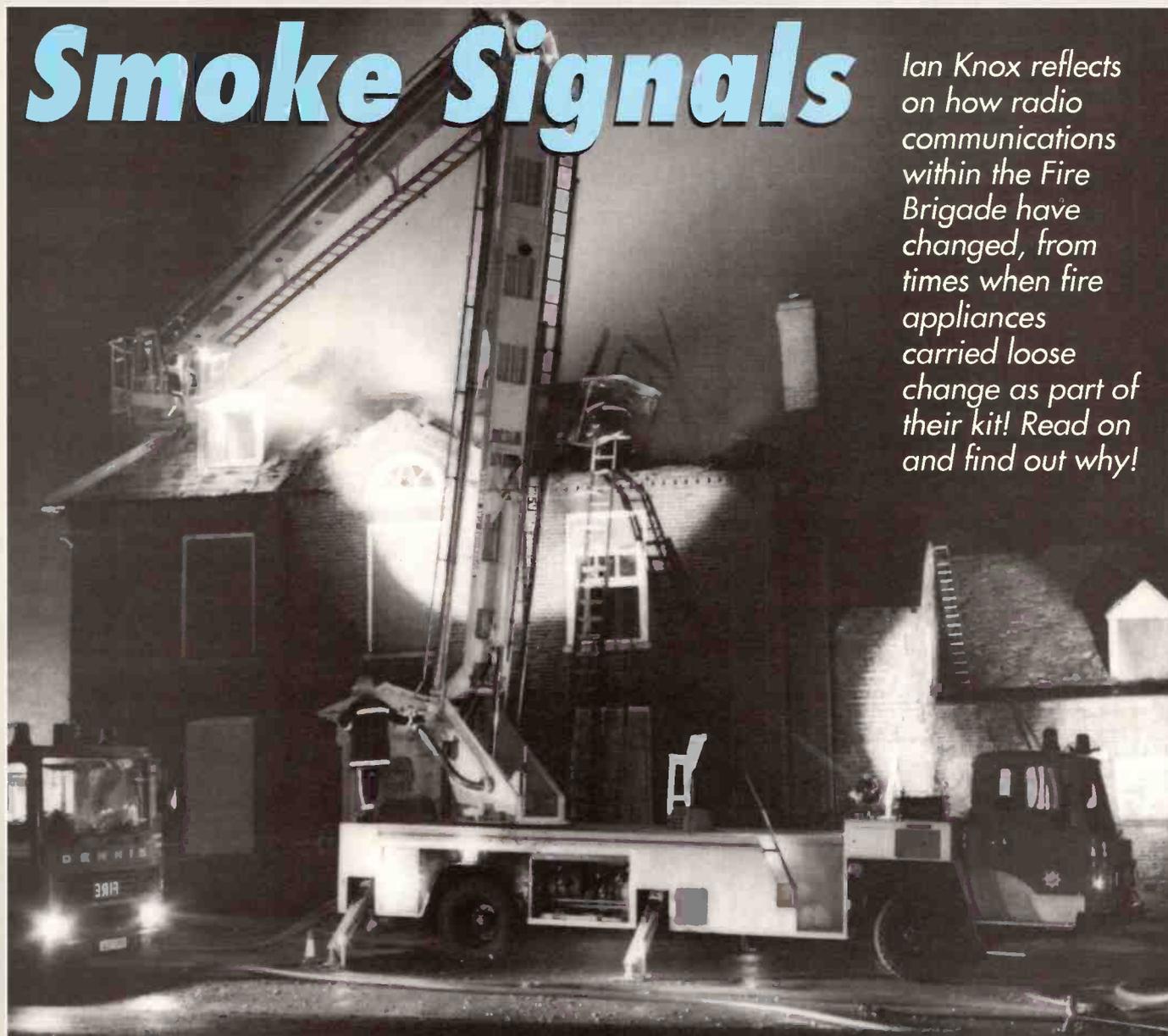
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ES&C



Smoke Signals

Ian Knox reflects on how radio communications within the Fire Brigade have changed, from times when fire appliances carried loose change as part of their kit! Read on and find out why!



With the number of emergency calls made to our Fire Brigades around the country increasing on a daily basis and the nature of incidents becoming more and more complex, today's modern Fire Brigades rely heavily on their radio schemes for communication and call-out facilities.

In days gone by, the method used to relay messages from the scene of a fire to the local City or Borough Fire Brigade's control room was via the telephone network and fire appliances carried loose change as part of their kit! It

wasn't until the mid-1950s that local Fire Brigades were equipped with radios and even then this was a shared system with the Police.

Eventually, in the mid-1970s, the Fire Brigades around Britain went 'state-of-the-art' and almost without exception, all fire appliances were fitted with radio sets tuned to dedicated Fire Brigade frequencies. It was around this time also that the call-out sirens around our towns and villages fell silent, as the part-time (retained) firefighters were now being called from their homes or places of work to the local fire stations by their new pocket radio alerters.

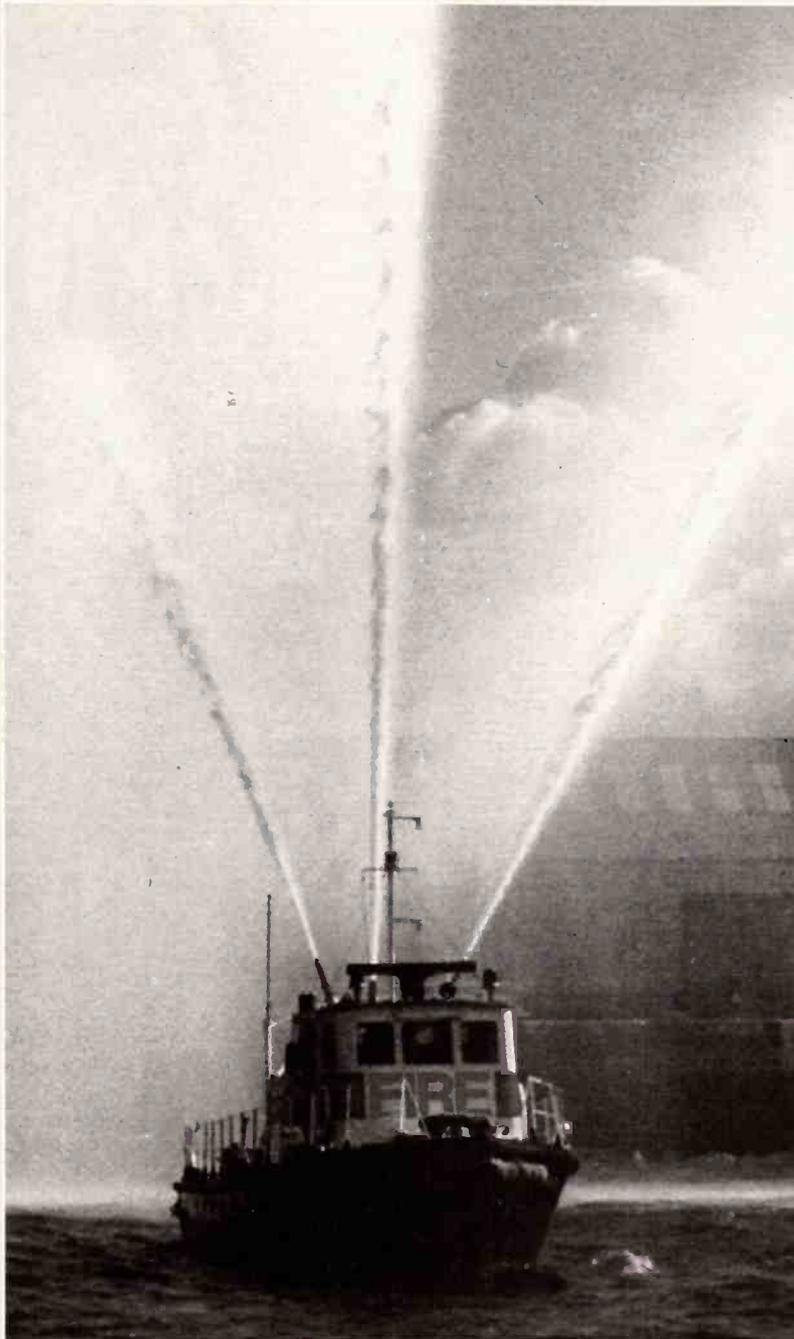
Further Modernisation

The mid-1970s brought further modernisation to the Fire Brigades as the older City and Borough Brigades, each having their own individual local control room, were amalgamated into larger, more efficient Metropolitan, Shire or County Brigades utilising just one centralised control room to handle and process the incoming emergency calls, the mobilisation of the appliances and the communications to and from the appliances for the whole of their region.

The compliment of fire appliances housed at any one of the larger brigades fire stations varied from just a

"Make pumps four, hydraulic platform required". This scenario depicts a typical 'make-up' type incident, as described in the article.

single fire engine, based at one of its many small village stations and manned by the retained firefighters called out by their 'bleepers', to a large city station, housing as many as six or more appliances including specialist fire and rescue vehicles, such as hydraulic platforms, rescue tenders or turntable ladders. Each one manned 24 hours a day by professional wholtime firefighters.



This fire boat had the callsign Fire Boat 39 and also carried a Marine band v.h.f. radio for communication with the Marine Emergency Services, together with its dedicated radio for the Fire Brigade Radio Scheme.

Unique Callsign

Each of these appliances within its county is assigned its own unique callsign. This callsign is generally derived from the type of appliance it is and the station at which it is based, also known as its home station. As an example, the first or front line appliance of one of our larger county brigade's takes its callsign from its home station's number. This home station number basically depends on the number of fire stations within the county.

If, for instance, the county in question has 48 fire stations,

then the callsign of the first or front line appliance for each of these 48 stations would be 01 to 48. Thus if the small village fire station's number is 21, then its fire engine's callsign is 21.

Likewise, the larger town or city fire station within that brigade housing more than one appliance is also allocated its own station number. Therefore, its first line firefighting appliance takes that number as its callsign.

The station number is also used in the other appliances callsigns bases at the same station, but is prefixed by another number identifying the type of appliance it is. For

instance, a hydraulic platform has the prefix 7, and if based at station 48, would have the callsign 748. Similarly, a rescue tender, prefix 3, from the same station would take the callsign 348.

Amongst the other more commonly called on appliances are the stations second firefighting appliance, prefix 1, the emergency tender, prefix 9 and the turntable ladder, prefix 10.

Booking Mobile

Once an appliance is turned out to an incident and whilst dealing with that incident, the messages that are sent back and forth between the appliances and control are kept

strictly to operational and procedural requirements and are of a set format.

As the initial call out is usually sent to the local fire station via teleprinter from a regional brigade control room, the first radio message sent, is back to the control room to inform them that the appliance is en-route to the incident. This procedure is known as 'booking mobile' and includes the details on the teleprinter message, the name of the officer in charge of the appliance and the number of crew onboard.

Once 'booked mobile', nothing is heard from that appliance until it arrives at the

incident and the message 'in attendance' is sent to inform control they have arrived. Depending on the nature of the incident, the sub-officer in charge will decide whether he can manage the situation with the men and equipment he has to hand and send a 'stop message' informing control that no further assistance is required at this incident.

Assistance Message

Alternatively, if the sub-officer is faced with a situation needing more equipment or manpower, then an 'assistance message' is sent back to control with the request for further appliances, etc. as required. Again these messages are of a set format which cuts down on amongst other things air time; vital when one control room is handling the emergency calls for a whole county.

The 'stop message' will include the name of the officer in charge, the address of the incident and the equipment in use, ie. the number of breathing apparatus and hoses for example. Another option open to the officer in charge, which further cuts down on valuable air time, is known as the 'H report' in which a coded message such as 'Lima 3' is sent from the incident back to control.

Coded Messages

These coded messages are only used when such things as scrub, heathland or rubbish are involved in fire and would not necessitate a full fire report. In the case of the 'Lima 3' message, the 'Lima' indicates what is involved in the fire and the '3' the means of putting it out such as water from hosereels or bucket, etc. This ▶

would be sent back in the form 'ZD from 21 stop message over'. Control would then acknowledge and the message 'From leading firefighter Smith, stop for waste ground, Copsley Grove Hightown, H report form Lima 3' would be passed.

An 'assistance message' is sent to control when further appliances or manpower is required at the incident. This type of message is known as a 'make-up' and would be sent using the terminology, 'Make pumps three, hydraulic platform required'. The officer in charge of the incident is asking for two more pumping appliances and one hydraulic platform to be mobilised to the incident. Assistance from other utility services such as the gas or electricity boards would also be requested in the 'assistance messages'.

Once the extent of the incident has been assessed, an 'informative message' is relayed to control, informing them of such things as the size of the building involved, to what extent the fire has taken hold, what equipment is in use and whether all persons are accounted for. It is now

unknown for the officer in charge of an appliance to put back a brief informative when he books 'in attendance' in the form of '21 in attendance, smoke issuing', or '21 in attendance, building well alight', warning control that other appliances may well be required.

Contact Point

When more than one appliance is in attendance at an incident, only one will act as the contact point, and all radio messages are passed through this fire appliances radio set. The appliance acting as the contact point leaves its blue lights flashing, indicating its purpose to the firefighters at the scene of the incident, and all other radio sets are turned off.

At larger more protracted incidents, a specialised control unit is brought in to manage the communications between the fireground and brigade control with any further 'assistance or informative messages' sent as necessary to keep brigade control apprised of the situation and

bring in further appliances as required.

As before, when the incident is brought under control, a 'stop message' is sent, and operations scaled down. As appliances are released from the incident, they book 'mobile to home station'. This indicates to control that they are available to take on further calls, should they be required, allowing control to release any fire appliances drafted in to cover the area to resume to their own station ground.

Home Station

On arrival back at station, the appliance is booked off radio watch by the message, 'closing home station'. The fire appliance is then available for call again, via the fire station's teleprinter system.

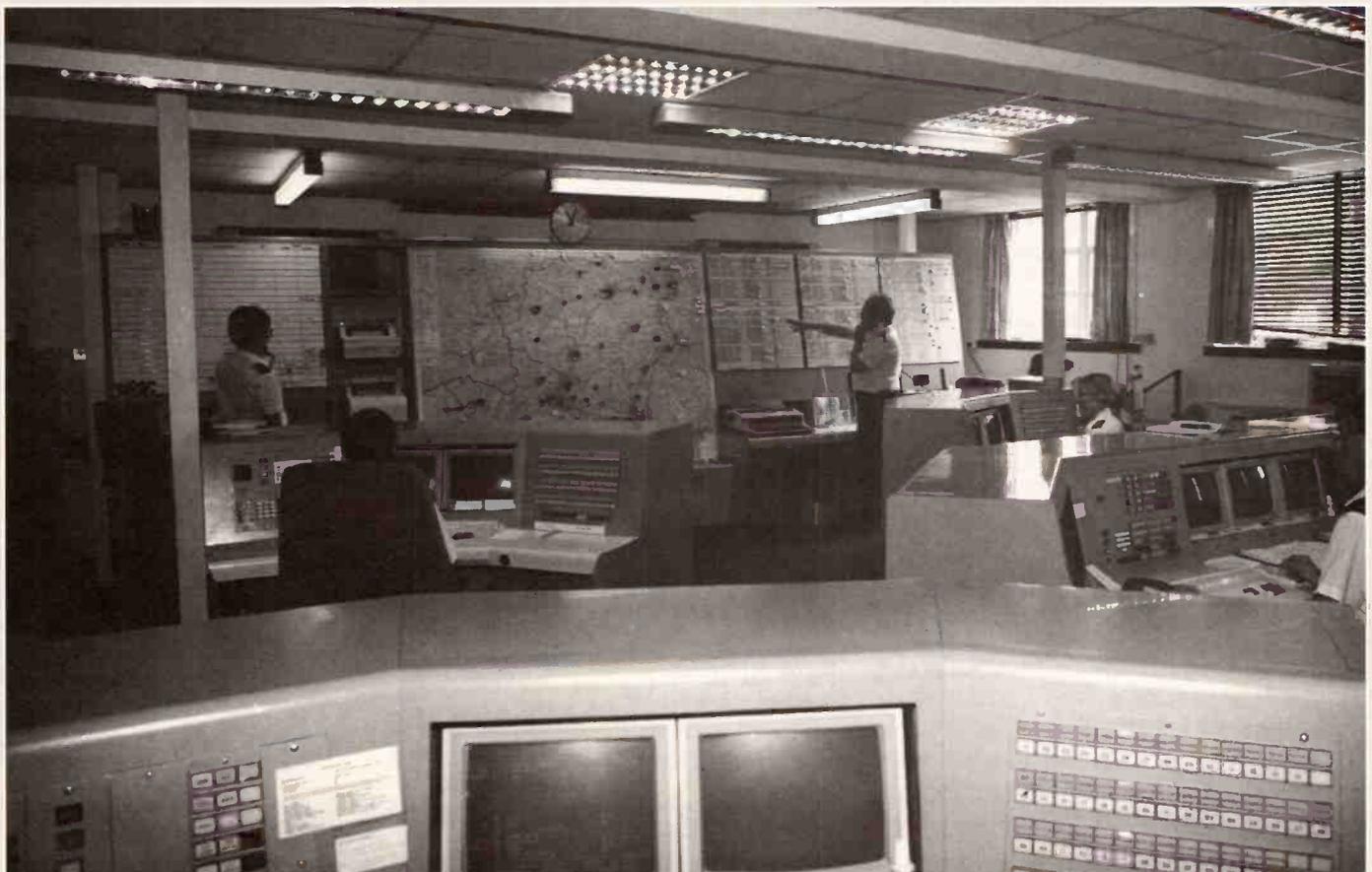
For the future, some brigades have already invested in 'push-button' technology for the routine messages such as 'booking mobile', 'in attendance' and 'closing home station'. Some brigades are also fitting radio linked teleprinters to the cabs of their appliances giving firefighters

on the ground instant access to such details as the nature of the buildings they are attending, or hard copy of information on today's many volatile and dangerous chemicals they are called upon to deal with.

Technology is so essential when we think of the old adage 'send reinforcements, we're going to advance' and the complexity of the messages sent and received in a busy fire and rescue service. ■

Control Room, handling an incoming emergency call and mobilising appliances to the incident.

(All photos courtesy of Hampshire County Council Fire & Rescue Service).





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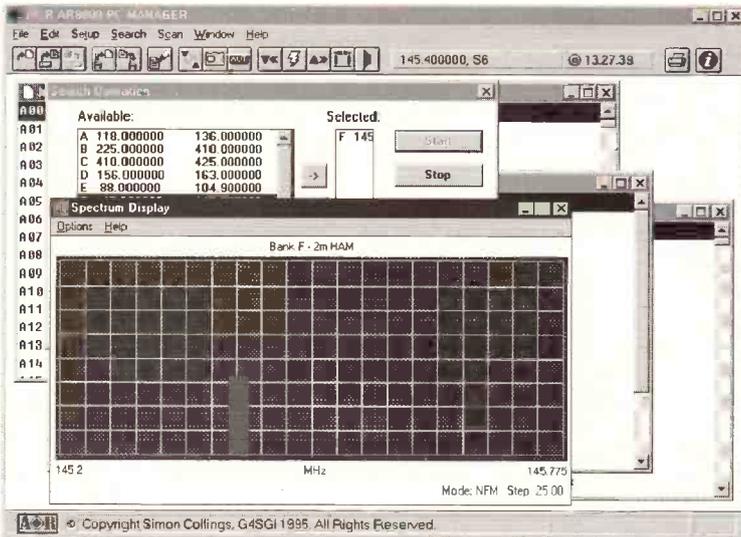
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PC-MANAGER for WINDOWS

New WINDOWS software package for the AR8000 & AR2700

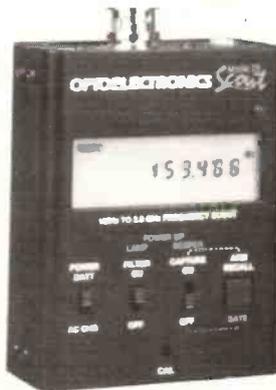


We are happy to announce the arrival of the new WINDOWS management software package for remote control of the AR8000 & AR2700 using an IBM compatible computer running Windows 3.xx or Windows/95. Facilities include memory/search bank upload, download, editing, sorting, automode bandplan data change, spectrum display and sound recording to disk (also requires CU8232 interface or equivalent plus serial lead).

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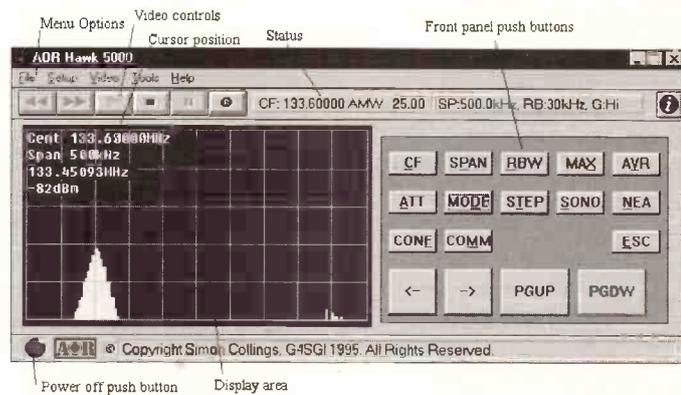
Of particular interest to operators of the AR2700 & AR8000 is the ability to connect the **Scout** directly to the receiver (small modification required) so that active frequencies are automatically fed to the AOR receiver which immediately jumps to the active frequency reported by the **Scout**, this feature is called **REACTION TUNE**. **Scout £399**

The **AR3030** short wave receiver provides coverage from 30 kHz - 30 MHz with all mode receive. The legendary 6 kHz mechanical AM filter is fitted as standard along with a 2.4 kHz Murata filter for SSB and an additional filter for NFM. Stability is excellent due to the standard fitting of a TCXO.

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HAWK-5000 for WINDOWS

New WINDOWS software package for the SDU5000



HAWK-5000 is a brand new PC control package for the SDU5000 spectrum display unit. HAWK-5000 will work in conjunction with the AR3000A plus ICOM ICR7100 receivers. Video frames may be stored to disk for replay at a later date and SONOGRAM makes identification of signal changes very easy. Spectrum data can be processed by HAWK-5000 to produce channel occupancy for export into formats suitable for other AOR packages so providing automatic loading of memory channels. The computer must be a minimum of 486DX66 IBM compatible with fast graphics and running Windows 3.xx or Windows/95 (also requires a serial lead).

A necessity for the professional listener.

HAWK-5000 for WINDOWS £99 + £3 P&P

The **SDU5000** is a spectrum display unit designed with the AR3000A, ICOM R7000, R7100 & R9000 in mind. It will also be ported for the new AR5000.

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(customised version) £995**



AOR AR5000 – "The new horizon"
New wide band all mode base receiver



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AOR AR7030 – "Superior by design"
New high dynamic range short wave receiver



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AR8000 UK
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TIP OF THE MONTH

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One such company is: E.S.P. Batteries, 565 Uppingham Road, Leicester LE5 6QA. Tel: 0116 241 3796.

Simply contact them to confirm price etc, then forward your old NiCad pack. The connector is used to produce the new pack which will duly be returned to you (providing you pay for the service of course) ready to plug into your AR800E (no soldering is required by you at all). Prices are quite reasonable. Please contact E.S.P. for details or other UK battery re-manufacturers for a quotation.



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TOP SECRET

Radio Secrets of the War

The Young Linguists

David White G3ZPA tells the story of the three young ladies who could speak fluent German. He then recounts the goings on at Whaddon Hall.

In the far off days of early 1940, three young ladies decided to volunteer their services to king and country and enrolled in the Women's Auxiliary Air Force (WAAF). It was not long before the WAAF authorities discovered that the three girls - who did not know each other then - had one unique talent that made them very much sought after. They all spoke German fluently. This ability unwittingly put them in at the forefront of the beginnings of the radio war, which was about to start as the Battle of Britain loomed near.

Early in 1940, the British Air Ministry had decided to set up a radio eavesdropping station at RAF Hawkinge near Folkestone, Kent in an endeavour to listen to German voice transmissions and all kinds of signals other than Morse code. The communications receivers supplied were made by Hallicrafters and covered the whole of the v.h.f. bands, which was indeed fortunate as in May 1940 voice transmissions were heard on 41MHz coming from German Stuka dive bombers.

After a few days of ever more and louder signals, it was realised that nobody could actually speak or understand the German language properly. The Air Ministry, realising that this was an amazing oversight on their part, hastily searched for German speaking linguists amongst service personnel and made a decision at the beginning of June 1940 not only to expand the RAF Y Service, but it was felt that this was where the WAAF service

could be most valuable. Accordingly, a language expert was sent to the camp at Ruislip in Middlesex to interview likely candidates.

Maypole Cottage

Some of these selected WAAF were sent to Hawkinge and by mid-July there were about 16 of them at the house - 'Maypole Cottage' - just outside the airfield perimeter. The three girls arrived at Hawkinge knowing absolutely nothing about radio whatsoever, but were immediately given intensive training by experienced RAF (male) W/T operators and literally thrown in at the deep end so to speak.

As soon as the radio operator picked up a German voice transmission he would immediately call out 'got one' and one of the girls would immediately write down the message in a log book and translate it. As time went by, the girls became very experienced in tuning the complicated Hallicrafter receivers and were able to search and listen on their own.

All logs would be sent by despatch rider twice a day to Station X at Bletchley Park and the Air Ministry in London and telephone messages were sent to Nr 11 Group at RAF Uxbridge. By August, the bombing was so intense on Hawkinge that it was decided to relocate all the WAAF personnel to a newly acquired site at West Kingsdown on the Kentish Downs leaving the male wireless operators to brave it out at Hawkinge.

Eavesdropping

West Kingsdown became the headquarters of the R/T eavesdropping service, known as Nr 63 Wireless Unit of the RAF. This was linked to the main W/T Headquarters Nr 61 Wireless Unit at Cheadle near Stoke-on-Trent. The girls often listened in to the German fighter pilots and could hear them issuing attacking orders on their FUG16 v.h.f. radio sets, which covered 38 to 43MHz, but felt powerless because they could also hear the radio transmissions of the Spitfire and Hurricane pilots, but could not warn them of an imminent attack by the high flying Messerschmitt fighters.

All the British fighter groups covering the south of England came increasingly to appreciate the value of the information supplied by the radio eavesdropping station at Kingsdown and put pressure on the Air Ministry for more of this which resulted in the Air Ministry approving the creation of several small coastal intercept stations, given the code name of Home Defence Unit (HDU) to ensure that all German Luftwaffe voice transmissions were given complete coverage.

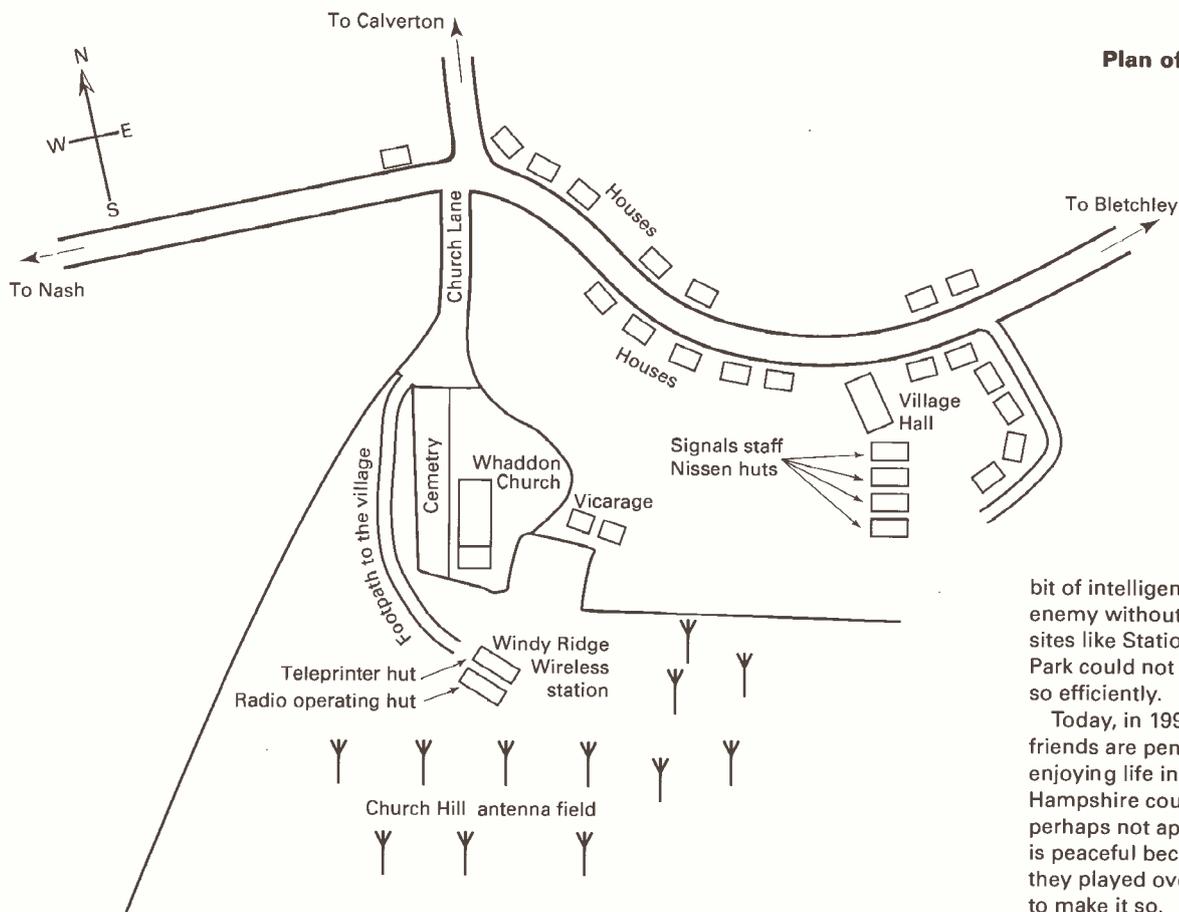
The HDUs were set up at Strete near Kingsbridge in Devon, Gorleston near Great Yarmouth, Scarborough on the east Yorkshire coast, Beachy Head near Eastbourne and Ingoldmells near Skegness on the Lincolnshire coast. These HDUs were all connected to West Kingsdown by telephone to give advance warning and the three girls - who by now

had got to know each other - were posted to these units as by the end of 1940. They were now very experienced radio operators as well as knowing all the code and swear words that the German pilots were using!

Elizabeth Jones (I'm using their present day married names) was sent to Gorleston HDU, which had taken over Gorleston House near the Lynx pub and was immediately put on 24 hour watches with each watch consisting of five German speaking R/T operators and one W/T operator who did not speak German but listened for the German Knickebein navigation beams and any Morse code transmissions. They also kept the Great Yarmouth Navy Intelligence Headquarters informed of the presence of German E-boats so that the naval OIC could despatch the equally fast British motor torpedo boats (MTBs) to try to intercept them.

It was very demanding work with five hour watches, which consisted of day one 8am to 1pm, then 6pm till midnight. Day two was 1pm to 6pm, then midnight to 8am, followed by 48 hours off. Patience Lambert was sent to Capel Cliffs near Dover and kept the Navy headquarters there informed of what had been heard from the high speed E-boats which were such a menace to British shipping and also supplied Kingsdown HQ.

Marguerite Morton was sent to Scarborough HDU to listen for aircraft coming from Norway as well as Europe and the E-boat traffic as well. Throughout this period, the



Plan of Whaddon Hall.

girls all agreed that working conditions were very basic the living accommodation and food were generally disgraceful, but the thought that others were dying or under fire meant that they considered themselves well off indeed!

One of the main duties was to listen to the morning test transmissions of the Knickebein and X and Y bomber navigation beams as the German technicians attempted to align these beams over that night's target as chosen by the Luftwaffe. In the years that followed, the three girls were moved around by the HDU stations as well as to HQ at Kingsdown, keeping the flow of valuable information coming in and one unusual task which was extremely valuable to bomber command was the monitoring the progress of the RAF bombers over Germany by listening to the German plotting stations as they tracked

the British bombers over Germany, well out of range of our own radar. We could obtain the exact position and time of arrival, thanks to the Germans and especially their night fighters, which always stayed in a fixed area.

Because of co-operation between the Y services, the WRAF assisted the WRENs of the Navy's at Great Yarmouth Naval HQ and were so successful in locating the German E-boats by listening to them and then getting a position fix from the Navy direction finding station at Southwold, which resulted in the destruction of so many of the E-boats that the WAAF flight sergeant in charge was asked to accept the British Empire Medal on behalf of the unit.

Late in 1944, the station at Kingsdown was unlucky enough to be hit by a V1 pilotless flying bomb, so it was

decided to close it and move to a better radio reception area near Canterbury in order to listen to the German pilots, who had by this time been forced out of France with the now receding front line in Holland and Belgium.

Marguerite Morton remained at the UK monitoring stations, but Elizabeth Jones was sent to the new monitoring headquarters in France and Patience Lambert finished the war at the Y Station in Belgium until all three were demobbed in 1945.

Upmost Secrecy

They had all been sworn to upmost secrecy throughout the duration of the war, so they and all the other WAAF WRENs and ATS girls of the Y Service have largely felt forgotten by the war historians, but let it not be forgotten that these girls played an extremely unsung, but vital part in gathering every

bit of intelligence from the enemy without which secret sites like Station X at Bletchley Park could not have operated so efficiently.

Today, in 1995, the three friends are pensioners, quietly enjoying life in the peaceful Hampshire countryside, perhaps not appreciating that it is peaceful because of the part they played over 50 years ago to make it so.

Whaddon Hall

We have discussed the role of the many military and other radio stations located in the various parts of the UK, whose primary duty was to pass all the information intercepted from the enemy to the Code Breaking Centre at Bletchley Park (Station X) and as these messages numbered several thousand daily throughout the duration of the war, then all of them needed to be (a) decoded, (b) distributed to the relevant section, (c) decisions made and (d) the information acted upon.

One can now begin to appreciate the huge scale of the task when it was realised that almost 12000 people were employed on this task in Station X. But what happened to all this information gleaned from the enemy?

Once a decoded message had been passed to the correct departments of the War Office, Air Ministry and Admiralty, then various routes for any outgoing traffic were employed, so we will look at just one of these routes. Deep

in the heart of the rural North Buckinghamshire countryside lies a small quiet village called Whaddon, where nothing much happened except for occasional whist drives in the village hall and summer church fetes, etc., but the commencement of hostilities in 1939 saw a dramatic change to the quiet lifestyle of the villagers.

A very large mansion called Whaddon Hall located to the northern outskirts of the village became the headquarters of the Special Communications Units (SCU) with its own radio station placed in its extensive grounds. Other secret radio stations were also located close by at Weald and Nash.

Spectacular Views

One particular station was set up at the rear of Whaddon Church on a large area of land nearby called Church Hill, with spectacular views across the countryside. This secret two-way radio station was built right on top of the hill in the path of the prevailing westerly winds and was therefore named the Windy Ridge Wireless Station. Only the top brass, such as Brigadier Gambier-Parry and his subordinates, knew that this was the Special Operations Group of the SCU and its primary responsibility was to transmit the information provided by Station X to both the British and later the American armies in the field.

Each army headquarters, whether British or American, had been allocated a mobile radio unit which was a large army van fitted up with 2-way W/T radios and they were always staffed by British Military Operators. In fact, the operators stationed with the American groups lived in luxury compared with those at British army posts, which made the latter quite envious.

Windy Ridge is the hill at the highest point in Whaddon and the receive antennas, which were mainly dipoles and Marconi end-fed wires, were located in the field nearby and

one of the antennas was actually attached to the chimney of the house that stood next to the vicarage, which was several hundred yards to the north of the station.

These all fed in to the two main Nissen type huts of the wireless station and both buildings were placed side by side and constructed with a concrete base then a low brick built wall foundation and then a curved corrugated iron roof was placed on top and a very large emergency generator was placed adjacent to one of the huts.

One hut contained 20 operating positions, each fitted with a single National HRO communications receiver, a pair of headphones and a Morse key. A large antenna distribution panel stood at one end of the hut and this enabled the operating staff to select any transmit or receive antenna to be connected to any selected operating position or 'bays' as they were known.

Keying lines for the telegraph keys were connected to a secret transmitting site in the Cotswold Hills and the power of the transmitters was mainly 350W with a few 200W ones. The second hut contained several teleprinters which received the messages from Station X which was only 6km away.

All the operating staff were posted there direct from their signals training and only those that came out top of the Morse code training classes were specially selected for these secret duties. Most of the 100 staff were army personnel, but there were also at least 12 airmen and one lone sailor, who was posted there in a rare moment of compassion by the Navy after he had been left behind when his ship sailed without him while he was recovering from illness. The ship was then sunk in the Mediterranean with the loss of all hands.

The unit had taken over the Whaddon Village Hall and many Nissen huts were constructed in a field at the

rear of the hall as living accommodation for the staff. The vast majority of the outgoing messages from Station X was in 5-letter cipher and the number of these messages increased all the time, reaching a peak in the final year of the war.

In order to protect the security of the army units involved, they were all given code names such as Sybil, Pack, Mermaid, Atlas, etc. In 1944, although the date of the D-Day landings was top secret, all the wireless operators at Windy Ridge realised that a great event was about to take place when most of the radio stations they were transmitting to closed down for a period, and this was the time when all the armies were embarking for the Normandy Landings.

Chocolates

When they opened up again, many of them were in France and other temporary code names were allocated to extra stations, these used chocolate names such as Fry, Cadbury, Rowntree, etc. The gradual progress of the Allied armies was noticed as the frequencies were raised gradually as they moved towards Germany, but at the end of December 1944, consternation reigned at Windy Ridge when the Mermaid station radioed in 3-letter 'Q' code that they were being bombed and that they were destroying their equipment and secret codes and then contact with them was then lost.

It turned out later that the code name Mermaid was the American First Army which had been overrun in the last major counter-attack of the combined German forces, known as the Battle of the Bulge. On the day before the Germans finally surrendered, all the operating staff at Whaddon Hall radio station were told to look out for a German station that was going to call them to try and surrender the German army.

Whaddon failed to pick this

signal up despite much searching, but the operators at Windy Ridge did hear it. It took them a while to realise that Whaddon had not heard it so they telephoned Whaddon Hall to advise them where to look, but it was too late and the signal was lost. It is sobering to think that if a contact had been made, then the war might have finished one day earlier!

Windy Ridge was built at the beginning of the war. Signals dwindled after hostilities had ended, but the station did continue for some years afterwards before finally being abandoned and the site on Church Hill reverted back to the farmer who then used the redundant buildings for agricultural purposes until many years later when vandals set light to the buildings and the fire resulted in their total destruction despite the Bletchley Fire Brigade attending quickly.

The Germans must have known about the Whaddon Hall and Windy Ridge stations as they did have a few bombs dropped on them, but they all missed the stations. Although one of them destroyed a house that stood on its own a few hundred yards away. Two of the original signals staff were buried in the small Whaddon church cemetery and one of the now fading headstones can still be seen today with the Royal Corps of Signals badge carved beautifully at the top of the stone. "Signalman 2595713 Pearson, you did your duty for your country".



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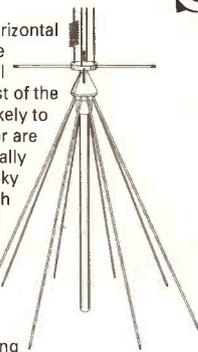


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Lawrence Harris is back again, this time he looks at an essential item for any satellite enthusiast, a multi-satellite tracking program.

PC TRACK version 3.1

If you are 'into' satellites in any capacity, whether monitoring signals, actively using their data for scientific research, or as a radio amateur, a tracking program is essential. Until a few years ago there were a limited number of programs available; now the situation is different. A variety of both commercial and shareware programs are readily available - if you know where to look - to cater for virtually all needs.

For some years I used two programs - *InstantTrack* and *TrackII*, both of which have operated reliably, allowing me to judge any new software that I came across. The programs *BirdDog* and *STS-Plus* have fared well on my computer. Readers of my 'Info' column kindly send me shareware programs from time to time and, when space permits, I have included descriptions in the column. Copies of *PCTrack*, written by Thomas C. Johnson of Johnson Scientific International, arrived at my computer from a BBS (Bulletin Board System) and an earlier version came from a correspondent. I have been running version 3.04, then the latest - 3.1 on two computers and believe that the program justifies a reasonably comprehensive review.

Hardware Requirements

A PC-compatible computer using an 80386(SX or DX) or 80486(SX or DX) CPU is needed, running DOS version 5.0 or later, and a minimum of 2Mb RAM. A maths co-processor is preferred but is not essential. About 5Mb of hard disk space are required, and a mouse can be used. The program runs in DOS protected mode, so can access all system memory. I ran the software on a 486SX running at 25MHz and on a 386DX running at 33MHz, with a co-pro fitted, and finally on a 486DX2-66MHz machine. There was a significant speed increase on the better processors - see later. The program uses standard VGA (640 by 480 pixels).

General description

PCTrack is a shareware program; the author asks users to run it for up to 60 days and to then register - cost \$45 (about £30) - and obtain an enhanced version. The software comes as a suite of files and programs and is easily installed on a hard drive. It includes two large databases operating within the program; one holds up to 300 satellites, the other up to 300 sites. Calculations are done to double precision accuracy, so for the best results, recent satellite Kepler elements should be used - see later. Many satellites can be shown

simultaneously on the graphical display, including footprints (circles of visibility on the earth below), and groups of satellite (eg., weather or amateur radio satellites, Glonass, etc.) can be set up.

Even at this stage I must say that this is one of the best programs of its type that I have used. Many parameters - colours associated with certain items, sites, time formats and views - are adjustable, giving considerable control over the display. Future passes can be identified, and even sections of the pass which are illuminated by the sun can be seen - ideal for monitoring 'visible' satellites. The updating of Kepler elements is almost automatic.

Getting started

The program arrived as a compressed 'ZIP' file, which I expanded within a temporary directory. Installation was straight forward, using the program provided. It was already set up with an almost full database of satellites and had several sites (locations) pre-programmed with details of major cities around the world. I selected London, but later edited in Plymouth. The program is started by entering PCT.

The starting screen is the launch pad from which you can select the type of display required. It contains a Menu and shows the version number as 3.1. Main Menu choices include *File*, *Edit*, *View* and *Options*, and can be selected either by clicking with a mouse or using F10 to activate, then pressing the first letter - *F*, *E*, *V*, or *O*. I used the keyboard method at first, to check that everything worked without the need for a mouse. After mastering that, I changed to mouse operation, which I found considerably more convenient. Some sections require entries in various parts of the screen - the mouse was speedier than the Tab key for these entries.

The sensible choice for the first use of the program is to configure the software using *Options*, *System configure*. This allows setting of the time/date formats - I set time to UTC, with no offset - then set the date format to the English standard - day:month:year.

Several function keys are programmed, but act differently according to the screen display; for example, when used from the Main Menu, F3 starts text display tracking of the primary satellite, but F3 selects global viewpoint when used from the tracking display. With the built-in help display there were no problems. From the Main Menu, the program can be started in graphical tracking mode, by pressing F2, or selecting *View*, *Track Graphics*.

Parameter Files

Having started the graphical display, the nature of the software design can now be appreciated. From the Main Menu, function key F2 loaded the default parameter file - 'default.prm', or whichever file was last used. This file, and others already present (called *.prm), has been pre-set with satellites and American sites. The screen shows either a three-dimensional globe with orbiting satellites, or a Mercator projection, depending on which was previously used. Press F4 to swap between 3D-global view and Mercator.

PCTrack allows the user to generate different satellite groupings eg., weather, amateur radio, geostationary satellites and many more, and to associate different sites with each. Each grouping is called a parameter file and the satellites selected must already exist in the Master satellite database. From this database, individual files having any combination of satellites can be saved as parameter files. To access the file-editing facility, we return to the initial Main Menu screen by pressing *Escape*.

Using *File*, *Open* you are shown the pre-set parameter files eg., weather.prm, any of which can be edited. I prepared a *METEORS.prm* file, to include all current group three *METEORS* together with later group two *METEORS* (2-20 and 2-21) - a final total of eight satellites. I also modified the weather.prm file; nearly all the CIS *WXSATs* were already present in the database.

Editing Satellite Files

To customise your (weather satellite) parameter file, you *Open* it from the Main Menu, then select *Edit*, *Satellites* (or press F5). The display allows editing of the Master Satellite database; you can *Edit*, *Add*, *Delete* or *Activate* a selected satellite. This is also where you select your Primary satellite - the one which runs in Text tracking mode.

I found this facility intuitive; when *Active* is selected, the Master database is on the left of the screen, the right side shows currently active satellites selected for the parameter file. With a deft click of the mouse you can select any satellite for transfer to or (remove) from the active set, or delete it from the Master database. You can create a new parameter file or save the present one with a new name.

The sites which appear on the display are called the primary and secondary sites, ▶

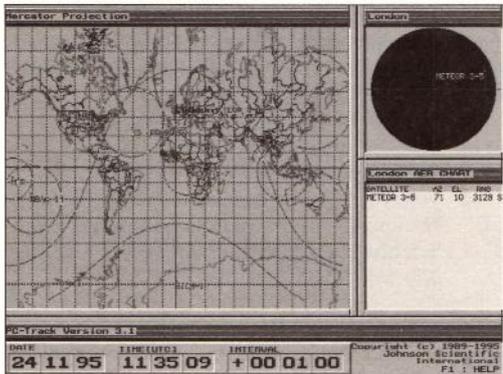


Fig. 1: Mercator map projection with site and AER listing in fast-forwards mode.



Fig. 3: 3D projection showing several satellites.

Fig. 2: Full-screen Mercator map showing several satellites.

though only one need be selected. Sites are edited by selecting F6 or *Edit, Sites* from the Main Menu. Clicking the mouse on the site, followed by transferring it to the Primary site box, is all that is required. You can edit the site by entering your own latitude and longitude, as accurately as you can obtain. Atlases can provide this information, or better still, a local Ordnance Survey map, and estimate your height above sea level.

Importing Satellites

Updating the database with new Kepler elements was straightforward. I had a new set of NASA 2-line elements, called 'apt.all', in a directory called Kepler. Using *File, Import*, you can read either 2-line or AMSAT format. The full filename and path was entered and the file read. New satellites can be entered in the same way - assuming the database is not already full. If necessary, satellites can be deleted from the database.

Changing the Display

Within the graphical display screen, a new Menu of hidden keys is available: to see the list, press F1 (the Help key). Within tracking mode, using F2 you can activate a fast-forward display; this mode calculates where the satellites are going. The amount by which time is incremented in fast-forward mode is adjustable; the left/right cursor keys select the second, minute and hour parameters; the up/down keys increment and decrement respectively.

Both displays - Mercator and 3D - are impressive, and, as becomes increasingly clear with this program, both are adjustable. While in global view (F4 switches to global

from Mercator), press F3 to change the position of your viewpoint. There are eight choices of perspective, four fixed longitudes seen from near the globe, and four from further away. Each option also illustrates the satellite's height above the globe. I was impressed with this, though wanted to change the viewpoint to zero longitude, rather than remain over the USA. Documentation explains that the registered version allows this flexibility - where's my credit card!

On first running this program, the tracking display included two other sections, one showing the Primary ground site selected for this file. Below this is an AER chart - showing the azimuth, elevation and rising/setting of each satellite when above the horizon of the selected site. You can remove or display the ground site graphics using F6. Without the sites, the Mercator map or globe expands to fill the screen. To see the AER display in action (assuming it was empty while you were running the program), press F2 to activate fast-forwards, and watch the display. As each satellite comes over the horizon, its entry appears in the lower section, showing its calculated position. Tracking can be paused using F7. After changing certain options you may want to refresh the screen - press F5.

Attributes

The versatility of this software becomes apparent as each new option is tried. Parameter files have attributes which can be changed. To select any attribute, you must use the tab key, then change it using the up/down cursor keys. The mouse is not used in this pull-down window. Attributes

include footprints, satellite name display, sun position, site names and satellite lines of sight (lines connecting the ground station to the satellite, when above the horizon - unfortunately abbreviated to LOS). Several attributes have multiple choices! Let's look at one - footprints; this attribute can have any of five options - single (no trail is left), cont (continuous, in which the satellite leaves a trail), svvis (the attribute is only shown when the satellite is visible from the site, and it leaves no trail), cvvis (as for svvis, but a trail is left during the period of site visibility), and off (no footprint). Setting either cvvis or svvis and enabling fast-forwards, quickly clutters up the screen with satellite trails - hence the use of F5 to clear the display.

The LOS attribute is worth mentioning; if set, a 'line of sight' is drawn between a satellite (while above the horizon) and the ground site. If not set, no line is drawn. Distant satellites (such as the geostationary ones) cause the line to project off screen.

Certain display colours can be changed using F9. Care has to be taken while doing this; during my experiments with colour, I inadvertently set the satellite footprints to have the same colour (blue) as the background. While changing other footprint options, I could not initially understand why the footprints had disappeared. Perhaps this illustrates the flexibility of the customising - as well as my fallibility!

Printouts

The software includes a facility to print pass details for future reference. A range of printers can be configured. Using the *Scan* option, a time period can be entered and a list of mutually visible passes for the two

ground stations will be produced. As usual there is a choice! You can produce a disk file (for incorporation into a word processor) or simply print it out directly. The program does not appear to actually produce passes for just one ground station, though the list that I produced using Plymouth only, matched well with data from my normal tracking software. There are additional facilities within the scan option - more detailed printouts and a 'visualisation' option; this latter shows the 3-D view illustrating the passes.

Documentation

Considerable! Several files are included with the program suite; a quick-look file called QUICKSTRT.DOC (16Kb) and a larger tome called USRGUIDE.DOC (51Kb). I read each file, taking notes as I plodded through, realising at each stage just how comprehensive this software is. The index alone is longer than documentation supplied with some commercial software!

Problems and Bugs

If you do not have a co-pro, a 486DX or a reasonably fast machine, you may find the program updates slowly, possibly taking several seconds between updates. The

software calculates the positions of all active satellites in the current parameter file - the more satellites on display - the longer it takes. Frankly, this didn't bother me, except when making changes - the software only responds after completing its calculation sweep - so one can feel a little impatient when there are a large number of active satellites. In normal operation, with eight satellites displayed, on a slow machine it may momentarily appear to have stopped; on my 33MHz 386DX (with co-pro) screen updates occurred every 1.5 seconds. My 25MHz 486SX took 12 seconds between screen updates. With two satellites displayed, updates then took about 0.5 second. This is not a meaningful problem when you know what is happening. Running on my 486DX2-66MHz, screen updates were better than 1 per second. I do not see a necessity for screen updates this frequently anyway.

The screen display is VGA, using 640 by 480 pixels, a little low by today's standards, though generally acceptable.

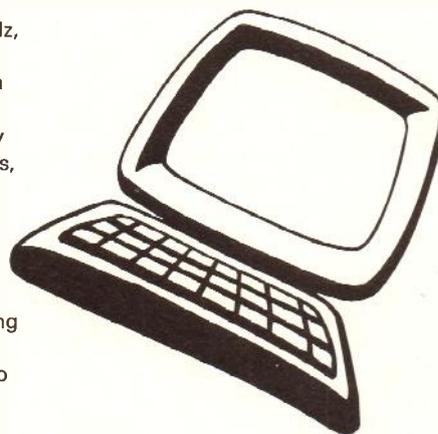
Bugs? I have not found any so far!

Availability

If you are a member of the Remote Imaging Group, PC-Track can be downloaded from their BBS on (01945) 440666. You may also

find it on other specialised BBS such as Starbase1 on 0171-703 3593 and 0171-701 6914. Alternatively, send me a (PC-compatible) 3.5in disk, together with pre-paid return package and 50p towards collection costs and I will provide a copy by return, including the latest Kepler elements for you to import into the program. These are also available routinely from me - see my 'Info in Orbit' column.

■



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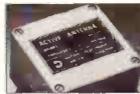
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The Royal Signals Museum

What is the connection between William of Orange and the No. 10 Army Microwave Communication Set? Phillip C. Mitchell explains that both were efficient means of communication used in the Second World War, and can be found amongst the thousand or so exhibits at the Royal Signals Museum at Blandford Forum.

William of Orange was the name given to a humble carrier pigeon who was awarded the 'Dicken Medal' (the animal equivalent of the VC) for a record high speed dash of 418km with messages from the Arnhem bridgehead to HQ in the UK. This of course has nothing to do with radio, but is mentioned

here as a novel means of communication, unjammable and not subject to the vagaries of propagation or jamming by the enemy!

However, turning to the more conventional mode that the No. 10 represents, the introduction in August 1944 of 'Wireless Station No. 10 Mark 1' as it was then known, into the Army inventory was hailed as a major technological

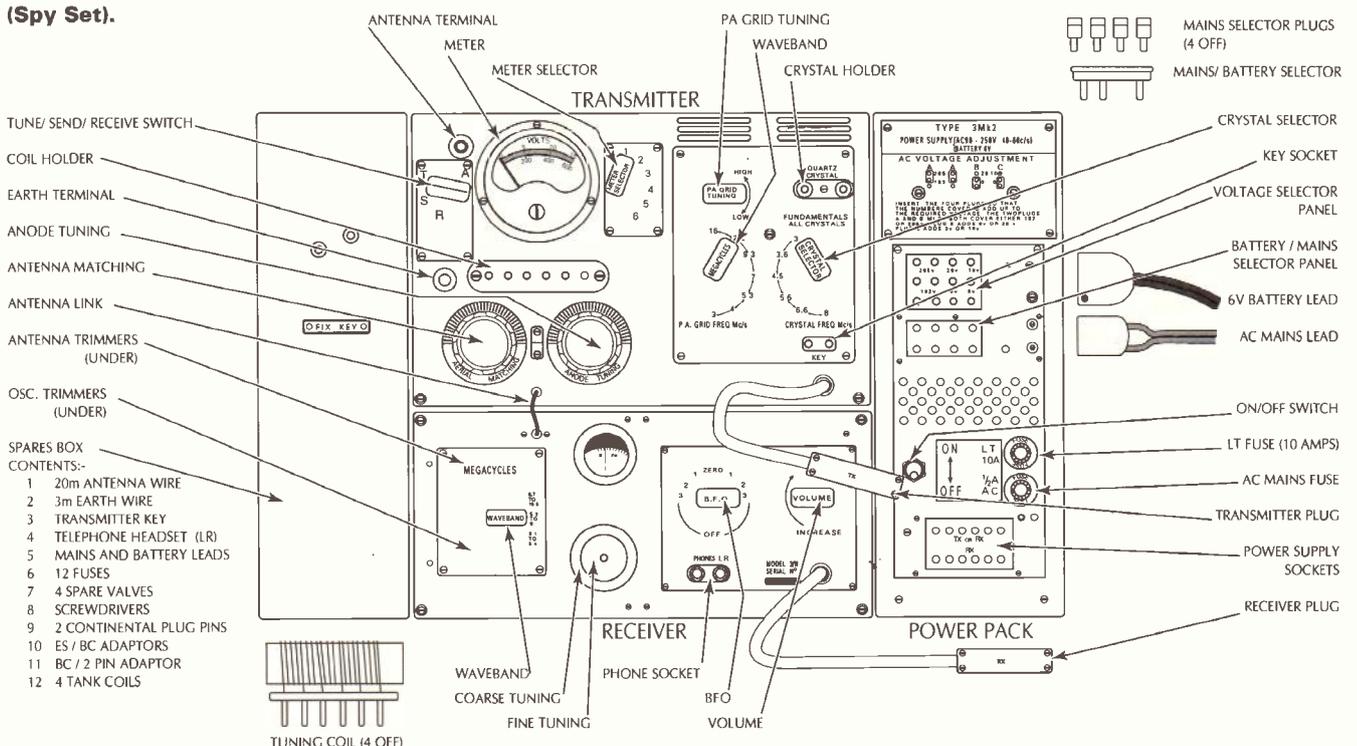
achievement in using microwave techniques for communication purposes. These sets were produced in time to be used to provide an invaluable 8-channel radio link between Field Marshal Montgomery's tactical HQ in Germany and London.

The self-contained trailer station with the two parabolic microwave roof mounted antennas (one receive, one transmit) had

an optical range of 80km and two identical co-located stations were needed to complete one link in the communication chain.

The parabolic dish antennas were demountable and many found their way to the tops of high buildings, church towers and even windmills to ensure optimum visual sighting to the next link in the chain. The operating

Fig. 1: Plan of Type 3 Mk II Suitcase transceiver (Spy Set).



frequency was between 4.410 and 4.880GHz and the transmitter power 100-400mW to send the pulse code modulated signals.

With power from two 3kVA generating sets to feed each set's 165 thermionic valves, there would not appear to have been any problems with heating the trailer! The '10

set' remained in active service well into the 1950s - a truly revolutionary piece of radio equipment and forerunner of the many microwave links in use today.

Many examples of conventional army radio communications equipment are on display such as the MkII mobile h.f.

Fig. 2: Type 3 Mk II Suitcase transceiver (Spy Set) and controls.



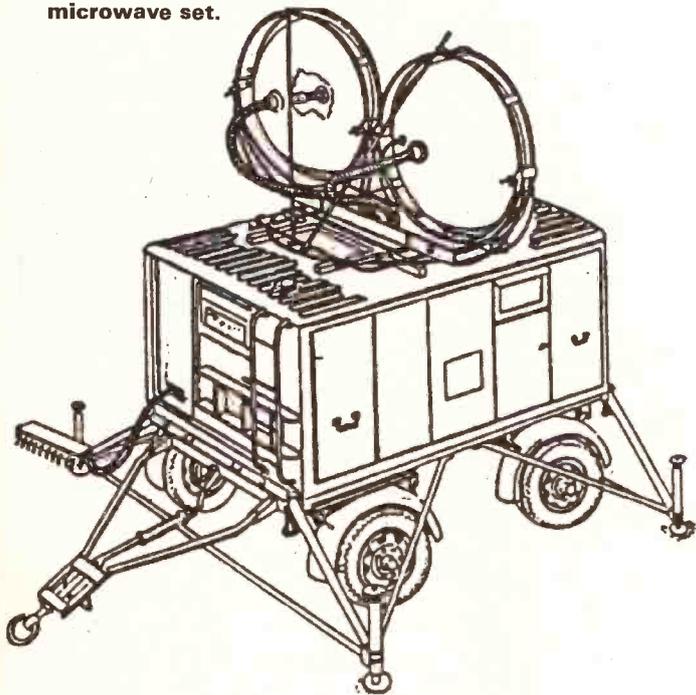
transceiver which saw continuous service from 1935 up to and during the Second World War. *Prospero*, the first British communication satellite launched in 1970 together with a model of its launch vehicle *Black Arrow* are also on display.

Amongst the more esoteric exhibits can be found a fine collection of Second World War spy radios, some suitably

disguised as innocuous suitcases for transmit in enemy territory by army and Special Operations Executive (SOE) agents.

The Type 3 MkII, designed by Major John I Brown, Royal Signals, and introduced in 1942 is a fine example of these transmitter/receiver suitcase sets. Some 7000 of this particular type were manufactured in the UK at the factory at Stoneleigh

Fig. 3: Wireless Station No. 10 Mk I microwave set.



Specification of Type 3 Mk II Suitcase transceiver (Spy Set) c. 1942

Transmitter

Circuit:

Oscillator-doubler driving Class C amplifier, crystal controlled. Provision for frequency doubling. Plug-in tank coils to cover 3.0-16MHz. Plug-in transmitting key.

Power input:

500V at 60mA. 230V. 18mA or 6.3V at 1.1A.

Power output:

Average fundamental power 20W. Second harmonic power 20W.

Receiver

Circuit:

Four valves. 7-stage superheterodyne primarily designed for c.w. reception. Three wave bands. 3.1-15.5MHz. BFO pitch controlled switch.

Intermediate frequency:

470kHz.

BFO:

470kHz ±MHz.

Sensitivity:

1-3mV for 10mV output at 1kHz.

Output:

50mV into 120Ω headset.

Power Pack:

Mains:

97-140V or 190-250V, 40-60Hz at 70W transmit, 40W receive.

DC:

6V accumulator, 9.5V transmit (key down) 3.5V (key up).

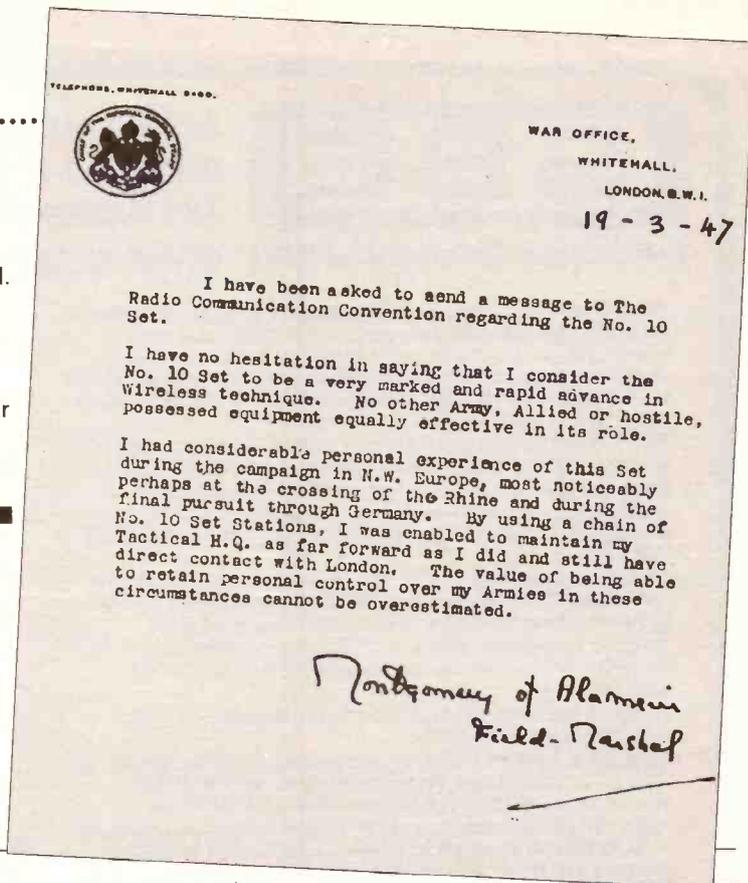
Park and saw service in most enemy territory during the Second World War. One wonders what become of these quite advanced sets, apart from the one on display at the museum.

The museum houses many other items of army radio communications in use up to the Gulf War and attracts approximately 12000 visitors a year. Plans are well advanced for a new Royal Signals Museum, using improved modern display techniques, in a more accessible location than at present, to be opened in 1994.

The museum current location at Blandford Camp

is signposted from Blandford Forum, Dorset on the A354 Salisbury/Dorchester road. Acknowledgement with thanks for assistance in compiling this article is given to Dr. Thwaites, Deputy Director and Major Pickard, Curator of the Royal Signals Museum.

Fig. 4: Field Marshal Montgomery's letter.



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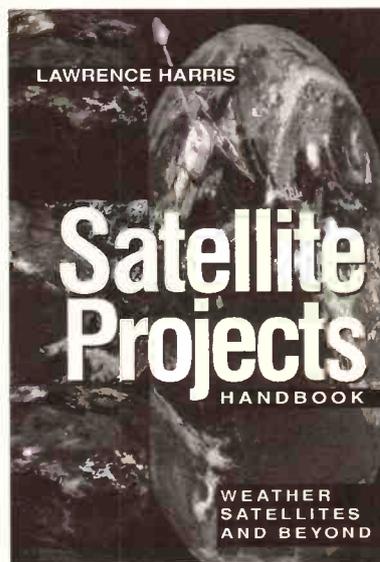
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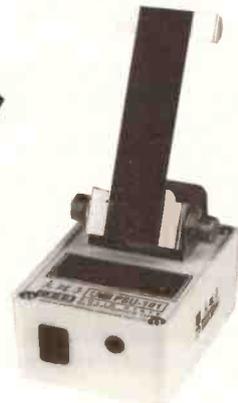
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The Calibration Laboratory

Very few people ever spare a thought for the Calibration Laboratory. We take the calibration of our instruments for granted, yet behind the markings on the dials of your equipment is a whole science that is becoming ever more complicated. Brian Berry explains all.

It was not until I started work at a calibration laboratory that I really began to understand instruments that I had been working with for many years in my job as a communications engineer. I had, like others, wrestled with signal generators, oscilloscopes, spectrum analysers and the idea of such things as decibels, distortion factors, sensitivity figures and bandwidth, etc., but it was only after having spent six months in a calibration lab that they all began to make real sense.

Here I was faced on a daily basis with having to actually calibrate and measure these things accurately. More importantly, it would be my name that went on the calibration certificate! In the field it had been "Yes, that's about 3dB down", in the calibration laboratory, "about 3dB" is not a statement that I would care to make in the hearing of the laboratory manager!

Most laboratories who undertake calibration today are required to calibrate to National Standards. The National Measurement Accreditation Service, under the auspices of the Department of Trade & Industry, is the body which oversees the standards to which the laboratory is expected to work, and regular audits ensure that these standards are maintained.

These standards involve measurements to an ever increasing degree of accuracy and complexity, and as a result, most calibration

laboratories are at the forefront of development technology. The engineers who work in these laboratories are highly skilled and are expected to maintain and develop these skills in order to keep abreast of modern developments.

The calibration laboratory is one of the few places nowadays where several apprentices are usually being trained, both academically and on the job, for a calibration engineer is a highly specialised type of engineer who needs a great deal of training in order to perform his functions correctly.

It also requires a special type of outlook. The calibration engineer must be both accurate and extremely conscientious in his work. A mistake on his part will be reflected by all future users of the equipment that he calibrates.

End users of electronic instruments utilised in such fields as electronics, aviation, medicine, research and development rely on the accuracy of those instruments for their own results, and it's not too much to say that, in some instances, life itself depends on them. At the same time, it is of little use attempting to proceed with the calibration of an instrument that is obviously faulty.

The calibration engineer must therefore also be experienced in the repair of a wide range of instrumentation and facilities must be available to enable such repairs to be carried out. With the huge range of test equipment

available today, this alone is a mammoth task, requiring the engineer to be constantly updating his knowledge and practices.

Extremely Expensive

The equipment used to take measurements in the calibration laboratory is, of course, extremely expensive. It must itself be calibrated periodically against National Standards, apart from the in-house calibration that is required to undergo at regular intervals.

All of these calibration stages must be traceable back to the National Standard. This naturally tends to make calibration an expensive business. Nevertheless, it is essential that engineers and others who use instruments in their day-to-day tasks can be assured of the accuracy of the readings that their instruments give them. There is nothing worse than trying to fault-find with an inaccurate instrument, or to diagnose a patient with high blood pressure with an instrument that is reading low.

Since few end users have access to any documentation other than an operating manual, the laboratory also has to maintain a large library of service manuals, each of which can cost up to £250 for a complex modern instrument. To give some idea of the task facing a modern calibration laboratory, the monthly throughput of instruments at the laboratory where I am currently employed is around 1500.

Granted many of these instruments are of the same type, nevertheless, the type range is extremely wide, covering everything from the humble AVO to the latest all singing all dancing digital network analysers, together with some pretty sophisticated equipment from satellite and broadcast television stations.

The customer, too, requires his instruments turned round rapidly, seven days is about the limit that most people can afford to be without what is, perhaps, their major piece of test equipment, and the laboratory has to be staffed and geared to satisfy this. After all, the customer is the reason for our existence.

Obviously no one engineer can be expected to cope with such a tremendous range. Even so, calibration engineers are a pretty costly item and in today's economic climate there is great pressure on individual engineers to expand their area of knowledge. Rotation of engineers through various departments on a six monthly basis ensures that they at least have a broad understanding of most items of equipment that pass through the laboratory. At the same time, the ongoing apprentice scheme ensures that future calibration engineers will be available to replace those who leave.

What of the laboratory itself? Apart from the normal provision of test benches, storage areas and spare parts, the laboratory has to be air conditioned and both temperature and humidity maintained and monitored at specific levels. Every

equipment specification states quite plainly under what temperature and humidity levels its calibration must be performed and the laboratory must be capable of providing these levels. Since they vary from equipment to equipment, separate rooms must be provided over which a range of levels can be maintained.

The instrumentation used for calibration is, by its very nature, extremely accurate. In a typical laboratory, for example, measurements of voltage can be made to an accuracy of ± 4 parts per million, whilst frequency can be measured to ± 2 parts in 10^{10} . Accuracies of this order do not come cheaply. A typical voltage calibrator can cost well in excess of £15000 and remember, these instruments have themselves to be calibrated at regular intervals!

Because of the extremely high gain that can be obtained from some items of test equipment interference from external sources, especially in an environment where many signal sources are in constant use - has to be guarded against. Hence rooms have to be electrically screened and incoming mains heavily filtered. The aim is to provide an electronically sterile environment, which is quite difficult in today's world. ESD (Electrostatic Discharge) protected areas also have to be provided.

On 1 January 1996, the EC Directive on EMC (Electro Magnetic Compatibility) becomes mandatory, which will have a major effect on the liability of manufacturers for

the effects of Electro Magnetic Interference (EMI) and, therefore, the acceptance of their products within the EC. This will impose a further burden on calibration laboratories in that many will be asked to test for susceptibility to, or emissions of, electrical and magnetic field strength.

The equipment to carry out such tests is extremely expensive. I know because we have just installed one of the very few instruments in the UK to perform this function. Costing well in excess of £100000 and known as a GigaHertz Transverse Electromagnetic Mode Cell (GTM Cell for short!) it can provide field strengths in excess of 200V per metre for the frequency range 10kHz to 1GHz!

The use of such an instrument, which as imagined can be dangerous to health and safety, requires specialised personnel trained in its operation and is yet another area in which capital costs will take some time to recoup. All things considered, the calibration laboratory is quite an expensive project to set up, but because of the tight controls in respect of temperature and humidity, does provide an extremely comfortable environment in which to work.

The technical challenges presented by the work in a calibration laboratory are extremely stimulating and at times can be both humorous and sad. Many firms who send work in purely because they are attempting to secure BS5750

certification seem not to understand the principles behind it. I recently had a screwdriver appear on my bench with a label tied to it stating 'Please calibrate and issue certificate!' It is mandatory in our laboratory that anything sent in by the customer **must** go through the complete process and so the screwdriver was duly inspected, cleaned and returned to the customer - without a calibration certificate!

Amazement

Another never ending source of amazement is the age of some pieces of equipment that appear on the benches. Marconi instruments in particular seem to be ageless. Signal generators from World War II years regularly turn up for calibration, and in most instances, a touch here and there is all that is needed to bring them back to the manufacturer's specification.

Built like the proverbial brick toilet, it would take something on the lines of a Chieftain tank to drag them off frequency once they have been set. They are usually handed over to the nearest apprentice (always under close supervision) while the engineer waits for the desperate cry of "What are these funny glowing lamps in here?"

Then too, equipment from what used to be our overseas colonies will appear - usually containing the body of some large, hairy and particularly repulsive insect that had crawled in to make a nest.

These are the instruments that make our engineers wince. Most have been severely modified in a 'make do and mend' style because proper spares were unobtainable, and are usually anything up to 1MHz off frequency!

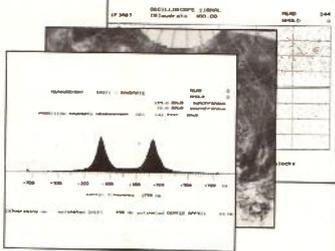
No wonder some of the overseas short wave stations appear in the middle of the amateur bands! But, like everything else, they go through the mill, and usually end up in a pristine condition at the end of it all.

So, next time you take a look at the specification of an instrument that you are buying - spare a thought for the laboratory and the engineer who has to check and certify that the instrument meets those specifications. ■

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"...the standard against which all future decoders will be compared..."
Monitoring Times - December 1994 (page 103)

If you monitor Short Wave RTTY you will already know all about Baudot, Amort, Packet and CW. You may have already had success with decoding ARO-M2 & M4, ARO-CE3, ARO-CE2, ARO-CE, SWED ARO, FEC-A, FEC-S, Pactor etc., but what about all the other signals that are still undecipherable with your present 'sophisticated' setup. Perhaps you have even tried to get a sensible analysis of the signal and found it too difficult. Well, Hoka Electronics have the answer! There are some well known (and expensive) RTTY decoders which still have limited facilities and difficult upgrade methods, but then there is CODE-3 from Hoka Electronics! It's up to you to make the choice - but it will be easy once you know more about CODE-3. CODE-3 works on any IBM-compatible computer with MS-DOS 2.0 or later and having at least 512k of free DOS memory, a CGA monitor and a serial port. The CODE-3 hardware includes its own digital FSK Converter unit with built-in VDE safety approved 230V AC power supply and RS232 cable, ready to use. CODE-3 now includes two new exciting hardware and software developments - a fully automatic software tuned audio bandpass filter and a new 'all-in-one' automatic classification system. Press one key and CODE-3 will measure baud speed (to 0.0001 resolution) and shift (to 1Hz) then analyse the bitstream and (if it is a recognised system) drop straight into decoding the signal within seconds of tuning in. CODE-3 decodes more systems than any other commercially available decoder - in fact more expensive decoders have no means of even identifying ANY received signals! Why spend more money on FEWER features? CODE-3 is the most sophisticated decoder available and the best news of all is that the latest version of this now famous Dutch decoder is available now. Just look at the list of features. ALL FEC systems are decoded with error correction fully implemented - unlike other more expensive decoders than only do some!



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 - SWED-ARQ/ARQ-SWE - CCIR 518 variant
 - ARO-E/ARQ1000 Duplex
 - ARO-N - ARO1000 Duplex variant
 - ARO-ES - CCIR 518 variant
 - POL-ARO - 100 baud Duplex ARO
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Final Reflections

Ron Ham

Firstly, may I wish you all a very happy Christmas and a prosperous new year and secondly, to tell you that, after 51 years in radio and the past 20 years writing monthly columns for *Short Wave Magazine* and *Practical Wireless* the time has come for me to retire. Before completing this, my final column, I would like to thank all of you, our readers and the Editorial Staff at PW Publishing for your support. It's been a happy relationship all around and I would like also to thank those members of the British Astronomical Association who have sent me auroral, solar and magnetic data to support the propagation reports that many of you have sent in.

Observations

In Edinburgh, **Ron Livesey** uses a 2.5in refractor telescope with a 4.0in projection screen for his daily observations of the sun and in September he identified one active area on the solar disc on the 3rd and 4th and two on days 21, 22, 23, 24, 25 and 26.

During his daily sunspot observations, **Patrick Moore** (Selsey), also using the projection method, found the sun's disc "spotless" on September 12, 13, 28 and 29 and October 1, 2 and 5. However, he noted three spots on his projection screen at 1510 on the 13th and kindly sent us a drawing, **Fig. 1**.

Aurora

Ron Livesey, the auroral co-ordinator for the British Astronomical Association, received reports of aurora described as 'glows or patches' for the overnight periods on September 20/21, 22/23 and 28/29, 'homogeneous arcs and bands' on 5/6, 24/25 and 27/28, 'rays' on 27/28 and 28/29 and 'active forms or flaming or flickering light' on 2/3 and 27/28. Such detailed reports came from observers in Banff, Carlisle, Cressage, Edinburgh, Fair Isle, Glengarnock, Helsinki, Kincardine, Mexborough, Milngavie, Morpeth, Peel, Portpatrick, RAF Kinloss and St. Andrews. Ron reports that the aurora on 27/28 was most active at 2040 and visible to an altitude of 40° from the Isle Of Man.

Magnetic

The magnetometers operated by **John Fletcher** (Tuffley), **Tony Hopwood** (Upton on Severn), **Karl Lewis** (Saltash), Ron Livesey, **David Pettitt** (Carlisle), **Tom Rackham** (Goostrey) and **Tony Rickwood** (Gillingham), between them, recorded strong disturbances to the earth's magnetic field on September 5, 11 and 27 and lesser events on days 2, 4, 7, 8, 9, 10, 12, 14, 15, 23 and 28.

Weather

In October I recorded only 1.23in (approx. 32mm) of rain compared to 4.54in (approx. 115mm) for the same period last year. Most of this fell in the first week followed by small amounts on the 17th and 25th. In general the month has seen many fine and mild days and some good clear night skies for the visual astronomers among you. The daily variations in atmospheric pressure from September 26 to October 25, **Fig. 2**, were taken at noon and midnight from my own barograph here in Sussex.

Tropospheric

From his home in Edinburgh, **George Garden** found some tropospheric DX on October 8. Although signals varied in strength

he logged BBC Radio Cymru from Llangollen on 104.3MHz and Metro FM from Tyne and Wear on 97.1MHz, using a Grundig 1100

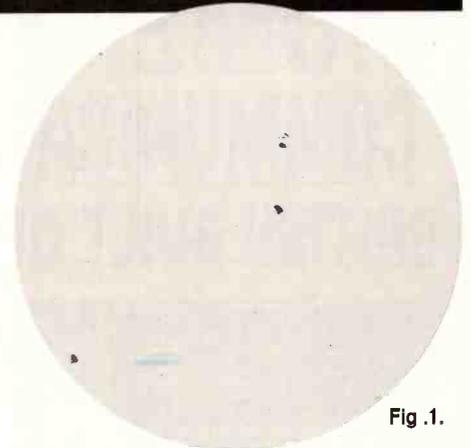


Fig. 1.

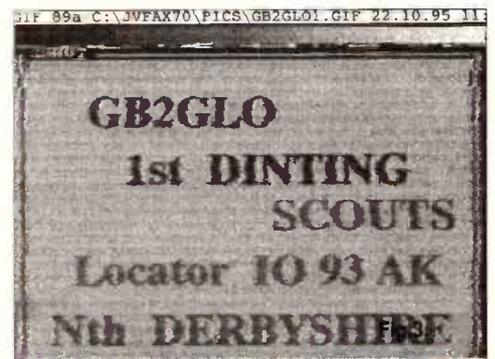
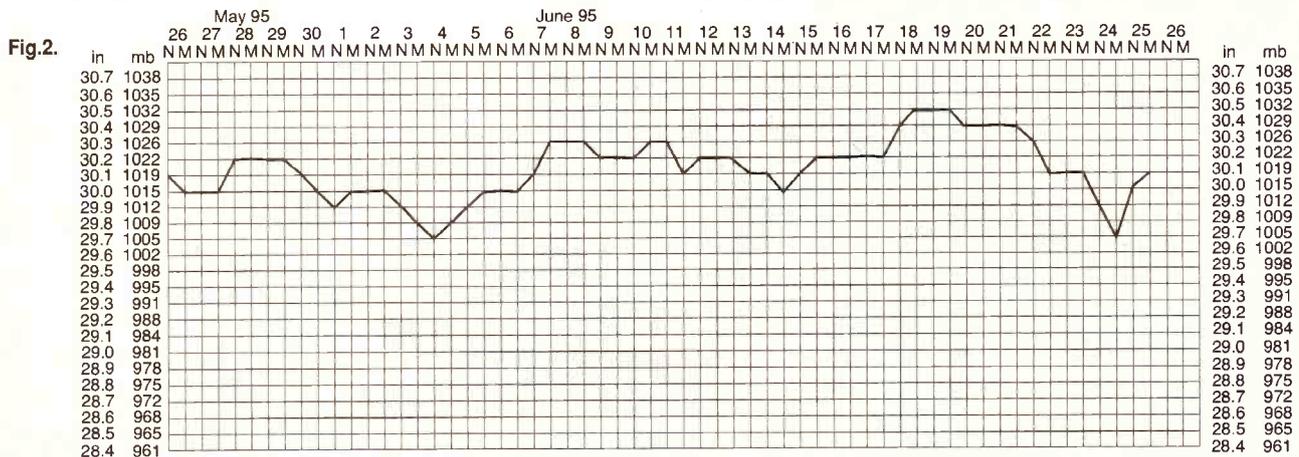


Fig. 4.

Concert Boy receiver and a "very erratic" picture from the Bilsdale transmitter of Tyne Tees TV. I saw signs of co-channel interference on pictures on the u.h.f. band while the pressure was high at 30.4in



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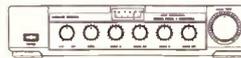
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SSTV

"The Glasgow club, GS4AGG, was again active for Jamboree On The Air," wrote **John Scott GM7UIK** from his station in Glasgow. John told me that during the event, on October 21 and 22, they made contacts around Europe from their shack at Auchengillan and that a camcorder and the video screen grabber system on his computer was used for some of the slow-scan television pictures which they transmitted. Pictures from England, **Fig. 3**, Italy, **Fig. 4**, Jordan and Spain, were among those received. "We had a fine time and everybody enjoyed this event," said John.

At his location in Stirling **GM0VRP** received some fine quality pictures during his slow-scan contacts in October with stations in Alaska, Germany, **Fig. 5** and Italy. Both GM0VRP and GM7UIK have exchanged s.s.t.v. signals on 144.5MHz and are very enthusiastic toward SSTV.

Author's Hardware

That's it folks, I trust that you have enjoyed reading my efforts as

much as I have in preparing the copy for you. I began my writing for *PW* with a heavy mechanical typewriter, graduated to an electric and ended with a Packard-Bell 486DX computer. No doubt whoever follows me will also use an electronic word processor, but, I wonder, will they begin or end by sending copy via the Internet? Over the years I have seen both *SWM* and *PW* grow in size, introduce colour and strive to please our readers with the latest technology. Perhaps in the future you will either read it on the Internet or receive it monthly on a CD-ROM. Whatever happens I am sure it will be an exciting future and I sincerely wish all of you the very best of luck.

Thanks, Ron. Your very interesting and useful columns have always been well received by our readers and you will be sorely missed. I am sure that this will not be the last time we hear from your word processor. Ed.



by Keith Hamer & Garry Smith, 17 Collingham Gardens, Derby DE22 4FS

DXTV

Welcome to this new monthly series for DXTV enthusiasts. Regular readers will no doubt be aware that Ron Ham has compiled his DXTV column for many years and has now decided to retire. We would like to wish Ron 'all the best' and hope that he will enjoy his extended leisure days.

Many DXers have been encouraged by Ron's articles over the years and we hope to continue the enthusiasm that readers have for this fascinating hobby. Hopefully, readers will support this new DXTV column. Feedback from readers will certainly help fellow enthusiasts. Please don't feel that, because you may have only recently started DXing, your reception won't be worthy of mention. Reception from British TV

transmitters is also part of the hobby and so is the interest in TV graphics such as test cards, clocks and captions. Overseas readers please note: let us have information about reception in your part of the world, or even information about TV in your country. Remember, someone's dream of an exotic signal could be the reception of your local TV station!

Let us know what equipment you use with details about your receivers, antennas, local interference sources, etc. We would also be pleased to receive copies of your reception reports. All this information helps other enthusiasts to compare their DX installation and general reception possibilities. Few DXers seem to use large outdoor antenna systems

nowadays but despite this, many produce excellent reception logs, sometimes using only simple antennas located in the lounge or bedroom!

Transatlantic Events

No-one can argue that the 1995 Sporadic-E season was one of the better ones in terms of the number of unusual or exotic signals plus the quality of reception. Transatlantic openings were very much in evidence during June and July, particularly in the 6-metre band at around 50MHz.

According to a report by **Ian Johnson** (Bromsgrove), Spanish Channel E2 signals at 48.25MHz were almost a daily occurrence in the USA. Unfortunately, transatlantic TV activity is usually a

one-way event because the lowest USA TV channel is located at 55.25MHz (Channel A2) and the m.u.f. (maximum usable frequency) only passed this mark on relatively rare occasions. One such occurrence on July 7 permitted the reception of TV signals as high as channel A5 at 77.25MHz.

Asian Signals

In Japan, extreme-range signals (over 4000km) were received on June 6 at 0230UTC from Doordarshan TV (India) on Channel E4. At a slightly shorter distance, pictures with sound from transmitters in Thailand were identified on a number of occasions throughout the summer on Channels E2 and E3.

Middle East Signals

TV signals from the Middle East were commonplace, especially in Europe where Iranian TV was received virtually on a daily basis. Well, maybe a slight over-exaggeration but reading through the logs it seemed like it! In the UK, various Middle East stations were identified including Saudi Arabia on Channel E3 (three times) and Iran on Channel E2 for over 90 minutes on the morning of July 1. There were several other instances of Arabic

reception but these remain unidentified.

Tropospheric Reception

The long hot summer produced excellent tropospheric reception conditions at times. August was particularly eventful for Band III and u.h.f. DXing with many Scandinavian stations being received as well as those in France, Belgium, Germany and the Netherlands. Perhaps some of the most distant reception was achieved by **Stephen Michie**

(Bristol) who identified the Norwegian (NRK) Halden transmitter on Channel E11 using only a small hand-held indoor Band III array!

Autumn Sporadic-E

Sporadic-E reception occurred during October with strong signals from RAI Uno (Italy) on Channels IA and IB in the late afternoon of the 11th. Twenty-four hours later, Spanish signals were present on Channels E2 and E3 with tropospheric-like stability displaying extremely clear pictures with little fading. The morning of October 23 seemed just like a typical summer Sporadic-E event with strong

continuous signals from Spain (Channels E2, E3 and E4) and also Italy on IA and IB. A few minutes prior to the main opening, Swiss DRS pictures were briefly noted on Channel E2, quickly followed by RAI Uno from the 42W E2 relay station in the Italian enclave of Campione d'Italia near Lugano. This latter signal lasted less than fifteen seconds but the logo (RAI-3-UNO) was clearly seen. Other signals included Canal

Plus (Corsica) and Portugal via Channel E3.

The Italian private TV station 'Radio-Video' on 47.8MHz continued to be received at fair strength outside the main

Contact Address

As we mentioned at the beginning of this column, we would be delighted to hear from enthusiasts around the world. Please send DXTV reception reports, equipment news, off-screen photographs and general information as soon as possible to: **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.**

Sporadic-E season. It was identified on September 14, 15 and 16 - in fact twice on the 15th! During October it was identified twice on the 28th. We wonder whether this particular transmitter, considering its relatively low transmission frequency, could be identified on a daily basis if the channel was monitored for long enough?



Fig. 4: Iran Channel E2 received in Derby on 1 July 1995.

Meteor-Shower Reception

If you are reading this column before January 3, prepare yourself for a deluge of meteor shower activity in Band I and also possibly in Band III. The Quadrantids shower peaks around January 3 and 4 and can provide lots of interesting signals, particularly from Scandinavia and Central Europe. Recent years have been poor in terms of TV signal propagated by ionised meteor trails but perhaps 1996 may be better.

For normal meteor-shower reception, the signals are only visible for a second or two so you need lots of perseverance and cat-like reactions to be able to identify these brief signals. Fortunately, the Quadrantids shower can produce extended activity resulting in a deluge of co-channel signals resembling patchy Sporadic-E reception. When this occurs it is worth trying your luck with Band III channels. In the past, distant countries such as Finland, Rumania, Italy and the former USSR have been identified in Band III.



Fig. 5: Iranian programme previews on Channel E2.

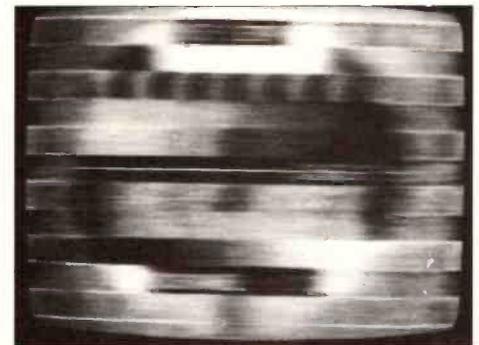


Fig. 6: Saudi Arabian PM5534 with 'HZ 22' 'CHANNEL 3' identification, received on Channel E3 in Derby on 1 July 1995 at 0745UTC.



Fig. 1: RTBF-1 (Belgium) on Channel E8 received by Tim Tebbs (New Romney, Kent).

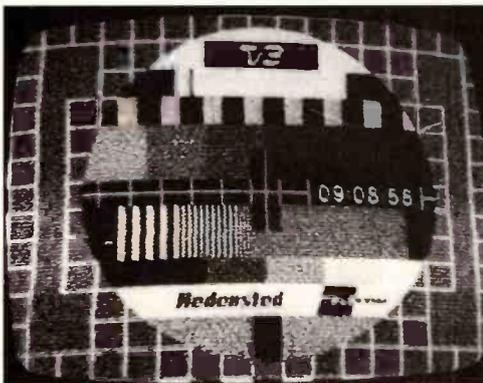


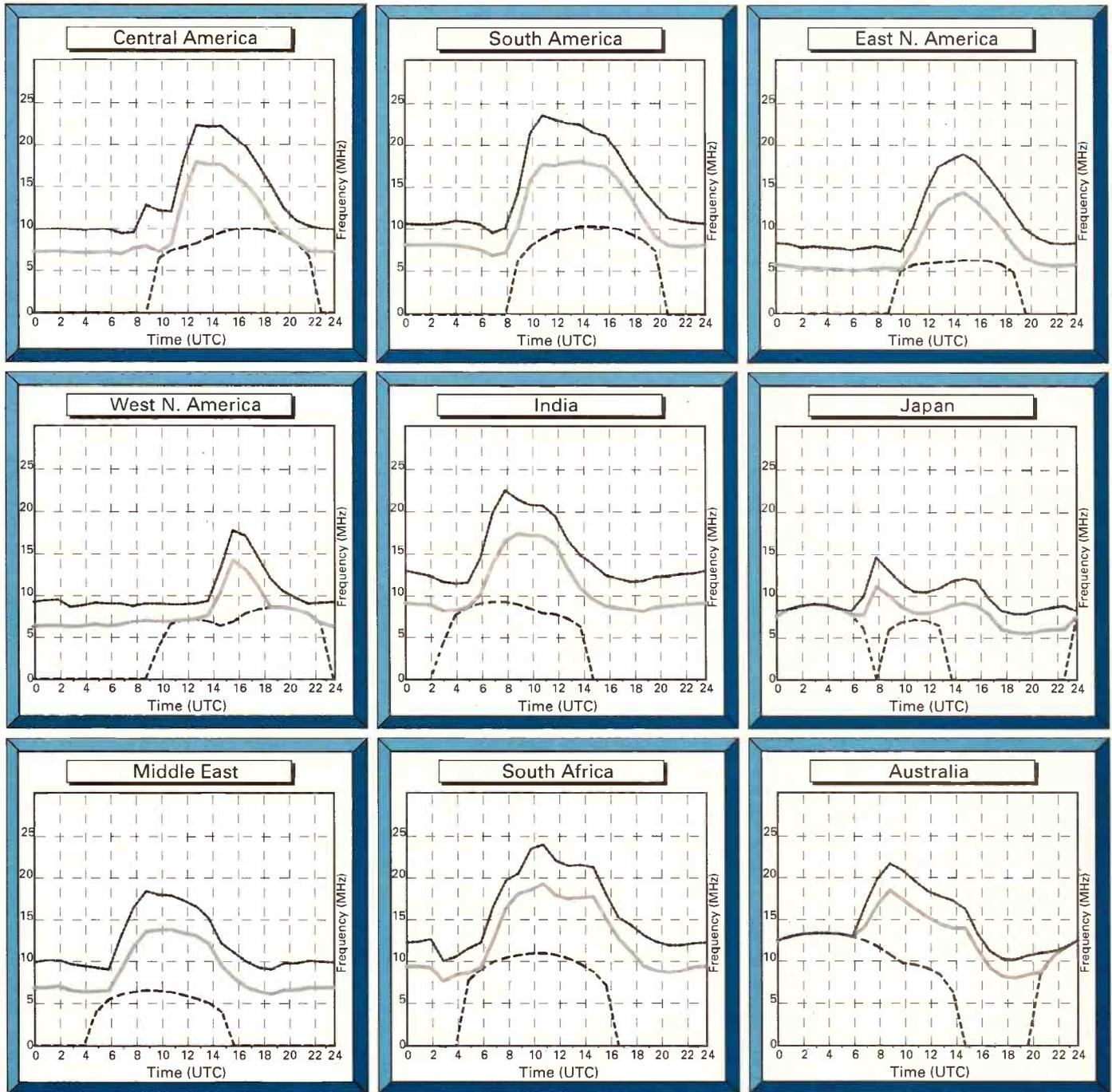
Fig. 2: Danish TV-2 PM5534 from Hedensted on Channel E30 received by Stephen Michie (Bristol).



Fig. 3: Rumanian identification caption seen on Channel R2 by Stephen Michie.

World Propagation Forecasts January

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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.

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73 from Dave G4KQH, Technical Manager.

Satellite TV News

The latest from the Clarke Belt

The broadcast media startled the quiet Saturday evening of November 4 1995 with a news flash that Israel's Prime Minister Yitzhak Rabin had been shot down at a peace rally in Tel Aviv. For several alert satellite enthusiasts this meant that Israeli based news groups would soon be uplinking live reports and two-way interviews. I arrived home from work at 2230 and on hearing the news quickly checked out the Clarke Belt that - as expected - was extremely busy with various live news packages and reports.

Feeds outbound were monitored on Eutelsat II F1 with the JCS (Jerusalem Capital Studios) offering news material to numerous broadcasters, Eutelsat 16°E was feeding CBS news in NTSC direct into the 'States for their own network consumption, II F4 at 7°E similarly was in action though news packages used SIS (Sound in Syncs) and Intelsat K's 21°W Reuters lease (11.449GHz hor) was offering continuously updated news as more information unfolded - re-runs of earlier material.

Later in the evening an east-bound Intelsat K live statement was carried from President Clinton at the White House both with sympathy for and in appreciation of the work achieved by Yitzhak Rabin. (The Intelsat K President Clinton speech actually was delayed relative to Astra that suggested that the White House feed had arrived in Europe by other means - such as a C Band feed - and then relayed once more for European distribution by Reuters)

November 5 concentrated on the sense of mourning after the assassination and with the world's leaders arriving for the funeral the following day. After the funeral, outrage followed with demonstrations that again were widely reported via the TV services.

It's a good idea to keep a check on Intelsat K activity since the Reuters leases offer a wide variety of signal sourcing from world-wide networks. November 12 found the Sky News reporter Jeremy Thompson shivering in a Washington street - discussing live with London the problems of the American government that was due to shortly run out of \$s after restrictions on increasing borrowing power were not eased by the US government.

I heard from **Julian Redwood** (Christchurch) the other day, he's currently overhauling and upgrading his C and Ku band dish system but comments on a reducing number of news feeds that he feels is due to the increasing use of digital compression by Reuters/Associated Press (APTV). At this time there are no 'decoders' available to resolve compressed signals though I'm told that it's necessary to program in the appropriate bit rate to access the signal itself. I'm hopeful that digital receivers (or decoders) will be available within the next year so that we can make a start with the news technology.

Julian reports that the APTV C Band feed over the 41°W TDRS satellite has ceased though more likely that it's gone digital. Tuning an analogue receiver over a digitally compressed signal resolves virtually nothing other than a slight darkening of the screen and a 'change' in the noise pattern on the screen.

SES Luxembourg witnessed the successful launch and orbiting of their new Astra 1E satellite that will bring to Europe the first domestic digital (compressed) transmissions during 1996 - Sky TV at this time are installing digital playout/presentation areas capable of outputting over 70 channels simultaneously. **John Locker** (Wirral) noticed that the 1E bird had been parked at 14°E for tests on November 4 running with the full 60dBW downlinks at 11.750 and 12.000GHz in the DBS band. Indicative of the improvements with both receiver and LNB design is that Sky are now pushing a smaller 480mm dish for the south-east UK (an arc between Southampton-Hull) rather than the usual 600mm. UK maker Lenson-Heath are now tooling up for the new size that will be used in conjunction with the new era low noise 'universal' LNB.

Bob French (Warwickshire) is making use of his rural retreat to have erected a 3m KTI Micromesh dish for his C Band work, the increasing use of Ku band in the 'States has necessitated improvements with normal C Band mesh for use with Ku band signals. Hopefully Bob will provide a photograph of his soon to be commissioned installation. Bob is hopeful of PAS-4 reception - which if he has no obstructions to the south-east - should be possible.

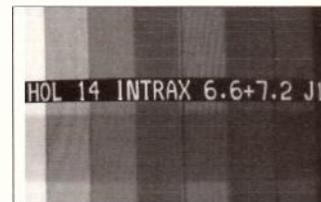
John Locker (Wirral) is incidentally receiving relatively strong signals from PAS-4 about 2 degrees above the horizon, the bird is very low in the UK sky at 68° East. The published footprint for the European Ku coverage in fact includes much of the UK, slicing off Scotland and Ireland.

I've received a letter from an old friend - **Stathis Panagiotidis**, Thessaloniki, Greece who has also been upgrading his receiving equipment. The new receiver replaces the veteran Amstrad SX320 (threshold 8dB) with a Samsung KR610S sporting just a 4dB threshold. Suddenly signals that were very poor have now an 'impressive improvement on weaker satellites such as the Astra' series, Greece being well out of the design footprint coverage. And an interesting well off-beam catch are Sirius 5.2°E signals. Usually a 2.4m dish is needed for quality reception of the 35-36dBW signals but Stathis uses just a 1m dish. Another catch has been the Russian GALS-1 at 71°E with the TV6 MOCKBA output at 11.836GHz - a very powerful signal. PAS-4 at 68°E is well received with the Arabic ART-3 and ART-Europe output (11.525/11.650GHz horizontal). Note: To help TVDXers I've asked Stathis for an update on the Band 1 transmitter situation in his region.

Nicholas Earley (Australia) has been on a well-earned holiday in Canada and notes that many large C Band dishes are still used in the country areas which outnumber Ku band dishes about 10:1. Only one digital receiver was seen in the shops - the RCA model at \$1200 though digital receivers are featured in mail order as low as \$699. Back home, Nicholas has on order a UK-made PACE digital receiver and although the Galaxy company in Victoria have already installed his dish, LNB and downfeeder cable but have no receivers available. An enclosed cutting advises that the Galaxy DTH satellite TV service has run into digital receiver problems, most of the first batch didn't work and have been returned, a new consignment was in transit mid November and might be installed 'just before Christmas'. Some have been on the receiver waiting list since January 1995!



A typical SNG uplink truck, this the Danish TV2/Lorry mobile facility using Advent equipment built into a standard Iyeco 59.12 vehicle.



Intrax International Satellite Services, based at Hilversum, Holland operate SNG facilities, here an SNG truck identifies via Eutelsat II F3 at 16°E.



Real DX, John Locker (Wirral) hauls in a weak NHK Tokyo signal from PAS-4 (68°E) just 2 degrees above the Merseyside SE horizon.



Cable Plus is a PAY-TV service for the Czeck Republic using Videocrypt scrambling and transmits from DFS Kopernikus 2 at 11.475GHz, horizontal.



Advertisement slide for the Hispasat satellite group's stand at the Geneva Telecom 95 show.

Where it all starts - an Ariane rocket at Kourou, French Guinea, this one carries the Brazilsat 2 bird atop the stack.



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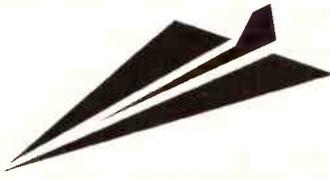
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Bandscan

Europe

If you have ever felt the urge to become an international broadcaster, move to Italy. Since the beginning of October 1995, broadcasters in Italy have been able to apply for a licence to transmit programmes on short wave to targets outside the country. This theoretically brings under control a rather loose framework which has allowed stations such as the Italian Radio Relay Service to operate transmitters beaming programmes on short wave frequencies. Adventist World Radio, a religious international broadcaster, has announced it has plans to expand its operations at Forli in northern Italy from its current single 10kW transmitter to a larger set-up. An application was expected to be made to Italy's radio-communications authorities by the end of December, 1995. This new law could mean that many more short wave transmissions are beamed from Italy in the coming years.

Recognised World Standard

Deutsche Welle, one of the world's largest international broadcasters, has announced that it is introducing the first all-digital service for listeners in Africa and Asia. The station is making use of the new Digital Video Broadcast or DVB system developed in Europe and that is now a recognised world standard for satellite transmission. DW has leased a transponder on Intelsat 702 over Africa and is sending both its radio and television programmes to the continent using DVB. It is planned that the signals on Intelsat 702 will also be used to feed the new AsiaSat 2 satellite that was due for launch in December. The new AsiaSat bird covers a geographic area that almost no other satellite can achieve - the footprint runs from Eastern Europe to Australia and New Zealand. That means more than three billion people are in the coverage area of the hot bird. All that remains is for every household to go out and buy a satellite antenna and the DVB box to allow them to watch and listen to DW. But the principal reason for DW to use the new technology is to reach rebroadcasters and cable-heads and this bold step moves them firmly along the road to gaining more audiences in a part of the world that is developing

fast. Listeners in Europe can hear DW on short wave at 2000 every day on 5.96 and 7.285MHz.

Deutsche Welle has been offering help to people who have been displaced by the war in the former Yugoslavia by broadcasting names of missing people in the hope that they can be reunited with family and friends. These 15 minute-a-day transmissions are now also being heard in Germany, relayed by domestic broadcasters Bayerischer Rundfunk, Westdeutscher Rundfunk and SFB in Berlin. Both the BBC World Service and Voice of America run similar programmes to help people get back in touch with others who have been affected by the war.

Analogue satellite television continues to be important, despite the advent of DVB. Romania's press agency has reported the start of TV Romania International, using Eutelsat II-F3 at 16 degrees east. The station is scheduled for three and a half hours every day, starting at 1930UTC. Tune in to the station on the frequency of 11.575MHz.

Increased Budget

France's world broadcaster, Radio France Internationale, is in the very happy position of having a government which is increasing its budget. In November, the station's board of directors met and agreed to an increase of more than 12% in RFI's budget for 1996. This is at a time when most international broadcasters, particularly those in Europe, are facing dramatic cutbacks. For example, Radio Sweden is being forced to trim its operations and the BBC World Service is now worse off in real terms than it was three years ago. The 1996 budget provides 735 million French francs, allowing more development of the improved transmitter facilities at the Issodun site in France, and the investigation of a new relay station in Asia. At the moment, no site has been chosen, but the station is concerned that other stations are building relays in the region (such as the BBC's new Thailand site). RFI in English is on the air at:

| | |
|-----------|---|
| 1200-1300 | 9.805, 11.60, 11.615, 13.625, 15.155, 15.195, 15.325 and 15.53MHz |
| 1400-1500 | 7.11, 12.03 and 17.56MHz |
| 1600-1700 | 6.175, 9.485, 11.615, 11.70, 12.015, 15.21, 15.53MHz |
| 1700-1800 | 9.485, 11.615MHz |

RAI in Rome is continuing to use the BBC's relay facilities to reach audiences in South America and is introducing transmissions to Asia from early January. It is broadcast from Ascension Island, home of the BBC's Atlantic Relay station, and from 9th January, via Singapore where the BBC's Eastern Relay station is located. At the moment it is only Italian language programmes that are broadcast from the BBC sites. English from Rome is at:

| | |
|-----------|------------------------|
| 0425-0440 | 5.99, 7.275MHz |
| 1935-1955 | 6.03, 7.235MHz |
| 2025-2045 | 5.99, 7.11, 9.71MHz |
| 2200-2225 | 5.99, 9.71, 11.815MHz |
| 0050-0110 | 6.005, 9.645, 11.80MHz |

Long Memory?

Listeners with long memories may recall the days when Danish Radio in Copenhagen broadcast in English. After a gap of around 30 years, January 7th sees the start of transmissions in the language again. Danmarks Radio has ceased to run its own transmitters, and instead rents time from the Norwegian authorities. You can tune in to English from Copenhagen, via Norway, in the last 15 minutes of each broadcast. And you can write to the station at **Rosenorns Alle 22, DK 1999 Fredriksberg C, Denmark, Fax: +45 35 20 57 81, or E-mail: rdk.ek@login.dknet.dk.** The station is airborne at:

| | |
|-----------|-------------------------------|
| 0430-0455 | 5.964, 6.04, 6.195, 7.165MHz |
| 0530-0555 | 5.965, 7.18MHz |
| 0630-0655 | 5.965, 7.18, 9.59, 11.735MHz |
| 0730-0755 | 5.965, 7.18, 9.59MHz |
| 1030-1055 | 7.295, 11.85MHz |
| 1130-1155 | 7.295, 9.62MHz |
| 1230-1255 | 7.295, 9.59, 11.84, 15.605MHz |
| 1330-1355 | 7.315, 9.59, 11.84, 15.605MHz |
| 1630-1655 | 9.59, 11.84MHz |
| 1730-1755 | 7.485, 7.525, 9.59MHz |
| 1830-1855 | 5.96, 7.485, 9.59MHz |
| 1930-1955 | 5.96, 6.195, 7.485, 9.59MHz |
| 2030-2055 | 6.195, 7.52MHz |
| 2130-2155 | 5.96, 6.17, 7.315MHz |

Co-operation is now the norm rather than the exception when it comes to international radio broadcasting. A new radio station was launched in November broadcasting across the Czech Republic. Czech Radio 6 went the air 6 November, using material from Radio Free Europe, now headquartered in Prague, BBC World Service, Deutsche Welle and the Voice of America. The new station is talk-based, with heavy concentration news, politics and business, and is carried on the medium wave channel of 1287kHz.

St Patrick's Day

Finally, some advance information: look out for unusual short wave transmissions St Patrick's Day, March 17. Several keen short wave enthusiasts in the Republic of Ireland are contemplating hiring transmitters to send special programmes around the world on the Irish Patron Saint's day, perhaps along the lines of the special once-a-year short wave service from St Helena. No more details at the moment, but a full report, if this actually happens, in the next Bandscan Europe in April's magazine!

Amateur Bands Round-up

Listening to the Amateurs Let's have all your news and comments, sent as usual for the start of the month.

Hello again! Over the past couple of days winter has finally got around to 'doing its thing' so now we must set to and clear up the garden ready for the winter snows.

Which is as good a way as any of mentioning that if you use a 'counterpoise' earth arrangement for your antenna, it should be so arranged that the counterpoise wire can't be buried in snow. Should it be under snow, then it will become decidedly less useful until you dig it out again or the snow melts!

Most receivers used by listeners on the short wave bands are fitted with wide enough i.f. filters to cope with a.m. signals. There is much to be said for considering the possibilities of 'closing in' the i.f. bandwidth to sideband or even c.w. widths. If you can't do this, you can make an improvement by using an audio filter. Obviously the ideal audio filter for 1996 uses digital signal processing (d.s.p.) techniques, but as always there are other cheaper possibilities.

For c.w. I have an ancient war-surplus thing called an FL8 that one plugs into the 'phone socket and into which one can plug the headphones. Also there is a mid-sixties vintage MFJ audio filter type CWF-2 that nowadays is all but 'mended beyond repair' after years of use.

At the Llandudno Rally a few days ago, I picked up an old Datong FL1 filter from the estate of a Silent Key member of RAFARS. One can also home-brew such audio filters....there are ALWAYS more ways than one of skinning the cat! An operating tip: when using any sort of audio filter turn down the r.f./i.f. gain as much as possible, compensating if necessary with more a.f. gain so the audio filter gets the best chance to do its job.

Letters

In Barnsley resides **Colin Dean** who is a member of ISWL. On 3.5MHz sideband he picked up CY0TP on Sable Island and 3V8BB. 14MHz c.w. was the mode for VU2JPS, on the Andamans, while side-band dealt with A71BI, A92EV, AP2MY, CY0TP, DU1AK, D44BC, FR5HR, HS7CHB, JX9JP, J52AK, SU3AM, TJ7AG, TT8BP, VE8TA, VK50PEACE, VQ9AM, VS6CT, XZ7A, Y195BIF, ZA7BM, ZD7WRG, ZD8Z, 3B8AD, 3W6GM, 4S7EA, 5A1A, 9G1YR, 9K2RA, 9L1PG, 9M8DJ and 9N1RHM. As for 18MHz, it managed AP2N, HZ1AB, OD5NJ, SV2ASP/A on Mount Athos, TA2IB, V51BG,

WP4U, Z21JE, 4S7RF, 9G1YR and 9K2QA.

The dreaded 'flu bug seems to have moved outwards from Wales, and it attacked **Phil Townsend** in London E17. Phil has a Lowe HF-225 a home-made pre-selector, an ended wire about 10m long and a medium-wave loop around about 400 x 300mm that is used for Top Band. 14MHz was the band used to pick out WA2JVM working 14BFT, 9H4AC working G0YAR, and VU2DK in Poona at the bottom of a pile-up of USA stations.

Why use a loop for Top Band? With a suitable screened loop arrangement tuned to a specific frequency, you will obviously pick-up less signal than you can get from a normal antenna. The profit, in simple terms, is that the noise is reduced far more than the signal when the loop is in use. Thus a reduction in noise of 35dB and a reduction in signal of 20dB leaves you 20dB profit; and of course you can arrange a small pre-amp to take signal from the loop and offer it to the main receiver. Top Band being so noisy makes the technique very useful indeed. Don't forget to break the coaxial braid at the centre of the of the loop, or it will not be a Faraday screen but a complete screen!

Now we head down to the Isle of Sheppey, and **Ted Trowell**, who remarks sadly that the warm weather kept the grass growing and gave him no excuse to retire to the shack! Ted is mainly an exponent of c.w. these days, and on Top Band he noted OZ1AXG, K1ZM, LA6REA, LX1DA, TM5SM, HA8IE and OM2XW; then at 3.5MHz FG/F6FGZ, 8P9II, 3A2MD (a YL) and K4PQL. 7MHz accounted for ZL6KCM, a RSARS Museum station at Waikanae operating old Collins kit, K7LFY, KH6NO, PT2CC, KK7K, ZL3PD, ZL1AMO, OH0/OZ1FG, PZ1DV, 4Z1JS, VK2ZC, 3V8AS and EG9A (Alhucemas Isle). 10MHz saw VK4SS, 4Z4DX, JH7DDH and EA6VS. The 14MHz crop included 9K2MU, 4S7WP, VE7NH, ET3KV, PJ2AM, LU6EF, LU8HSO, FM5CW, K1EFI/VP9, W6CYX, 9Q5MRC, 3B8DB, LU1XSI (Cape Horn), KROY and ZA1Z. At 18MHz we see log entries for K0UXQ, ET3KV, 4X1VF, TU4EY, 3V8AS, 9Q5MRC, 5N35/OK1MU and 9Y4KB. Now for the surprise....21MHz sideband logged from G3YEP/MM in the Red Sea, 9K2MA and N4ISE/OD5! A quick flip back down to refuge at the c.w. end of the same band produced 7Z5OO, A71CW, EA6ZY, 9K2MA, 4X6VJ, PU2MHB, ET3KV, TA2ZY,

VU2BK, 9J2SZ, EA8CN and EA8AT. Yet higher in frequency again, the rarefied atmosphere of 24MHz for ZS1JX, 9J2SZ, TU4EY, 5N35/OK1MU, KG4O and 4X4DK; and on 28MHz signals were logged from 9J2BO and 4X6VJ.

As one should, **John Taylor** in Cheadle Hulme has many interests and as he says he has been 'in and out of s.w.l. for sixty years'. John has dug out his Yaesu FR-400, resting since back in 1980 and is busy giving it something akin to a 36,000 mile service. Meantime he wants to know 'what happened to the Geoff Watts *DX News Sheet* and his Prefix Lists?' Firstly, *DXNS*; when Geoff's eyesight got too bad, and his wife was ill, it was taken over by RSGB and continues to this day with editing and printing being done by Chris Page G4BUE. As for the Lists, Geoff continued it and indeed added other complementary lists, right up until his death. They were so much missed that the RSGB took them up, and they now appear, consolidated into the RSGB Prefix Guide, under the very able editorship of John Forward G3HTA. It is understood that the new editions of the Guide will be published at intervals. I should add that G3HTA and G4BUE are both themselves active operators.

Another one to return to the hobby after a decade of absence is **Geoff Wallis** of Chippenham who will be remembered by some Old-Timers as ZB2R. Now he has a Sony ICF-600, buckled to an inverted-V, 60 metres long, but Geoff hopes to be back on the air soon. A quick listen on 7MHz starting at 0540UTC on November 10 yielded CN8TM, S59KAB, CT1BBR, JA4SM, 5V8JE, 9A4QV/MM at 36N 049W, WB0CNQ, ZL3SQ, CT4AS, TK5MH, EA5CLH, W4LZW, ZL1AMO, EA7TO, LZ2LT and GM3JDR who lives to the north of Wick. November 13 saw another foray on this band, between 0700 and 0720, that produced W8IQ, VE9AA, OH5UX, YK1AN, T91ENS, HB9OM, 9A4QV/MM, VP8AT, CT4AS, LZ2HA, HB9OM again and ZL1AMO. By contrast a lunch-time look at 14MHz between 1340 and 1430 produced RU1AQ, 5B4ABF, VK3OX, AA1KL, 3V8AB, OL8M, Z3JXA, DA0TJM, ZL3SQ, S59KAB, SV8JE, Z32XA by KM6ON, CT4AS, KO4IO and VU2BK.

QSL Addresses

Thanks to Ted Trowell ET3KV via DL1VU; N4ISE/OD5 via N4JR; 5N35/OK1MU via OK1DCH; ET3BN to PO Box 150194 Addis Ababa;

8P9II via DL7DF; EG9A via EA4URE; 7Z5OO via W1AF.

From *DX News Sheet*, 5H3CK via I4LCK; HP2CWD via Jose N.G. Lee. PO Box 728 Colon, Rep of Panama. I note also that KF0UI is in hospital so cards for HP1XVH, EL2RR, HH2/N2SIY, J3/N2SIY, J3/KB0QNS, LX1RQ and XW1/W6EFR are held up. Son KB2NY says, "Please wait a while, and normal service will be resumed when Dad has recovered".

Finally

My anonymous correspondent, who asks so many questions he must be using me as sort of unofficial RAE tutor!, is asking this time about earths. Go borrow a small mirror and a pin for what follows, and also recall that radio waves and light waves differ only in their wavelength.

Now, hold the pin horizontally above the mirror, and imagine the pin is in fact fed at its centre with a feeder like a dipole. In the mirror you would see an image of the pin and of the feeder. The pin 'antenna' and its image are both similarly fed; if you covered the mirror, the pin antenna could still radiate because each leg of the antenna is fed.

Now get a tiny blob of, say, Blu-Tack and stick the pin vertically above the mirror. Now you can imagine one leg of the feeder going to the base of the pin; the other leg has to be connected to the silvering of the mirror. The antenna now comprises the vertical bit that we simulate as the pin, and the image in the mirror to which we have connected the odd leg of feeder. Imagine we have a quarter-wave long pin; the image is a quarter-wave long too, and between them together they constitute a vertical dipole.

Now repeat the whole sequence over an ordinary table-top. Clearly, we can deduce that the horizontal dipole is complete in itself, since we can see it all. However, when we now look at our vertical, we can see the pin, but the other half - the image - has disappeared.

So - we deduce that the silvering on the mirror is analogous to our radio ground. The more we do to 'silver the mirror' by way of radials, counterpoises and whatever, the better the earth part of the system will be, and the better the antenna will work. An antenna that depends on earth in this manner is called a 'Marconi' antenna, while the one that takes power from both legs of the feeder, like a dipole, is called a 'Hertz' antenna.

SSB Utility Listening

Following the write-ups in recent months concerning Emergency Action Messages (EAMs), a number of people have written-in with logs of what they have heard. One person even went so far as to do breakdowns of the EAMs by day, week, day of week, and time of day. Recently, I have been hearing EAMs and Skyking broadcasts from Yokota (Japan) early in the morning, so it seems that the propagation may be improving at last.

One final comment about EAMs. You've all heard them on h.f., but now you can see how they are used. By the time that you read these words, the film *Crimson Tide* will be doing the rounds of the cinemas. It is a film about a nuclear submarine which receives an EAM message ordering them to fire their missiles upon an enemy, only to receive another partial EAM countermanding their original launch order. The film goes some way to explain how the message is received and decoded, and then follows ensuing arguments between the senior officers whether they should launch or not.

FYY

The callsign 'Foxtrot Yankee Yankee' has been used for many decades by aircraft operating from RAF Finningley. Some of the aircraft are involved in navigator training for the RAF, and some are used to train pilots how to fly larger multi-engined aircraft. As part of the training, the students get to operate the h.f. radios in the aircraft, and learn how to pass messages. For this purpose, an h.f. station was established - this station uses the callsign 'BT9P'. I have seen quite a few reports of this station over the years, and several books list it as 'RAF Doncaster' - RAF Finningley is quite close to Doncaster, so I guess they that they are almost correct!. The 'FYY' aircraft using h.f. to contact 'BT9P' are either Jetstream T.1 turbo-prop aircraft, or Dominie T.1 jet aircraft.

This year, RAF Finningley closed, and all flying units were transferred to other RAF airfields. Both the Jetstream and Dominie aircraft are now based at RAF Cranwell (between Sleaford and Lincoln). As a result of the move, the callsign of these flights has changed. They no longer use

'FYY', they use the prefix 'CWL' followed by a two-digit number. As far as I know, station 'BT9P' has not changed its operating frequencies, but I do not know if it has moved to a new location as a result of the airfield closure. *Ferrells Confidential Frequency List* (9th ed.) lists the following frequencies for station 'BT9P': (c.w.) 5.361, 5.685, 6.752, 11.250, (u.s.b.) 3.050, 4.749, 4.790, 8.984, 9.024, (RTTY) 4.830MHz. During the Summer, BT9P was heard on 8.980MHz with the following practice message for FYY42: "FYY42 DE BT9P = IMMEDIATE 121311Z = FROM ABC TO FYY47 = RESCUE 51 AND RESCUE 53 ARE OPERATING NORTH OF YOUR AREA IN SEARCH AREA 54 NORTH TO 60 NORTH AND 01 WEST TO 04 WEST. YOU ARE TO REMAIN BELOW FLIGHTLEVEL 200 UNTIL 121420Z = 1319Z". The practice message has to be read-back perfectly by the student - not very easy, even under ideal conditions.

SCC

The Sea Cadet Corps (SCC) was mentioned earlier this year, and I even mentioned a few of their frequencies. I had a 'spooky' experience in early November

while listening to the Sunday morning net on 6.9925MHz. Station MFP34 passed a message saying that 'This net was mentioned in the October issue of *SWM*', and the reply from MFJ04 was 'all SCC frequencies were published earlier this year' (I presume that they mean in the *Eavesdropping on the British Military* book). Hey folks, people have been talking about me over h.f.! I spent the rest of the morning listening to their net, and I am quite impressed with the way that it is run. This particular frequency suffers a bit from QRM, but the signals are usually very good over most of the UK. Does anybody know if they QSL, or where I should write to?

SAM

I have mentioned the 'Mystic Star' network several times in this column, and I have even listed a few frequency/channel tie-ups in the Traffic Log over the past year or so. I still get letters asking for a 'full list of tie-ups', but until now I have been unable to help.

For those of you not familiar with this network, it is a series of h.f. frequencies between 3 and 27MHz, used by United States VIP aircraft for discrete

communications. A lot of the contacts are 'in the clear' (i.e., not scrambled), so it is possible to hear some quite intriguing conversations. Much of the communications is now done by satellite links, so the 'Mystic Star' network tends to be used as a backup service. However, there are times when the satellites are not available, or the aircraft equipment is broken; this is when h.f. radio comes to the rescue!

In recent months on the WUN network on the Internet, there have been several conversations regarding the 'Mystic Star' network, and several partial frequency lists have been passed around. I have been in touch with the compiler of one of the lists, and he has given me permission to distribute the list to readers of *SWM*.

Before you all start writing-in requesting a copy, I should point out a few things about the list. The full 'Mystic Star' network contains 1000 tie-ups, but the list I am offering contains about 200. The list should also be used as a guide only, as the tie-ups do change from time to time. The list contains a few other interesting frequencies, such as some of the USCG discrete frequencies, and an almost complete list of the US Strategic Command h.f. frequencies. Please note, I am not just giving this list away, you will have to do some work yourself to get a copy. I cannot charge for the list, so I will swap you a copy of the list for a copy of your own recent logs. I'm after a full page of logs, not just one or two items on a scrap of paper; don't think that you can write-in claiming 'not to hear anything' - if you can't hear anything on h.f. already, having the list will not help you. Also, please try to check-out some different frequencies from whatever you normally listen to; I'm trying to avoid hundreds of logs for 11.175MHz or the NAT tracks!

So, to get a copy of the list, send me a copy of your own logs, along with a large stamped s.a.e. (self-addressed envelope), and I'll send you the list by return. The address is at the top of the page. For those readers not in the UK, send just the self-addressed envelope, and I'll pay for the stamp (I must be mad!, but it is Christmas). Remember, no logs or s.a.e., no list - no exceptions! Happy Christmas everyone.

Traffic Log

(all freqs in MHz u.s.b., all times in UTC)

| | |
|--------|--|
| 4.635 | (5/10, 14.03) 'GT' called by 'Coastal Control', with long counts to allow 'GT' to tune their radios. This is 'ship channel 37' in the 'Coastal Control' network. |
| 4.724 | (11/10, 07.41) Neatishead ADRU broadcasting the message "we are unable to give further service due to evacuation of this unit". |
| 4.787 | (5/10, 18.30) Probable British Army training network involving callsigns V34, L21C, L6U, B4Q, V21D and V42. They were suffering badly from QRM from broadcasts stations. |
| 5.436 | (10/10, 08.16) Buchan ADRU working station 1BI, requesting that they 'go red at this time'. I always understood that 'green comms' were in the clear, so presumably 'red comms' means that they are scrambled. |
| 5.598 | (23/10, 23.50) Quid 60 (a KC-135 tanker aircraft from RAF Mildenhall) working Santa Maria ATC with a 15-minute running commentary of the air-to-air refuelling of flights 'Reach 143BS' and 'Reach 144BS' by aircraft Quid 60 and Quid 66, all in total darkness. The 'BS' suffix to the Reach flight indicates aircraft involved in the 'Bright Star' exercise in Egypt during late October and November. |
| 6.556 | (17/10, 23.32) Britannia Ops, Luton working 'Kilo Echo' (Monarch Airlines Boeing 757 G-BMKE) who was en-route to Tenerife, discussing some problems with their landing-gear. |
| 8.968 | (15/10, 23.47) Spar 76 working Lajes with a phone-patch to Andrews VIP. 76 was told to use channel F295 Upper (11.460MHz) as primary, and F117 Upper (6.993MHz) as secondary, and that they would be sharing the primary frequency with a Navy aircraft. |
| 15.016 | (16/10, 11.35) Britannia 369A working Lajes GHFS with a phone-patch to Lajes Metro, requesting their current weather. For their PIREP, they reported that they were a Boeing 767 at flight-level 370, at position 48°N 20°W. |

Airband

Christmas Quiz time again! Christine Mlynek chanced upon this subject whilst walking around an aerodrome, and took the photo. You need to tell me what it is, where on the aerodrome you'd find it, and its purpose. In the event of there being more than one good answer, the winner will be the entrant who, in my opinion, has provided the most detailed and accurate description. Any further tie-break will be by random selection. My decision is final and no correspondence will be entered into. Entries to reach me by the February 16 deadline please. The prize is an a.d.f. 'radio compass' indicator, made by Aircraft Radio Corporation of New Jersey.



Christmas Quiz. Christine Mlynek.

Help Wanted

I don't think there's an aeronautical connection, but I can't help noticing the well-equipped antenna farm at Edlesborough (between Hemel Hempstead, Hertfordshire, and Leighton Buzzard, Bedfordshire). It's not a place that ever gets mentioned in articles on radio. So, who out there can satisfy my curiosity and tell me what it's for?

That there's so little in this column relevant to Scottish readers has been noticed by both myself and **Colin Topping GM6HGW/RNARS 1870** (Newport on Tay). Did you ever fly in the Navy, Colin? Well, Colin points out that the terrain up there isn't ideal for v.h.f./u.h.f. but there is, nonetheless, activity at various

places. Of course, if readers have any more news on the Scottish aviation scene, please pass it on to me!

I'll help **B.R. Taylor** (Woking) with the identification of Whiskey Whiskey. This British Airways Boeing 767-300 is in fact registered G-BNWW. Aircraft are often referred to by the final two letters of their registration, and Whiskey is the internationally-agreed phonetic for W. Phonetics are useful when letters are spoken over a communication system (such as radio) as they reduce the chances of the listener mis-hearing.

News

The future of London's Helicopter Emergency Medical Service (flown by G-HEMS) is in doubt. The *British Medical Journal* of 4/11/95, page 1185, reports that funding might cease in 1997. The debate continues as to whether or not there are benefits to patients by rapidly bringing medical care in a helicopter, as distinct from applying first-aid and taking the patient to the medical facilities by road ambulance. Could be one less exciting aeronautical activity in London airspace.

Follow-Ups and Foul-Ups

Sorry about another problem with a caption. In the November issue, page 68, you saw a 'Prototype'. This wasn't meant to be a quiz, so no prizes for identifying it as a Hunting Jet Provost.

Receiver Hardware

Will certain parts of the v.h.f. airband be converted to 8.33kHz channel spacing? The story so far: air-traffic control administrations say that they will run out of frequencies for en-route traffic quite soon. The airlines reply, hard luck; it'll take us much too long to re-equip with transceivers capable of 8.33kHz channels. The costs and benefits are that the equipment will be expensive, but without the ability to communicate with controllers on all frequencies, certain direct routes will be denied to overflying aircraft and a long, expensive, detour would become necessary.

What can be done about it? Anyone purchasing new equipment should attempt to

future-proof by going for the most flexible offering available. As you can see from the review of the Yupiteru MVT-7200 (November page 12) both this and the MVT-7100 offer 50Hz channels. Beware, though, that I'm not sure if this spacing works on a.m. rather than s.s.b. only. You'll have to check prior to purchase.

Let's pick two existing adjacent frequencies: 130.0 and 130.025MHz. The new plan enables two extra channels to be interleaved at 130.00833 and 130.01666MHz. I suppose the next channel is theoretically 130.02499MHz but that's really 130.025; actually, instead of 8.33kHz spacing, we mean 'eight-and-a-third kHz'. In other words, the existing 25kHz spacing is divided into three parts by inserting two new centre frequencies. The MVT-7200 could be expected to get as close as 130.00835 and 130.01665MHz, which I'm sure will be close enough.

Another suitable receiver is being investigated by **James Turner** (Huddersfield) who tells me that he hopes the AR-8000 would also be able to tune the nearest 50Hz increment from the channel centre. James thinks that



Beagle D.5/180 Husky.

Christine Mlynek.

the introduction of the reduced spacing won't be until 2007. I wonder if the airlines are procrastinating, holding out for something better to come along - such as shared-channel digital communications.

They still haven't decided what to call the new allocations. As this column is read in industrial circles, let me suggest that the two examples above could be called '130.0 plus channel' and '130.02 minus channel'. No change to the nomenclature for existing frequencies. How about it?

Now, antennas. Not an easy problem for **Paul Fineman** (Orpington) despite having the height advantage of living on the 10th floor. Paul managed to mount an Air 33 antenna (from Haydon Communications, who advertise in this magazine) on the outside of his block of flats, with much improved v.h.f. reception as a result. Haydon tell me that this passive antenna contains a pair of collinears, one centred on the v.h.f. and the other on the u.h.f. airbands. Could this be a solution to others who have restricted locations?

Frequency and Operational News

From the CAA, A/C 90/1995 shows the withdrawal of the OW n.d.b. that was on 389.5kHz to the west of Heathrow. A new airway is J11, between Benix, Barlu and Fawbo, just east of the Channel Islands. A/C 98/1995 explains that this is to ease the flow of aircraft departing Jersey and then overflying London.

Another military air base closure is Scampton, home of the Red Arrows. A/C 97/1995 says that the Reds will move to Cranwell, but will still train in the same airspace near Scampton. Control is by Waddington Approach 127.35MHz.

Why would an aircraft experience a sudden loud bang while in flight? So asks **A. Sayner** (York). Assuming there's no fault with the aircraft itself (such as a jet engine surge) the most likely possibility is having run over another aircraft's wake

turbulence. Aircraft (helicopters as well as fixed-wing) leave a vortex wake of disturbed air behind them. This takes some minutes to settle down, and is worse for heavier aircraft. Sonic booms aren't allowed over or near land, so this isn't a likely explanation.

It's nice to know that pilots retain a sense of humour, but the correct phrases to be spoken over the air are listed in the CAA's CAP 413 document. First, send a reply envelope (to hold a single A4 sheet) to the Broadstone Editorial office (not to me!) and ask for the Airband Factsheet. This lists

suppliers of charts and books (including the CAA). Use this information to obtain the documents you need. CAP 413 doesn't mention airborne witches, **Mr. Sayner**, but your letter did arrive near to Halloween!

Approaches to airports with parallel runways can be confusing. Heathrow currently allocates one runway to arrivals and the other to departures, but they are investigating the possibility that both runways could simultaneously handle any movement in the interest of expediency. Gatwick has a main

too far to the side of the i.l.s. localiser. Presumably, controllers will explain that the AMA has alarmed when instructing pilots to go-around.

NDBs

I also recommend the Airband Factsheet (as above) to **Martyn Doig GW4CQZ** (Denbigh). Martyn wants a list of all n.d.b.s but I'm afraid this column isn't big enough to publish it in! A decode is included in each section of the *RAF En Route Supplement*, and again, you'll find contact details for purchasing these in the Factsheet.

Meanwhile, using the decode list, I've looked up the callsigns of the beacons that Martyn asks about and here are their identities. Frequencies are the official allocations in kHz, but when tuned on a receiver there might be a slight error due to both calibration of the receiver and off-setting for best reception.

AB=Akraberg 381. BGW=Le Bourget 334. BUN=Bruno 341.5. CNE=Caen 404. EAS=Eastleigh 391.5. GLG=Glasgow 350. ING=St. Inglevert 387.5. JEW=Jersey 367 (now withdrawn). KB=Kariba 399 - but it's in the southern hemisphere! LYX=Lydd 397. MAK=Mackel 360. MLX=Morlaix 371. MP=Cherbourg 373.

MRV=Merville 403.5. NEW=Newcastle 352. NGY=New Galloway 399. NIK=Nicky 336.5. NL=Nolso 404. NN=Eskilstuna 362. OA=Amsterdam 395. OAN=Orleans 385. ONO=Ostend 399.5. OP=Brussels 402. OY=Belfast 322. PTH=Perth 388. SBH (not SB)=Sumburgh 351. SHD=Scotstownhead 383. SOG=Solling 374.5. TLA=Talla 363. WLU=Luxembourg 346. WPL=Welshpool 323. I haven't room to print the latitude and longitude of all these, but the Supplements will tell you.

What about TST? Any navigation aid radiating with this callsign is under test, and shouldn't be used. Unfortunately, it means it can't be identified until it goes back into service and its normal ident replaces the TST transmission.

Most beacons consist of duplicate transmitter systems (in case one goes wrong). The change-over is automatic, and most beacons are monitored centrally so that the engineers are alerted to any faults. The

callsign of the beacon is suffixed by a letter E (one dot) indicating emergency operation of a standby transmitter or alternative power if the mains supply has failed.

Finally, here are some beacons that I can't identify along with frequencies (kHz) given by Martyn. Who can tell the rest of us where they are? ACD 416. ACT 417. BOU 391. BST 428. FNR 401. GMN 333. LRW 357. MVC 326. ONT 431. SBL 323. SBY 329. WC 357.

The next three deadlines (for topical information) are January 12, February 16 and March 15. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

Abbreviations

| | |
|--------|-----------------------------------|
| AIC | Aeronautical Information Circular |
| a.m. | amplitude modulation |
| CAA | Civil Aviation Authority |
| CAP | Civil Aviation Publication |
| Hz | hertz |
| i.l.s. | instrument landing system |
| kHz | kilohertz |
| MHz | megahertz |
| n.d.b. | non-directional beacon |
| s.s.b. | single sideband |
| u.h.f. | ultra high frequency |
| v.h.f. | very high frequency |



Duxford's Catalina taxis out.

Christine Mlynck

and standby runway plus a taxi-way - all in parallel. Twice, aircraft have landed on the taxi-way! To enable the aerodrome controller to have a clearer idea of the runway for which an approaching aircraft is lined up, improved radar is now available. The Approach Monitoring Aid (AMA) will sound an alarm if an aircraft is deviated

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Scanning

Happy New 1996 to everyone - and I hope that Christmas was good for you, radio equipment wise! I sincerely hope we can keep up the good work we achieved last year and make the column better - I'm open to suggestions and will always try out anything new!

Now, to add my weight to the debate on the 'creeping in' to the magazine of computer related items. No, we should not have a dedicated computer section. Computing is a hobby in itself and it's also one that has its own market. However, we cannot afford to ignore the fact that it has ties with radio and that this serves a large audience. Consequently, I endorse quite fully the argument that we need a computer/radio page. Take a look at scanning if you want proof. When it first came out it was viewed as a 'young pretender' and ignored for ages. Now it is a way in for many to the wider world of radio. The magazine can become the leader here - and that guarantees its survival. In other words, if we adopt the head in the sand approach then we stand a chance of letting this new area pass us by. Others will take it up - and we could lose the entire magazine as a result. Let's not forget that radio is a specialist hobby. We either move with the times and cater for all tastes or we go under. That's it starkly. If you want more convincing, may I ask what other magazine caters solely for the listener? Answer? None. Every other radio magazine is dedicated to transmitting - either CB or amateur. *SWM* is dedicated to the listener. Long may it be so. Either we change - or we don't. I'm all for change.

Scanning News

I erected another antenna here at Steeple Claydon over the winter. This is mated with my VT-225 that was previously on the Scanmaster Base. The AR2000 is now on this external antenna - with excellent results - so it was decided to mount the VT-225 on the new external and pull in more when backing up the AR2000. This has been achieved by mounting an Air-33 from Haydon Communications to the chimney stack. The signals are tremendous - to say the least! I'm now more

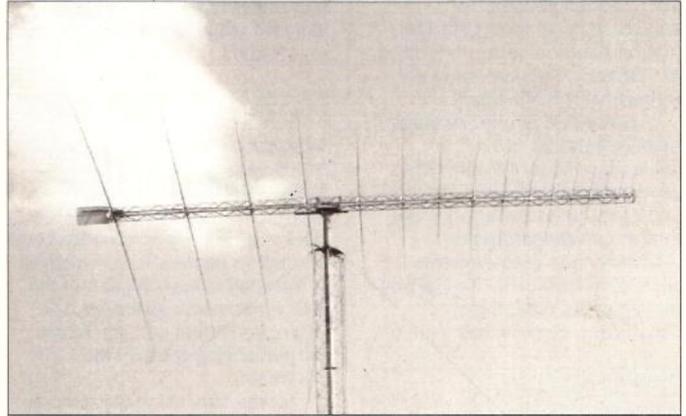
than happy with the results and my ranges have increased accordingly.

For those who don't know, the Air-33 is a dedicated airband base antenna - civ and mil - that is quite small and very sturdily made indeed. Full marks to Haydon for speedy delivery and assistance on this. I use verticals as a discone cannot be anything other than a compromise. Some are still advertised as being ideal for stuff like airband when, in fact, they're no more than a 'make do'. The fantastic claims made by many antenna manufacturers - of discones in particular - are so plausible that many people will purchase them believing the claim that the antenna will cover - and quite brilliantly - from 500kHz through to 2GHz. Not! Or, at least, nowhere near as good as a narrowband antenna. So, is the Air-33 good? In a nutshell, yes. It most certainly is.

A word now on mountings. This season will almost certainly down a few antennas - high winds and all that - so did you make sure your mountings were secure? I've never had any trouble with mine as I double up the number of locknuts used and always check on security. I also apply grease to all external parts - Vaseline being a good one - that allows me to take down all mountings when needed without resorting to any 'appliance of science' methodology - this being a tin of Plus Gas and a 2kg hammer! I also make sure that the lower portion is shielded from predominant wind direction. Mounted on a crank arm on the chimney, the Air-33 has good lower mounting shielding from most of the weather whilst the antenna proper is 'in the air'.

How good is the system? Brize and Lyneham Ground from the QTHR at Steeple Claydon, with Fairford mostly weak but readable - and as for aircraft....! It's as good as fitting a pre-amp and without the hassle of blowing the front ends!

A letter from **John Bulger** of St. Alban's Head has with it an extract from the professional magazine *Technical Rescue* on what is, to my mind, a disturbing trend amongst some scanner owners. According to the magazine, and under the heading 'Imposters', it tells of a number on non-ambulance service personnel



Log periodic antenna.

turning up at accidents posing as paramedics. The magazine hints that scanners are used to gather information. This is made worse by the news that, at least once, an i.v. line was put into a casualty....

Now Greater Manchester and Merseyside Services have issued ID cards to crews in an effort to thwart this sick and dangerous practise. To my mind, as an ex-RNLI crew member, this is a situation with horrific overtones. Let's not beat around the bush here - someone could be killed by people who masquerade like this. What makes me angrier than usual however is that scanners are - once more - being blamed.

Maybe this is true in this case, I don't know. What I do know is this: It is **everybody's** duty to report anything illegal, or life threatening, to the appropriate authorities. I'm asking here that, if you know - for definite - that someone uses a scanner for illegal activities then you **must** report this fact to the police. You don't have to give your name - in fact, I'd say that it isn't vital so long as the information is correct. Do remember telephone calls can be traced so any duff gen you pass on will rebound on you. You may never get any recognition for what you've done but you can rest assured that your info will possibly save a life.

Don't - please - do this for malicious reasons. However, if the law is being broken like this, then you have a duty to pass on what you know. If we are going to try to get any credibility then we must - at all costs - police our own space. To that end each of you have a responsibility. If you don't fancy speaking to the police, then perhaps a call to the service being targetted - local ambulance or fire brigade HQ, Coastguard, etc. - again anonymously - may well do. It's our hobby - let's try to keep it as safe and enjoyable as we can. Some anonymous mail now.

On page 576 of the current *Argos Catalogue* is an amplified antenna. It's a nine section telescopic whip type with a switchable amplifier - and costs, according to the source, half of a very similar one advertised in many radio mags! The writer says it's useful on v.h.f. and u.h.f. frequencies. Anyone else used this? I'd be interested in hearing your experiences if you have.

Mark Hoey asks if anyone has the frequencies for McDonald's - drive thru. Mark says he has an Icom ICR-700, Realistic PRO-2035, AR-800 hand-held and an Opto Scout wired up to a double discone and to a rotatable log periodic. Not all at the same time, Mark, I hope! Joking aside, he also asks for the address of Paul Wey who edits and produces the excellent *Scanning Report*. I'll slot that in a bit later.

G-HEMS uses 122.950. HEMS OPs is on 166.425/171.225 and is same as LAS Channel 7. Kent Air Ambulance uses 132.650, also used by Dover Coastguard. In London, the Met are available on the above LAS Ch.7 for co-ordination/cross service working. Channel 69 is 455.9875 and not 450.275 as previously reported. This channel is simplex and used for major incidents. My thanks to Anonymous for that lot.

Information supplied by **Paul Wey** is, as I've said previously, of high content and accurate. Certainly moreso than many of the 'mass produced' gen available on the market currently - and at a quarter of the price. I cannot praise the man enough as he is way above the ordinary who claim frequencies are 'up-to-date'. I always have copies of Paul's stuff to hand in the shack, and updates, and know from personal experience that it's worth its weight in gold. Paul also writes a piece in the Black Cat Aviation Group's 'Logbook' so he'll need no introduction to airband readers.

For Joseph Neal, and Mr. Holt I'll mention Paul's address. Also, that The Black Cat Aviation Group can be contacted at: **BCAG, 19 Crescent Road, Hunstanton, Norfolk PE36 5BU.**

If you're interested in *The UK Scanning Report*, you can contact Paul at: **2 Icknield Way, Baldock, Hertfordshire SG7 5AJ.**

In the words of many of our transatlantic cousins - go for it! I know that **Mike Dodds** of Charlbury will do! Mike wrote to ask for the address, which was given, and also asks if any VT-225 owners get complete 'white noise' and signal reading of S5 across the scale whilst on 243.0MHz? This happens to Mike in the field or at home. I am now based just down the road from Mike - more or less - but the issue doesn't bother me. Oxford Ears, who lives in Abingdon, and who also runs a VT-225 reports some noise - but nowhere near the S5 Mike gets! Can anyone help here with this query?

In response to an earlier query by Dave Howarth regarding a Log Periodic antenna for scanning. A reader sends in the following: You need *The VHF UHF Manual* by G.R. Jessop G6JP - currently unavailable from the *SWM Book*

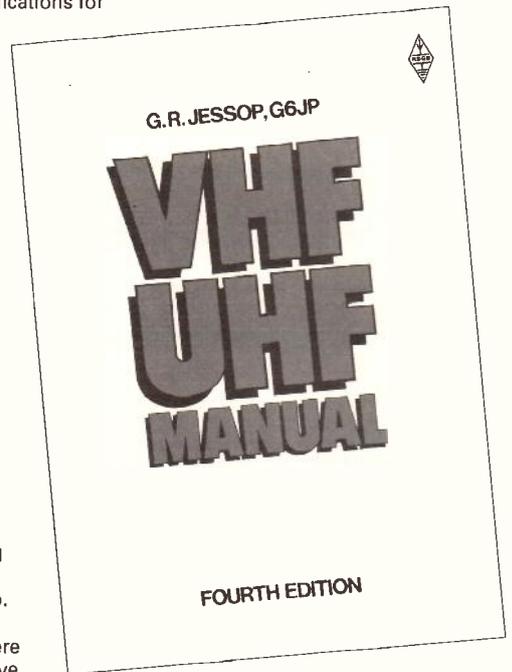
Store - that covers this area. **HOWEVER!** A log periodic that is intended to be used for scanning 'broadband' would be massive - requiring a brick outhouse type rotator, a commercial standard mast and a crane to put it up there! As my correspondent so rightly states - as big as a football pitch! He also brings in the question of obtrusiveness. Everyone who knows about radio would know what it was - do you want to attract that sort of attention? If there is any TVI - Television Interference - in your neighbourhood you may well get the blame, meaning a visit from the DTI. The question of legality would then be brought in....

My correspondent also mentions the fact that a broadband scanner would probably suffer tremendously from overload and subsequent crossmodulation - and add to the expense of building and mounting such an antenna. It's horses for courses, obviously, and you do what you want - but think on first. **'Arran 52'** wrote me with a copy of an airband listing. It looks excellent - but can you write back and let me know where it came from and how I get involved with it!

Lastly, a huge thanks to all at

C.M. Howes Communications for patience and good humour during my self-inflicted attempt at home construction. The filter is now set up in line, working brilliantly - and has improved my listening no end. Without you, it would be filed into the 'Sometime' tray: Sometime soon I'll learn how to do it!

This about sums it up for another month! I'm very busy here with college and all the rest - plus attending to the Mini Clubman and keeping it going through this weather - so it's all go. However, do remember that I'm here to help and, if you have a query then get it off to me and I'll do what I can to assist. In the meantime, good scanning and listening. Catch you down the log sometime.



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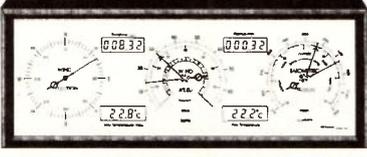
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Info In Orbit



Fig. 1.

As many readers realised, a lot of work went into the November Special Edition. I was in touch with each of the organisations concerned; the World Meteorological Organisation and the European Space Agency to mention but two. A number of scientists and administrators were particularly helpful in finding specific pictures for me. My thanks for the many compliments received.

Current WXSATs

No dramatic changes during the last few weeks; NOAAs 12 and 14 continued routine operations on 137.50 and 137.62MHz respectively. METEORs 2-21 and 3-5 changed operational duties around November 10. This date may have been somewhat early for METEOR 3-5 because at that time, it was still rather near the terminator in the northern hemisphere, preventing

transmissions from starting until the spacecraft had travelled further south and into sunlight. Consequently, only southern observers would be able to monitor it at that time.

As mentioned later, METEOSAT had a change of operations around

November 14 when EUMETSAT took over operations. After a period of silence, METEOSAT-5's carrier was switched back on at 1354UTC and, shortly after, the administration message announced that normal operations would resume from 1458UTC. The only immediate difference that I noticed was the more stark country outlines that the satellite data processing team super-impose on the infra-red image formats. Software written to 'remove' these outlines, has a fight on its hands!

OKEAN-4/SICH-1 Pictures

One of the most unusual pictures that I have seen, taken by the OKEAN or SICH oceanographic satellite, was Fig. 1 sent by

James Ridout of Devizes. This image was received by James at about 0200UTC, though the date is uncertain. The picture was recorded by the satellite, and later re-transmitted to a ground station, while passing over Britain. The image has three sections and shows part of the eastern coastline of Brazil, and the number sequence along the frame edge, that allows its time of origin to be calculated.

Les Hamilton of Aberdeen has kindly sent me two more images received from OKEAN-4 during early autumn, when the spacecraft had an unprecedented period of activity. A nearly complete image of Britain received on September 3 can be seen in Fig. 2.

METEOSAT Operations

Until December, responsibility for METEOSAT control was undertaken by the European Space Operations Centre (ESOC), EUMETSAT, the European Organisation for the Exploitation of Meteorological Satellites, assumed responsibility for the operation of METEOSAT as from mid-November. They had been developing their own ground segment since 1991, and have done extensive testing using METEOSAT-4, located at 10° east. During this testing, people using small dishes, (less than specification size,) experienced some interference, but generally not too much.

From mid-November, the formal hand-over of control to EUMETSAT, of the back-up spacecraft METEOSAT-6, was phased in. From November 15, EUMETSAT took over control of METEOSAT-5.

According to the News Bulletin issued by EUMETSAT during October, the transition arrangements should be transparent to users of METEOSAT data. Anyone wishing to contact EUMETSAT before 15 January 1996 should write to: **MOP Programme Manager, EUMETSAT, Am Kavalleriesand 31, D-64295 Darmstadt, Germany.**

The contact address for mail from January 16 is: The Operations Division, EUMETSAT (at the above address).

NOAA Satellite Operations

Monitoring the active NOAA WXSATs on 137.50 and 137.62MHz

can sometimes give a false impression of what is actually going on. Here is a summary of the current activities of the NOAA constellation during mid-autumn.

NOAA-9 is in 'Semi-Standby' status, providing data from SBUV (Solar Backscatter Ultra-violet sounding spectral radiometer), SSU (stratospheric sounding unit), and ERBE (earth radiation budget experiment). No a.p.t. (image telemetry) is transmitted, but the beacon (137.77MHz) can be monitored occasionally.

NOAA-10 Also in 'Standby' status. The SOCC (Satellite Operational Control Centre) takes one pass per week to monitor health and safety.

NOAA-11 In 'Standby' status. The SOCC takes one pass per week to monitor health and safety. The Search & Rescue instrument is on for real-time use.

NOAA-12 Nominal operations - most, if not all equipment working normally.

NOAA-14 Nominal operations. Some tests are being done on the SBUV hardware.

NOAA-K Readiness Tests

The launch of NOAA-K remains listed for December 31, but my contacts in NOAA suggest that Spring 1996 is more likely. Data pre-processing software has been transferred to EUMETSAT for distribution to the UK Meteorological Office and Meteo-France.

NOAA-K has three propulsion system tubing elements that are suspect, so pressure testing is underway. The NOAA-K MIRP (Manipulated Information Rate Processing unit) exhibits a failure to process some serial commands for things such as a.p.t. channel switching, and a serial-to-parallel converter in the MIRP is among the suspect areas.

Beginners' section

WXSATs and computing: We have looked at antennas, cabling and receivers in previous columns. Before looking at decoders, let us take a brief look at computer technology - as it affects monitoring. During recent years, there has been a rapid change in the specifications of the computers used by readers of 'Info', and described in the many letters received for this column. A few years ago it was the 286 running between 8 and 15MHz; then we saw 386s (80386s to be

precise), accompanied by a speed increase to around 33MHz. I have used one of these for three years now, and, fitted with a co-processor, it still serves me well.

For readers just starting on the road to WXSAT decoding, who have written during recent months for more information, most WXSAT software can run satisfactorily on a medium speed 386, if not a fast 286. Alan Burnett-Provan of Solihull uses a 386 for running his FAX software, but was told that it was too slow for WXSAT decoding. This could be the case if the computer is a 386SX, but one company, TH2 Imaging of Margate, who market their WXSAT decoder as a hardcard, (for insertion into an expansion slot) have commented to me that many of their customers use low specification computers.

My elderly 286 finally broke down some months ago, due to motherboard failure - the POST BIOS chip and the c.m.o.s. battery failed. I decided to replace the motherboard with a modern 486-compatible unit. Replacement was straight-forward - cable connections and separators all completely compatible - so the whole job was completed in a morning. The motherboard cost about £90 (the price has fallen further since summer). I fitted a 486SX 25MHz processor (it was the only one the local shop had, and I was in a hurry). Testing the latest satellite tracking software leaves a 25MHz chip out of breath, so I fitted a 486DX2-66MHz Intel processor, and the result is superb.

I know that many computer users try to avoid PC-compatibles, but when it comes to WXSAT software - perhaps they cannot be



Fig. 2.

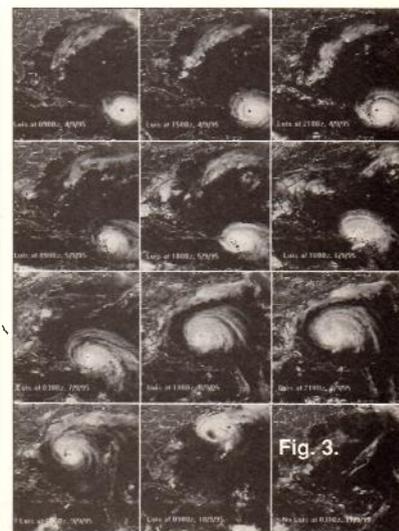


Fig. 3.

beaten. I maintain a collection of software for 'Info' readers, all of which is PC-orientated, and occasionally referred to in the column.

New Products

The section on receivers covered standard hardware designs such as synthesised and crystal frequency receivers. I must mention the latest offering - the MSR50 - from the Martelec Communication Systems stable, that breaks away from traditional products and is what they describe as a virtual receiver. A full review should be available shortly, but it is worth summarising here. The receiver is computer controlled, utilising a screen image for setting up and frequency selection. Connection to the computer is via the parallel port; this frees the serial connection to allow the input of a demodulated signal from a suitable decoder - which Martelec also manufacture. Provision is also made to run this receiver via an Amiga computer. I hope to have completed my examination of this new model shortly.

Letters

An interesting question was raised by **Brian Turnbull** of Richmond. He decodes WXSAT images using Pixel-Plus software, and needed a screen capture program to save the pictures. Brian was using 'Screen Thief' to do this, but apparently the resulting quality was not as good as his original pictures. Brian recently obtained a copy of IMDISP that can read the files and convert them to GIF.

Current software, such as (JVFX version 7) and PCGOES/WEFAX, includes a 'save' option, the use of which produces an image file in one of the standard formats - TIF, PCX, GIF. For Windows users, the program Paint Shop Pro (v3) includes a screen capture program and extensive help pages describing how to use it. DOS users who do not have built-in image file conversion can try IMDISP; I have a copy for anyone having problems obtaining it.

WXSATs and the Law

Andrew Morley asked about the legality of recording WXSAT signals. Most readers are aware that certain frequencies are excluded from monitoring, and therefore recording. Some notorious cases have been published in recent years, and unfortunately these have appeared to blight the genuine, perfectly innocent monitoring of utility frequencies. It is illegal to monitor and record the WXSATs, but it is very unlikely that anyone will take any action against the hobby monitoring of these signal. However on no account should images be sold to commercial (or other) interests. SWM is able to publish images because they are not current.

Hurricane Luis

Alan Jarvis of Cardiff sent two disks containing images from his collection. He monitored the re-transmissions from METEOSAT-5 that originate from GOES-E (currently GOES-8), **Fig. 3** is a sequence of images of the LY format (infra-red of North America, including the northern part of south America. The image sequence starts at 0900UTC on September 4 and shows the movements of the spectacular hurricane, which passed near the Caribbean islands, up to September 10. Alan modified the images by adding artificial colour.

Bulletin Boards (BBS)

Within the UK there are two BBSs that I can recommend for obtaining Kepler elements and other satellite data.

RIG - The Remote Imaging Group operate a BBS - **Tel: (01945) 440666** (use 8 bit, 0 parity, 1 stop bit for connection). RIG provides current elements for WXSATs, and larger files including the amateur radio satellites. This BBS also contains a selection of image processing and display software, and a summary of the current WXSAT operational status. RIG is a voluntary body publishing a high quality, quarterly magazine that carries features on weather satellites. Membership secretary is Ray Godden G4GCE who can be contacted on 01923 720714.

Starbase1 - A huge BBS - **Tel: 0171-703 3593** and **Tel: 0171-701 6914** (connection protocol as before). This specialises in astronomy and space. It carries three sets of Kepler elements, from a small file to one containing some thousands of satellites of all descriptions. There are messaging areas covering a variety of topics, including computing. Subscribers have additional privileges, but access is free for many files and programs.

Dartcom BBS is available on **Tel: (01822) 88249** (protocol as above), but is mostly for use by their customers, and unfortunately, often contains little of real interest - Kepler elements can be ancient!

Monitoring Shuttle Transmissions

Chris Brown of Ashford has an AOR AR-2800 receiver amongst his scanners, fed with a long wire, to which a Howes a.t.u. is attached. He is very interested in tuning into Shuttle re-transmissions and would like to know what frequencies readers have found to be most reliable. I welcome any reports concerning Shuttle monitoring for inclusion here. My postbag indicates a huge interest in this topic. For frequency listings, Chris mentions the book *Monitoring NASA Communications* by Tiare Publications. I believe that most, if not all of these frequencies are actually listed in the Shuttle pack that I update for issue to readers. (You can also find Shuttle comms.

frequencies in October '94 SWM - back issues are still available - **KN.**)

Monitoring MIR Transmissions

Steven Manning is one of our younger readers, and has used his Steeple Tone MBR-7 receiver to monitor MIR transmissions on 146.60MHz. One of Steven's queries concerned the availability of schematic or circuit diagrams of decoders for WXSAT pictures. The easiest freely available source is probably the graphics section of JVFX version 7, that includes suggested circuits for interfaces that take the audio output from a dedicated WXSAT receiver and conditions it for input to a PC, in which the picture information can then be extracted from the modulated signal.

Kepler Elements, MIR & Shuttle Pack

Many of the letters for this column describe problems experienced by beginners who have acquired satellite tracking programs but have been unable to make sense of the results. The problem often turns out to be the use of ancient Kepler elements, which are several weeks, or even months old. **Peter Tanner** of Weston-super-Mare told me how he entered some data into his program, then realised it was six years old!

Peter made his own crossed-dipole and was able to detect WXSAT signals on his scanner. For serious monitoring, Peter is planning to obtain an interface, and have one of his receivers modified for the WXSAT band.

Several years ago, before the Internet and public sources (BBS) of Kepler elements had arrived, I had great difficulty in getting elements more frequently than three monthly intervals! Consequently, it was very difficult to do research on satellite projects, when there was such an uncertainty over the time of passage of a satellite over the UK. I now retrieve elements for over 4000 satellites on a weekly basis, and this is the file referred to in the end section of the column each month. Anyone doing their own satellite project can obtain this file, and other data for MIR and the Shuttle are also available. Costs change occasionally to reflect the expense of data retrieval and dissemination.

The latest Kepler elements for the WXSATs, MIR and Shuttle are available as follows:

- 1) For a print-out of the latest WXSAT elements, the Shuttle and MIR, send an s.a.e. and 20p coin or separate, extra stamp. When the Shuttle is in orbit, elements are a few hours old. Transmission frequencies are given when operating. This data originates from NASA and is totally up-to-date.
- 2) I also send monthly Kepler print-outs to many

- 3) You can have a computer disk file containing recent elements for the WXSATs, and a large ASCII file of elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers (for the WXSATs, Amateur Radio satellites, and others), ideal for computer searches, or automatic updating of your tracking software. Please enclose £1 with your PC-formatted disk and stamped envelope.

The Shuttle Pack is a four-page A4 'booklet', updated regularly and listing all scheduled launches up to the year 2003, together with frequency listings, and a FAQ (frequently asked questions) about reception. Please enclose an s.a.e. and 50p.

Special Edition

Some 'Info' readers may have seen the unpleasant allegation about the Special WXSAT edition, that appeared on a British Bulletin Board. The writer alleged that some of the information published in the Edition was wrong. Every item was verified by the organisations concerned - so had the writer chosen to contact me personally, he could have heard this for himself. I had previously written to the firm, commenting on their lack of communication and unwillingness to respond to faxes and requests for software fixes. They refused to apologise for a previous false claim about me on their BBS. Readers can draw their own conclusions.

Frequencies

NOAA 14 a.p.t. on 137.62MHz;
NOAA 12 a.p.t. on 137.50MHz;
NOAA beacons on 136.77 and 137.77MHz; METEORs currently use 137.85MHz; OKEAN-4 and SICH-1 use 137.40MHz occasionally and METEOSAT-5 uses 1691 & 1694.5MHz.

Seasonal greetings to all readers of 'Info'. I continue to welcome your letters, reports and pictures and any comments or suggestions for the column.

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Decode

All the Data Modes

ARQ Explained

In response to questions from several readers, this month I'm going to dedicate some space to the basic ARQ modes. So what are the ARQ modes? Well, ARQ is an acronym for Automatic Repeat reQuest and effectively describes one of the key properties of this type of transmission.

If you've already spent some time monitoring standard RTTY signals you will no doubt have been frustrated by the large number of errors. This is especially problematic when dealing with weak signals or those suffering interference. RTTY is particularly poor because of its use of a shift character to switch between the letter and numeric character sets. If the shift character is lost in noise or interference, the message is transformed into gibberish! Whilst this vulnerability is irritating for the listener, it can be disastrous for the commercial operator trying to pass vital information.

It was this need for a much more reliable version of RTTY that led to the development of SITOR and its off-shoots. The term SITOR is yet another acronym and represents Simplex Teleprinter Over Radio. The simplex bit means you can only send in one direction at a time, the rest is obvious. The new system represented a significant step forward and offered a built-in error detection system that was able to automatically repeat any lost characters. In addition to these basic improvements, SITOR was able to achieve this whilst maintaining an overall data rate of 50 baud. This was particularly important as it meant that SITOR links could interface directly with the existing 50 baud Telex network. Let's now take a look at how all this is achieved.

The principles and standards used for this type of communications link are contained in CCIR recommendation 476-4. At the heart of this recommendation is the code or alphabet used to convert the keyboard characters into a number. It is important at this stage to realise that a RTTY or SITOR link can only exist in one of two states that are known as mark or space. In digital terms this converts to a 1 or 0. In order to send text over such a link we first

have to convert letters into binary numbers. This conversion is done using an electronic look-up table. I've shown an example of the SITOR alphabet in **Table 1**.

Table 1 SITOR (CCIR476-4)

Look-up Table

| Letter | Binary Number |
|--------|---------------|
| A | 0011010 |
| B | 0011001 |
| C | 1001100 |
| D | 0011100 |
| E | 0111000 |
| F | 0010011 |
| G | 1100001 |
| H | 1010010 |
| I | 1110000 |
| J | 0100011 |
| K | 0001011 |

At this point you're probably wondering how on earth a simple radio link can know whether or not the received signal has been corrupted by interference. The answer is surprisingly simple and lies in the SITOR alphabet. If you examine the binary numbers in the alphabet carefully you will note that each number contains three ones and four zeros. It's this simple pattern that's used to test for errors in the received signal.

The SITOR decoder simply looks at each received character and only accepts those that have the right combination of ones and zeros. Although this system is a great improvement over basic RTTY, it's clearly not foolproof. If a signal suffers interference but the received characters still have the three to four ratio the error will go unnoticed. Despite this weakness, the practical results are extremely good with very low error rates.

So now we have an error detection system that works, how can we correct the errors. To understand this part of the operation you need to appreciate that there are two different modes within the SITOR specification. Mode A also known as ARQ is the mode used to communicate between two stations. Mode B or FEC (Forward Error Correction) is used as a broadcast mode where the signal can be received by any number of receiving stations.

Let's start by looking at Mode A. In order to handle the error correction this mode splits the message into groups of three characters. Once the first three characters have been sent, the station switches to receive and

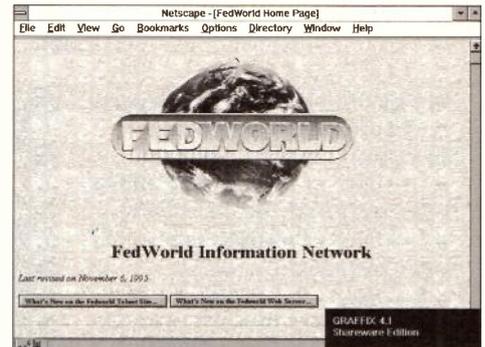
waits for an acknowledgement from the receiving station. This acknowledgement can either be a straightforward confirmation that the characters have been received without error or that data was lost. If all was okay the transmitter will send the next three characters. If, on the other hand, an error was detected, the last three characters are repeated. This whole process happens very quickly with a transmission every 450ms (0.45s).

You will remember that earlier I mentioned that the overall transmission speed remains at around 50 baud. This is achieved by sending the three character blocks and the acknowledgement using 100 baud.

One other important point that differentiates SITOR from RTTY is the use of a synchronous transmission mode as opposed to RTTY's asynchronous system. The difference between synchronous and asynchronous lies in the way each element or character is put together. In a RTTY signal the five data bits are surrounded by a single start bit and one or one and a half stop bits. This means that for every five bit character seven and a half bits have to be transmitted. In addition the receiving RTTY station runs using its own timing with the start and stop bits of the received signal used to control the reception.

A synchronous signal does away with the redundant start and stop bits and relies on the data patterns for the receiving station to find its way to the start of the message. The receiving station also derives its timing from the incoming signal. The end result is a faster overall transmission rate for the same number of bits. Because the SITOR signal is synchronous there are no pauses like those found in RTTY signals.

In order to achieve this the



FedWorld WWW home page.

SITOR alphabet contains two idle characters known as alpha and beta. In the absence of any text, the transmitting station will send these idle signals. So what does all this sound like? The best way to find out is to tune to a typical SITOR signal and you will soon learn to recognise the regular chirping sound. As the most prolific users of SITOR are the maritime operators, try listening in to the bands shown in the table below.

Now let's take a look at Mode B or FEC. This is a synchronous transmission like Mode A except that it's clearly not possible to send the message in bursts with pauses for acknowledgements - this would create chaos as lots of stations attempt to acknowledge receipt. The simple solution is to send the message twice, but with the repeated message delayed by three characters and interleaved with the original. In this way the decoder can still look for the four to three pattern and if an error is detected it can pick-up the appropriate character when it's repeated some three characters later. Whilst this system works well, it can't handle any long bursts of interference as there's only a 630ms gap between the original and repeated characters.

NAVTEX Receiver

Clive Morton from Camborne in Cornwall has a particular interest in the reception of NAVTEX transmissions. However, one of the problems with this mode is the requirement to leave your receiver tuned to 518kHz for long periods. Rather than tie-up his main receiver, Clive asks if I know of any designs for a receiver of

| Band | Ship frequency (MHz) | Coast Frequency (MHz) |
|----------|----------------------|-----------------------|
| 4MHz | 4.1725 - 4.1815 | 4.2095 - 4.219 |
| 6MHz | 6.263 - 6.2755 | 6.314 - 6.3305 |
| 8MHz | 8.3765 - 8.3960 | 8.4165 - 8.4360 |
| 12MHz | 12.477 - 12.5495 | 12.579 - 12.6565 |
| 16MHz | 16.6835 - 16.7335 | 16.8065 - 16.9025 |
| 18/19MHz | 18.8705 - 18.8925 | 19.6805 - 19.7030 |
| 22MHz | 22.2845 - 22.3515 | 22.376 - 22.4435 |
| 25/26MHz | 25.17 - 25.1925 | 26.1005 - 26.1205 |

this type. (SWM hopes to be publishing a design for a dedicated receiver in the near future - Ed) Whilst I'm not aware of any current kits or ready-built products, but it shouldn't be too difficult to design a simple direct conversion receiver. It might also be a good idea to include some form of tuning so that the receiver could be used for I.f. FAX reception.

Maybe this could form the basis of an article for the magazine or even a Decode FactPack. If you have any bright ideas for such a design, please drop me a line with the details.

Whilst on the subject of NAVTEX, **John Spillett** of Ringwood is having trouble receiving this mode. Having spent many hours monitoring this maritime information mode you do need a degree of patience to find the correct tuning point. If you've not encountered NAVTEX before it is an automated information service that provides a printout of navigational and meteorological messages and warnings along with search and rescue information.

At present all the participating coast stations operate on the same frequency, 518kHz though there are plans to open-up 490kHz at some point in the future. In order to prevent total chaos on this single frequency each station in a local geography is allocated a number of time slots in which to send its message.

For example my local station, Niton Radio on the Isle of Wight, has a transmission slot transmits at 18 minutes past the hour every four hours. To set-up your receiver you need to tune to approximately 518kHz when your local station is transmitting. To help with this here are the first transmission times of a selection of Northern European NAVTEX stations.

Niton 0018, Portpatrick 0130, Cullercoats 0048, NCG Texel 0348 and Oostend 0248UTC. These transmissions continue at four hour intervals throughout the day.

Digital Selective Calling

How many of you have noticed the bursts of packet like data currently to be found on many of the h.f. maritime frequencies? The data packets are from the new digital selective calling (DSC) system that's being implemented on a global scale.

DSC provides an automated messaging system that will ultimately negate the need for manual distress monitoring. It also provides a very neat way to set-up ship-to-shore contacts. The system forms a vital part of the Global Maritime Distress and Safety System (GMDSS) and is being implemented through the Safety Of Life At Sea (SOLAS) Convention. This body has produced a treaty document that

requires all passenger ships and most other ships over 300 Tons to carry DSC equipped radios from 1 February 1999.

After that date ships will be allowed to turn off their v.h.f. channel 16 and 2182kHz radio guard equipment. To help speed progress to full implementation, the US FCC have ruled that all marine radios sold or built after 1997 must have DSC capability.

Let's now take a closer look at the format of the signal. The transmission comprises a 6-7 second burst of data at 100 baud with a shift of 170Hz. The information is transmitted with forward error correction rather like FEC, but also includes a checksum to confirm data integrity. Within each packet are a format specifier, called party identity, category, originator identity, telecommand and other information such as ship's position, transmit and receive frequencies. A typical message would look like this:

FORMAT SPECIFIER: SELCALL individual
 CALLED PARTY ADDRESS: 233 — 295000
 CATEGORY: ROUTINE
 SELF IDENTIFICATION: 233 — 296000
 TELECOMMAND: J3E telephone

SHIPS POSITION COORDINATES:
 SW LATITUDE 25 deg 40 min
 SOUTH
 LONGITUDE 48 deg 16 min WEST
 RQ
 CHECK SUM OK
 DATE 04-10-1995 TIME 09.28:29

The main purpose of this message is to transfer positional data from one ship to another. The identity of the two ships is contained in the nine digit codes e.g. 233 — 295000 and 233 — 296000. The first part of the identifier known as the Maritime Identity Digits (MID) shows the nationality that in this case is the UK. The remainder of the code is the ships' individual identifier.

Readers Special Offers

Here's the latest list of reader' special offers. Whilst I do my best to return orders promptly, please allow up to two weeks for delivery.

IBM PC Software(1.44Mb disks):

Disk 1 (Order Code DK1) - JVFAX 7.0, HAMCOMM 3.0 and WEFAX 3.0

Disk 2 (Order Code DK2) - DSP Starter plus Texas device selection software.

Disk 3 (Order Code DK3) - Ultrapak 2.1 and NuMorse

Disk 4 (Order Code DK4) - Mscan 1.3 and 2.0

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FactPack 1 Solving Computer Interference Problems (Order Code FP1)

FactPack 2 Decoding Accessories (Order Code FP2)

FactPack 3 Starting Utility Decoding (Order Code FP3).

FactPack 4 JVFAX and HAMCOMM Primer (Order Code FP4).

FactPack 5 On the Air with JVFAX and HAMCOMM (Order Code FP5).

FactPack 6 Internet Starter (Order Code FP6).

For the printed literature just send a self addressed sticky label plus 50p per item (£1.50 for four, £2.50 for 7 and £3.00 for 9). For software send £1.00 per disk (£1.75 for 2, £2.50 for 3 or £3.00 for all 4) and a self addressed sticky label (don't forget I provide the disk!).

When used for distress signals the decoder at the coast guard station will automatically recognise the distress signal and download the ships position data. The message will also alert any other ships within range of the transmission. So you can see this is much more powerful than the more conventional distress monitoring system. A second and more common use of DSC is to establish ship-shore communications. To do this the ship or shore station will send out a DSC packet with the required ID and a suggested mode and frequency for the working link. As with the distress signal, the data can be automatically extracted and ships radio gear set to the appropriate mode and frequency.

Because the system is relatively new there are few decoders available on the amateur market. The only ones I'm aware of are the Hoka Code 3 and Code 30 units where DSC is available as an option. As the data format is so

similar to FEC it ought to be relatively easy for software authors to adapt existing software to receive DSC. A particularly attractive option would be a simple stand-alone unit like the ERA Microreader set-up to display decoded DSC messages. Let's hope the authors read this column!

If you have some programming skills and would like to have a go at writing your own software, take a look at the source code that's supplied with PKT-MON12 on my Disk 1. This contains the full Turbo Pascal source code so has many of the key routines already sorted.

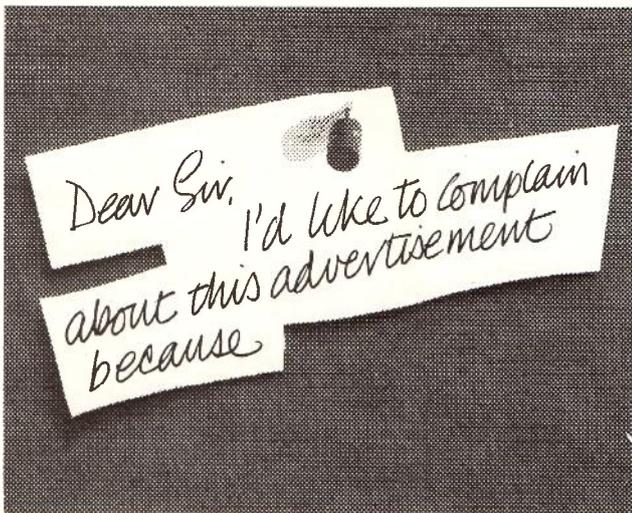
If you want more info on DSC use your Internet connection to Telnet to FedWorld (IP192.239.92.3 port 23). After you've completed the new user log-on, type UDD54 to connect to the US Coastguard system. You can now browse through and download a wide range of fascinating files - and its all completely legal!

Frequency List

Before I give you the frequencies for this month, may I wish all readers a Happy Christmas and Peaceful New Year. Special thanks go to those reliable contributors who send information in (even when I don't thank them as often as I should!). Your work is very much appreciated.

This month's selection of readers frequencies comes thanks to many listeners including: **Danny Goodrum, Ian Taylor, Martin King, Les Crossan and Day Watson.**

| Frequency (MHz) | Mode | Speed | Shift | Call | Time | Location |
|-----------------|------|-------|-------|--------|------|------------------------|
| 3.855 | FAX | 120 | 576 | DDH | 1420 | Hamburg |
| 4.489 | RTTY | 75 | 400 | GFL26 | 0930 | Bracknell Met |
| 4.570 | FAX | 120 | 576 | DHJ51 | 1540 | Grenfell Met |
| 4.853 | FAX | 120 | 576 | NPM | 0320 | USN Pearl Harbour |
| 8.145 | RTTY | 50 | 400 | EIP | 1155 | Shannon flight data |
| 10.600 | RTTY | 50 | 500 | XVN37 | 1545 | VNA Hanoi |
| 10.952 | ARQ | 100 | 170 | HBD20 | 1644 | MFA Berne |
| 10.954 | RTTY | 50 | 400 | CFH | 1331 | Halifax Canada |
| 11.423 | FEC | 100 | 170 | SOL242 | 1800 | Polish press |
| 12.228 | RTTY | 75 | 400 | BZR62 | 1804 | Xinhua |
| 14.367 | RTTY | 50 | 400 | BZP54 | 1415 | Beijing Press |
| 16.788 | FEC | 100 | 170 | PNA | 0950 | Philippine news Manila |
| 17.445 | FAX | 120 | 576 | 5YE | 2130 | Nairobi |
| 19.7515 | FAX | 120 | 576 | 6VU79 | 1705 | Dakar met |



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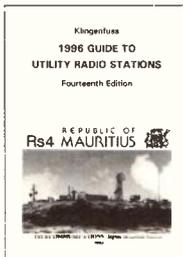
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Off the Record

As this issue of *SWM* reaches most of us towards the end of December I think I can fairly safely wish everyone a very Merry Christmas and a Happy New Year. Special greetings also have to go to those, sometimes anonymous individuals, that send me letters, logs, and information that help make this page come alive.

Pirate Press

Several interesting stories have emerged in recently. *Offshore Echo* reports that former Radio Caroline presenter Steve Conway has received a warning letter from the Radiocommunications Agency. His alleged offence was to include pirate radio details on his premium rate telephone information line. The RA are reported to have monitored his telephone service and threatened to prosecute anyone that publicised pirate radio stations with matter that promotes unlicensed broadcasts directly or indirectly.

A slightly related article appears in *Horizon* on the subject of computer users obtaining world-wide pirate radio information using the Internet. The writer asks if accessing this information is illegal in the UK? The doubt arises as the Internet is a new medium that did not exist when the Broadcasting Act was passed in 1990. It could be argued that the information is being broadcast, but it is stored on a computer in the USA that is outside British jurisdiction. It would of course be possible for the authorities to monitor the telephone circuits and identify British users of the system and to intercept downloaded data. They wouldn't...would they?

FRS Goes DX says that Dave Miller is producing recordings of extracts of world-wide s.w. pirates, that will be available on CD or cassette. He can be contacted at **55 Falcon Street, Dunedin, New Zealand**.

Newsbeat reports that another filming opportunity has been lost by the radio ship *Ross Revenge*. Yorkshire TV who produce the 60s programme *Heartbeat* wanted a pirate radio vessel for one of their episodes. The fact that Radio Caroline's *Ross Revenge* is still without proper steering capability caused the TV company use a suitably disguised hired coaster for the part. The report says that



Caroline could have earned £1000 per day for up to eight days filming.

Requests

George Tuck of Gateshead has written in response to last quarter's comment on Radio North Sea International and the alleged spying activities. He says, 'What can you spy upon from a radio ship that cannot be done on land?' George has to rank highly among anoraks. His amateur radio

callsign, which he insists is genuine, is G4RNI.

Next is a letter from an independent television producer from Leeds, David asks for the address of ENIGMA (European Numbers Information Group and Monitoring Association). It is **c/o BRC, 17-21 Chapel Street, Bradford, West Yorkshire BD1 5DT**. It seems the idea of radio piracy, mentioned last quarter, and international espionage caught David's eye, or was it his imagination.

Many interesting facts about Radio Northsea International are featured in *Pop Went The Pirates* available from the 'SWM Book Store'. Some incidents include the attempted hi-jack of the radio ship, a suit case full of foreign bank notes, a bomb attack on the boat, its arrest by the Dutch police and the vessel being used for military target practice and sunk!

Data on CB?

The Radiocommunications Agency have sent licensed Citizens Band radio users a questionnaire. Subjects referred to include the use of some existing UK channels for data use rather than speech and the use of a.m./s.s.b. sharing what is now the CEPT f.m. frequencies.

Other topics for future discussion include the recent change in antenna regulations, 80 channel rigs, new equipment standards and the development of CBOS. These initials stand for Citizen's Band Observation Service, an organisation of volunteers throughout the UK who co-ordinate information provided by the RA's local district offices. Further details may be obtained from **Mrs Karen Scott, Amateur and Citizen's Band Unit, Radiocommunications Agency, 189 Marsh Wall, Docklands, London E14 9SX** or the controller

Short Wave Pirates Chart

| Station | Monitors |
|-----------------------|-----------|
| Black Arrow | A,D |
| Brigitte | B |
| Britain | A,B,D |
| Caroline (French) | A,C,D,F |
| Coast FM | A,B,C,D,F |
| Coroner | D,E |
| Crazy Wave | C,D,F |
| Dublin | A,B,C,E,F |
| East Coast Commercial | A,B,D |
| IRRS (relays) | A,B,C,E,F |
| Jolly Roger | A,B,D,F |
| Laser Hot Hits | A,B,C,D,F |
| Mariquita | E |
| Meteor | A,E |
| Mirage | C |
| Moonlight | A |
| Orion | C |
| Ozone | A,B,C |
| Pacman | A,D,F |
| Pandora | B,C,F |
| Subterranean | A,F |
| UK Radio | B,C,D,F |
| WINKR | B,D |
| Zodiac | B,C |

MONITORS

- A: Free Radio Monitoring, Halesowen, W. Midlands.
- B: Bob Marsh, Bexleyheath, Kent.
- C: Rab O'Fokel, Sunderland, Tyne & Wear.
- D: David Williams, Southampton, Hampshire.
- E: Bruno Pecolatto, Pont Canavese, Italy.
- F: Ian Turner, Deal, Kent.

Jolly Roger QSL card.

of CBOS **Mr David Daniel, The Old Forge, Broad Well, Market Lavington, Devizes, Wiltshire SN10 4DZ.**

Jam-Busters

Even though the Cold War has been over for some time there is still plenty of jamming audible on the h.f. bands, presumably coming from China, the Middle East and Cuba. The broadcasters effected by jamming tend to fight back by increasing the powers and numbers of transmissions to their intended target area. Thus gobbling up large spaces in the broadcast bands that could be made available to other users, or at least ease the congestion.

The key to the problem could well be in the hands of listeners. If on a world-wide basis people refused to listen to the external stations of countries that jam foreign broadcasts, it could place extreme pressures on their own stations. There is nothing more demoralising to a broadcaster than to produce programmes that either bring about no response, or only letters of complaint.

Do you think us radio listeners should complain and do something about the illegal jamming that effects our hobby, or should we leave it to those that manage the h.f. radio spectrum? Drop me a line and put your opinion on/Off The Record.

Jolly Roger Radio

This is one of the most regularly reported stations on this page, Jolly Roger is well known for its country music and its relays of other stations. JRR is known to use between 60 and 150W in the 48 metre band and has received reports from the America's and the Middle and Far East. I am also informed that they have their programmes relayed by a m.w. station in Tamaru, New Zealand. Regular correspondents to JRR are able to collect the complete set of 22 brightly coloured QSL cards.

Jolly Roger started broadcasting seven years ago, future plans include the use of an extra transmitter for relays and the possible introduction of FM. For details of Irish Free Radio you can write to **PO Box 39, Waterford, Ireland.**

LM&S

Long, Medium and Short Waves

Before detailing the latest reports on reception in the broadcast bands I would like to wish all listeners and readers a Happy New Year!

When making your resolutions for 1996 remember to include a resolve to send reception reports to me for this column! Other listeners will then be able to share your findings and add to their enjoyment.

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 October.

During several evenings towards the end of October **Fred Pallant** (Storrington) detected a weak carrier on 189kHz, but he was unable to establish its origin until the 30th when it became apparent that it was a broadcast in Italian from Radiotelevisione Italiana (RAI) via their 10kW outlet at Caltanissetta, Italy. At 2200UTC he logged it as SINPO 13341.

Medium Wave Reports

Favourable conditions for the reception of m.w. transmissions over transatlantic paths existed during some nights in October. At 0630 on the 17th **John Slater** (Scalloway, Shetland) picked up a broadcast from CJCH in Halifax, NS on 920. It was peaking SIO333. He then tuned to the low end of the band and heard VPCM in St.John's, NF on 590, which rated SIO222 at 0645.

Despite frequent checks, nothing was heard by **Harry Richards** (Barton-on-Humber) until the 28th, when he received a clear ident from WNRB in Boston, MA on 1510. During a discussion programme their signal was a fairly steady 33232 at 0115 and later the noise became less severe. He heard them again the next night, but their signal was not as steady - it peaked 33232 at 0035. He also picked up a broadcast from CJYQ in St.John's, NF on 930 which peaked 33232 at 0045. During his search of the band Harry believes he heard the callsign WBBR amongst all the din, but he says "it would have taken 'voice enhancement' in a laboratory to have found out!"

The sky waves from some stations in the Middle East and N.Africa also reached the UK after dark. Those from the IRIB 400kW outlet at Ahwaz, Iran on 1386 were received by **Paul Bowery** in Burnham-on-Crouch at 0300. They rated 24322. He used their parallel on 15.040MHz to confirm identity. Reception from the BSKSA 1600kW outlet at Damman, Saudi Arabia was described by **Eddie McKeown** (Newry) as "quite excellent" - he logged it as 45244 at 2257.

Over on the Isle of Wight **George Millmore** (Wootton) found reception from the M.East rather erratic. The best signal came from BSKSA via Damman on 783, which peaked SIO444 around 2200 on October 23. Reception from some stations in N.Africa proved to be quite good, but the band seemed to be dominated by Spanish stations.

After sunrise on October 26 unusual conditions were observed by **Sheila Hughes** in Morden. Much to her surprise the broadcasts from several stations in Spain were booming in around 0700. At 0730 the transmission from the RAI 150kW outlet at Bari, Italy on 1116 was peaking 43333.

Whilst searching for m.w. local radio outlets, **John Wells** (E.Grinstead) noticed that R.Broadland was using the ident 'Amber Radio' on 1152. Also that R.Mercury had adopted the name 'New County Sound' on 1476, but they still referred to 'Mercury Extra' on 1521. I wonder if such changes are really worthwhile - it seems to me they simply confuse most listeners!

Short Wave Reports

Due to the solar sunspot minimum period just now, international broadcasters are forced to use the lower frequencies to provide a reliable service. Some are making more extensive use of relay stations. Schedule changes may be introduced at short notice.

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

The conditions in the **21MHz (13m)** band are generally unstable. Daily variations in the strength of signals received have been evident. Sometimes R.Australia's broadcast to Asia via Darwin on 21.725 (Eng 0630-1100) has been very clearly received in the UK. It was rated 45445 at 0900 by **Simon Hockenull** in E.Bristol; 45455 at 0930 by **Norman Thompson** in Oadby; 54444 at 1020 by **Chris Shorten** in Norwich; also 54444 at 1053 in Burnham-on-Crouch. In Cyprus **John Parry** (Larnaca) rated it 35553 at 0838.

When the conditions permit a number of other broadcasts can be received in the UK. Those noted before noon were DW via Julich? 21.680 (Eng to S.E.Asia 0900-0950), rated 25333 at 0930 by **Eric Shaw** in Chester; UAER, Dubai 21.605 (Eng to Europe 1030-1055) 55444 at 1032 by **Michael Griffin** in Ross-on-Wye; R.Portugal Int via Sines 21.655 (Port to Brazil 1000-1200 Sat/Sun) 25433 at 1052 in Storrington; BBC via Rampisham, UK 21.590 (Ind to M.East, Africa 1100-1130) SIO333 at 1120 by **David Green** in Doncaster; BBC via Ascension Is 21.660 (Eng to

Long Wave Chart

| Freq (kHz) | Station | Country | Power (kW) | Listener |
|------------|---------------|------------|------------|-------------------------------|
| 153 | Bechar | Algeria | 1000 | L* |
| 153 | Donebach | Germany | 500 | B.C.D.E.H.*J.*K.L.M.*N.O.P |
| 153 | Bod | Romania | 1200 | J* |
| 162 | Allouis | Fance | 2000 | B.C.D.H.*J.*K.L.M.N.O.P |
| 171 | Nador Medi-1 | Morocco | 2000 | A.*L.*N.O.* |
| 171 | Kaliningrad | Russia | 1000 | B.C.D.H.*J.*K.L.*N.P |
| 177 | Oranienburg | Germany | 750 | B.C.D.E.*J.K.M.*N.O.*P |
| 183 | Saarouis | Germany | 2000 | B.C.D.H.*J.*K.L.M.N.O.P |
| 198 | Droitwich BBC | UK | 50 | B.D.H.J.K.M.O.P.D |
| 198 | Burghaad BBC | UK | 50 | N |
| 198 | WesterglenBBC | UK | 50 | C |
| 207 | Munich | Germany | 500 | B.C.D.E.G.*H.*J.*K.L.*N.O.*P |
| 207 | Azilah | Morocco | 800 | B* |
| 216 | Roumoules RMC | S.France | 1400 | B.C.D.G.*H.J.*K.L.M.N.O.P |
| 225 | Raszyn Riev | Poland | ? | B.*C.D.*H.*J.*K.L.*M.*N.O.*P* |
| 234 | Bektheiler | Luxembourg | 2000 | B.C.D.H.*J.*K.L.*N.O.P |
| 243 | Kalundborg | Denmark | 300 | B.C.D.*G.*H.I.K.L.N.O.P |
| 252 | Tipaza | Algeria | 1500 | A.*H.*K.N.O.* |
| 252 | Atlantic 252 | S.Ireland | 500 | B.C.D.F.H.J.K.L.M.N.O.P.D |
| 261 | Burg(R.Ropal) | Germany | 200 | B.C.E.H.*I.K.L.N.O.P |
| 261 | Taldom Moscow | Russia | 2000 | B.*C.*N.O.* |
| 270 | Topolna | Czech Rep | 1500 | B.*C.*H.*J.*K.L.*M.*N.O.*P |
| 279 | Minsk | Belarus | 500 | B.*C.*H.*J.*K.L.*N.O.* |

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

Listeners:-

- (A) Tim Allison, Middlesbrough.
- (B) Paul Bowery, Burnham-on-Crouch.
- (C) Martin Dale, Stockport.
- (D) John Eaton, Woking.
- (E) Ted Harris, Manchester.
- (F) Simon Hockenull, E.Bristol.

(G) Sheila Hughes, Morden.

(H) George Millmore, Wootton, IoW.

(I) Fred Pallant, Storrington.

(J) Harry Richards, Barton-on-Humber.

(K) Tom Smyth, Co.Fermanagh.

(L) Andrew Stokes, Leicester.

(M) Andrew Stokes, while in N.France.

(N) Norman Thompson, Oadby.

WE/S.Africa 1100-1700) 32233 at 1130 by **Bernard Curtis** in Stourbridge.

After mid-day they came from UAER, Dubai 21.605 (Eng to Europe 1330-1355) was rated 55454 at 1339 in Newry; RFI via Montsinery, Fr.Guiana 21.645 (Sp, Fr to C.America 1400-1655?) 25322 at 1415 by **Darren Beasley** in Bridgwater; BBC via Limassol, Cyprus 21.470 (Eng to E.Africa 1300-1700) 35333 at 1510 by **John Eaton** in Woking; WYFR via Okeechobee, USA 21.525 (Eng to Africa 1600-1700) 35333 at 1604 by **Gerry Haynes** in Bushey Heath; WYFR via Okeechobee, USA 21.745 (Eng to Europe 1600-1700?) 35443 at 1620 in Storrington; R.Japan via Moyabi, Gabon 21.700(Jap to Europe, M.East, Africa 1600-1700) 33333 at 1654 by **George Tebbitts** in Penmaenmawr; HCJB Quito, Ecuador 21.455 (Eng, u.s.b. + p.c.) 25443 at 1729 by **Tim Allison** in Middlesbrough; Monitor R.Int via WSHB 21.640 (Eng to E.Africa 1600-1800?) 34333 at 1730 in Scalloway.

Unreliable propagation conditions also exist in the **17MHz (16m)** band, but broadcasts from several continents were noted in the reports. During the morning R.Pakistan, Islamabad 17.900 (Eng to Europe 0800-0845) was rated 45444 at 0800 in Scalloway; R.Australia via Carnarvon 17.715 (Eng to Asia, Pacific 0100-0900) 44433 at 0805 by **Stan Evans** in Herstmonceux; Voice of Russia 17.860 (Eng [WS] 0900-1200) 44333 at 0930 in Morden; BBC via Skelton, UK 17.705 (Eng to Europe 0900-1615) 35544 at 0935 in Middlesbrough; R.Tunisia Int via Sfax 17.500 (Ar, Fr to N.Africa 0700-?) 35553 at 0943 by **David Edwardson** in Wallsend; R.Vlaanderen Int, Belgium 17.595 (Eng to Africa 1000-1030) 43343 at 1020 in Norwich; UAER Dubai 17.825 (Eng to ? 1030-1050) 43333 at 1035 in Ross-on-Wye; R.Pakistan, Islamabad 17.900 (Eng to Europe 1100-1120) 43333 at 1100 in Stalbridge; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) SIO222 at 1151 by **Ted Walden-Vincent** in Gt.Yarmouth.

After mid-day, RFI via ? 17.575 (Fr to Africa 1400-1600) was 25333 at 1410 in Bridgwater; Israel R,

Jerusalem 17.545 (Heb [Home Sce rly] to Europe, N.America 0800-1700) 45544 at 1340 in Woking; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1400-1500) 44243 at 1425 in Newry; BBC via Woofferton, UK 17.640 (Eng to Europe 0800-1500) 45454 at 1430 in Oadby; RCI via Sackville, Canada 17.820 (Fr to Europe, M.East 1500-?) SIO222 at 1530 in Doncaster; BBC via Ascension Is 17.830 (Eng to W.C.Africa 0730-2100) 34343 at 1532 by **Martin Dale** in Stockport; R.diff TV Marocaine via Tanger 17.595 (Fr, Eng to M.East, N.Africa 1400-1700) 44444 at 1610 in Penmaenmawr; WYFR Okeechobee, USA 17.760 (Eng to N.America 1400-1700) 33333 at 1650 by **Robert Connolly** in Kilkeel.

Later, WYFR Okeechobee, USA 17.760 (Eng to Europe, Africa 1700-1945) was 45444 at 1700 in Bushey Heath; Monitor R.Int via WSHB 17.510 (Eng to Africa 1800-2000) 24232 at 1905 by **Rhoderick Illman** in Oxted; R.Nederlands via Bonaire 17.605 (Eng to S/E.W.Africa 1830-2025) 35444 at 2020 in Chester; VOA via ? 17.725 (Eng) 33333 at 2040 by **Peter Pollard** in Rugby.

Slightly more stable conditions have been evident in the **15MHz (19m)** band. During the morning R.Australia via Darwin 15.245 (Eng to Asia, Pacific 0200-0900 [Sports Sce 0200-0730 Sat]) was 25542 at 0720 in Wallsend; AWR via Slovakia 15.620 (Eng to Africa 0900-1000) 55555 at 0900 in Morden; AIR via Aligarh? 15.050 (Eng to N.E.Asia 1000-1100) 34233 at 1012 in Woking; BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 1000-1500) 32223 at 1030 in Stalbridge; UAER, Dubai 15.395 (Eng to Europe 1030-1055) 42543 at 1031 in Bridgwater; R.Pakistan, Islamabad 15.625 (Eng to Europe 1100-1120) 55555 at 1106 in Norwich.

After mid-day, R.Australia via Darwin 15.530 (Eng to S.Asia 1100-1300) was rated 44434 at 1215 by **Leo Barr** in Sunderland; WWCR Nashville, USA 15.685 (Eng to Europe 1100-2100) 35343 at 1253 in Middlesbrough; UAER, Dubai 15.395 (Eng to Europe 1330-1355) 54333 at 1337 in Herstmonceux; RTV Marocaine via Tanger 15.335 (Ar to

Medium Wave Chart

| Freq (kHz) | Station | Country | Power (kW) | Listener | Freq (kHz) | Station | Country | Power (kW) | Listener | Freq (kHz) | Station | Country | Power (kW) | Listener |
|------------|----------------------|--------------|------------|----------------------|------------|---------------------|--------------|------------|-------------------------|------------|--------------------|--------------|------------|----------------------|
| 520 | Hof-Saale (BR) | Germany | 0.2 | K* | 900 | Milan | Italy | 600 | C*,E*,K*,L*,N* | 1377 | Lille | France | 300 | C,D,E,K*,L,N,O |
| 531 | Ain Beida | Algeria | 100 | C*,E*,L*,M*,N* | 900 | COPE via ? | Spain | ? | L*,L*,N* | 1377 | Ukraine | Ukraine | 50 | C* |
| 531 | Leipzig | Germany | 600 | C*,E*,G*,K*,L*,N* | 900 | Qurayyat | Saudi Arabia | 1000 | L* | 1386 | Ahwaz | Iran | 400 | C* |
| 531 | RNE5 via ? | Spain | ? | K*,L* | 909 | Bournemouth(BBC5) | UK | 0.025 | L | 1386 | Bolshakov | Russia | 2500 | L*,N* |
| 540 | Wavre | Belgium | 150/50 | A,C,E,K*,L,N,P* | 909 | B'mens Pt(BBC5) | UK | 140 | C,E,N,O,P* | 1386 | R.Ned via P'shakov | Russia | 2500 | D*,E,K* |
| 540 | Sidi Benour | Morocco | 600 | C*,E*,K*,L*,M*,N* | 918 | Plesivec(Sloven'nR) | Slovenia | 600/100 | C*,E*,K*,L*,N* | 1395 | Lushnje(Irانا) | Albania | 1000 | D*,E*,K*,L* |
| 549 | Les Trembles | Algeria | 600 | C*,E*,J*,K*,L*,N* | 918 | Madrid(R Int) | Spain | 20 | C*,E*,K*,L*,N* | 1395 | Lopic? | Netherlands | ? | C,D,K*,L,N |
| 549 | Thurnau (DLF) | Germany | 200 | A,C,E*,G*,J*,K*,L*,N | 927 | Wolvertem | Belgium | 300 | C,E,K*,L,M,N* | 1404 | Brest | France | 20 | C*,E*,K*,L,N*,D |
| 558 | Espoo | Finland | 100 | E*,L*,N*,P* | 936 | Bremen | Germany | 100 | C,E,K*,N* | 1404 | Ukraine(UR2) via ? | Ukraine | ? | C* |
| 558 | RNE5 via ? | Spain | ? | E*,K*,L*,M,N* | 936 | Venezia | Italy | 20 | C*,E*,L* | 1413 | RNE5 via ? | Spain | ? | K*,L* |
| 567 | Berlin | Germany | 100 | K* | 936 | RNE5 via ? | Spain | ? | L*,N* | 1422 | Heusweiler(DLF) | Germany | 1200/600 | C,D,E,G*,K*,L*,N |
| 567 | Tullamore(RTE1) | Ireland (S) | 500 | A,C,E,J,L,N,P* | 945 | Toulouse | France | 300 | E*,K* | 1440 | Marnach(RTL) | Luxembourg | 1200 | C,D,E,K*,L |
| 567 | RNE5 via ? | Spain | ? | K*,L*,N* | 954 | Brno (CRo2) | Czech Rep. | 200 | C*,E*,K*,N* | 1440 | Damman | Saudi Arabia | 1600 | K* |
| 576 | Munlacker(SDR) | Germany | 500 | C*,E*,G*,N*,P* | 954 | Madrid(DI) | Spain | 20 | C*,E*,K*,L*,N* | 1449 | Squinzano | Italy | 50 | C*,L* |
| 576 | Barcelona(RNE5) | Spain | 50 | E*,L*,N*,P* | 963 | Pori | Finland | 600 | C*,E*,K*,L*,N*,P* | 1449 | Redmoss(BBC) | UK | ? | K*,M |
| 585 | Paris(FIP) | France | 3 | C,E,L*,P* | 963 | Tir Chonaill | Ireland (S) | 10 | E*,M* | 1467 | Monte Carlo(TWR) | Monaco | 1000/400 | E*,K*,L*,N |
| 585 | Madrid(RNE1) | Spain | 200 | C*,E*,K*,L*,L* | 972 | Hamburg(NDR) | Germany | 300 | C*,E*,K*,L*,M*,N* | 1485 | AFN via ? | Germany | 1 | C* |
| | | | | M*,N*,P* | 972 | RNE1 via ? | Spain | ? | C* | 1485 | SER via ? | Spain | ? | C*,M*,N |
| 585 | Gafsa | Tunisia | 350 | L* | 981 | Alger | Algeria | 600/300 | C*,E*,L*,N*,O* | 1494 | Clermont-Ferrand | France | 20 | C,D,K*,N |
| 585 | Dumfries(BBCScott) | UK | 2 | A,E | 990 | Berlin | Germany | 300 | C*,E*,K* | 1494 | St.Petersburg | Russia | 1000 | K*,L*,M*,N |
| 594 | Frankfurt(HR) | Germany | 1000/400 | C*,E*,G*,K*,M,N*,P* | 990 | R.Bilbao(SER) | Spain | 10 | E* | 1503 | Stargard | Poland | 300 | E*,L* |
| 594 | Dujda-1 | Morocco | 100 | C*,L* | 999 | Schwerin (RIAS) | Germany | 20 | E* | 1503 | RNE5 via ? | Spain | ? | C*,N |
| 594 | Muge | Portugal | 100 | E*,F*,K*,L* | 999 | Torino | Italy | 20 | C* | 1512 | Wolvertem | Belgium | 600 | A*,C,E,J*,K*,L*,M*,N |
| 603 | Lyon | France | 300 | N* | 999 | Madrid(COPE) | Spain | 50 | C*,E*,K*,N* | | | | | |
| 603 | Sevilla(RNE5) | Spain | 50 | E*,K*,L*,M | 1008 | Las Palmas(SER) | Gran Canaria | 10 | L* | 1521 | Kosice(Cizate) | Slovakia | 600 | E*,L*,N |
| 612 | Athlone(RTE2) | Ireland (S) | 100 | E*,L*,M,N*,P* | 1008 | Flevo(Hilv-5) | Holland | 400 | A*,C,E,K*,L,N | 1521 | Duba | Saudi Arabia | 2000 | L* |
| 612 | Sebba Aïoun | Morocco | 30 | C* | 1017 | Rheinsender(SWF) | Germany | 600 | L*,M*,N* | 1521 | R.Maresla(SER) | Spain | 2 | C* |
| 621 | RNE1 via ? | Spain | 100 | C*,L*,N* | 1017 | RNE5 via ? | Spain | ? | L* | 1530 | Vatican R | Italy | 1500/450 | E*,J*,K*,L*,N |
| 621 | Wavre | Belgium | 80 | C*,E*,K*,L,M,N | 1026 | Graz-Dobl | Austria | 100 | G* | 1539 | Mainflingen(DLF) | Germany | 700 | E* |
| 621 | Barcelona(OCR) | Spain | 50 | C*,L*,N*,P* | 1026 | SER via ? | Spain | ? | A*,C*,E*,L*,N* | 1539 | SER via ? | Spain | ? | C* |
| 630 | Dannenberg(NDR) | Germany | 100 | E* | 1035 | Tallinn | Estonia | 500 | L* | 1539 | Valladolid(SER) | Spain | 5 | L*,N |
| 630 | Vigra | Norway | 100 | K*,N* | 1035 | RAI via ? | Italy | ? | C* | 1557 | Osijek | Croatia | 10/20 | C* |
| 630 | Tunis-Djedeida | Tunisia | 600 | C*,E*,L*,P* | 1035 | Lisbon(Prog3) | Portugal | 120 | E*,K* | 1557 | Nica | France | 300 | N |
| 630 | Praha(Liblice) | Czech | 1500 | C*,E*,K*,L*,N*,P* | 1044 | Dresden | Germany | 250 | C*,E*,K*,N* | 1566 | Stax | Tunisia | 1200 | C*,K*,L*,M*,N |
| 639 | RNE1 via ? | Spain | ? | C*,E*,K*,L*,N* | 1044 | SER via ? | Spain | ? | C*,E*,K*,L*,N* | 1575 | Genova | Italy | 50 | C*,K*,L* |
| 648 | RNE1 via ? | Spain | 10 | E*,N* | 1053 | Zaragoza(COPE) | Spain | 10 | E*,K*,N* | 1575 | SER via ? | Spain | 5 | C*,J*,L*,N |
| 648 | Orfordness(BBC) | UK | 250 | C*,E*,H*,L,M,N*,P* | 1053 | Talk Radio UK via ? | UK | ? | C,E,L,M,N,O* | 1584 | SER via ? | Spain | 2 | C*,J*,L* |
| 657 | Neubrandenburg(NDR) | Germany | 500 | C*,K*,N* | 1062 | Kalundborg | Denmark | 250 | C*,E*,K*,L*,N* | 1593 | Holzkirchen(RFE) | Germany | 150 | E*,K*,L* |
| 657 | Napoli | Italy | 120 | C*,K*,L* | 1062 | R.Uno via ? | Italy | ? | C*,K* | 1602 | SER via ? | Spain | ? | C*,L* |
| 657 | Wrexham(BBCWales) | UK | 2 | C,E,I,N | 1071 | Brest | France | 20 | L* | 1602 | Vitoria(EI) | Spain | 10 | C*,L*,N |
| 666 | Messkirch(RohrdtSWF) | Germany | 300/180 | C*,E*,G*,K* | 1071 | France-Inter via ? | France | ? | E*,K* | 1611 | Vatican R | Italy | 15 | B*,K*,N |
| | | | | M*,N*,P* | 1071 | Lille | France | 40 | C,O | | | | | |
| | | | | C*,K*,L* | 1071 | Riga | Latvia | 50 | L* | | | | | |
| 666 | Lisboa | Portugal | 135 | C*,K*,L* | 1071 | Bilbao(EI) | Spain | 5 | K*,L*,N* | | | | | |
| 666 | Barcelona(COPE) | Spain | 10 | E*,K*,N* | 1071 | Talk Radio UK via ? | UK | ? | C*,E,N | | | | | |
| 675 | Marseille | France | 600 | C*,K*,L*,N*,O*,P* | 1080 | Katowice | Poland | 1500 | C*,E*,K*,L*,N* | | | | | |
| 675 | Lopic(RIO Gold) | Holland | 120 | A*,C,E,K*,L,N,O | 1080 | SER via ? | Spain | ? | C*,E*,L*,N* | | | | | |
| 684 | Sevilla(RNE1) | Spain | 500 | C*,E*,K*,L*,N* | 1080 | SER via ? | Russia | 300 | K* | | | | | |
| 684 | Avajal(Beograd-1) | Yugoslavia | 2000 | E*,L*,N* | 1089 | Krasnodar | Russia | 300 | C*,E,L,M,N,D* | | | | | |
| 693 | Potenza | Italy | 20 | C* | 1089 | Talk Radio UK via ? | UK | ? | C*,E,L,M,N,D* | | | | | |
| 693 | Tortosa(RNE1) | Spain | 2 | K* | 1098 | Nitra(Jarok) | Slovakia | 1500 | A*,K*,L* | | | | | |
| 693 | Droitwich(BBC5) | UK | 150 | C,E,L*,M,N,O,P* | 1098 | RNE5 via ? | Spain | ? | A*,K*,L* | | | | | |
| 702 | Flensburg(NOR) | Germany | 5 | C,E*,K* | 1107 | AFN via ? | Germany | 10 | A*,C*,K*,N* | | | | | |
| 702 | Monte Carlo | Monaco | 40 | C*,L* | 1107 | RNE5 via ? | Spain | ? | K* | | | | | |
| 702 | Sebba-Aïoun | Morocco | 740 | K* | 1107 | Talk R.UK via ? | UK | ? | C,E,L,M,N | | | | | |
| 702 | Zamorá(RNE1) | Spain | 10 | E*,L*,N* | 1116 | Bari | Italy | 150 | C*,J*,K*,L* | | | | | |
| 711 | Rennes 1 | France | 300 | C*,E*,J*,L | 1116 | Pontevedra(SER) | Spain | 5 | C* | | | | | |
| 711 | Heidelberg | Germany | 5 | C*,N* | 1125 | La Louviere | Belgium | 20 | C*,E*,K* | | | | | |
| 711 | Laayoune | Morocco | 600 | L* | 1125 | Danovec | Croatia | 100 | C* | | | | | |
| 711 | Murcia(CDFE) | Spain | 5 | E* | 1125 | RNE5 via ? | Spain | ? | C*,J*,K*,L*,N* | | | | | |
| 720 | Langenberg | Germany | 200 | C,P* | 1134 | COPE via ? | Spain | 2 | A*,C*,E*,J*,K*,L*,N* | | | | | |
| 720 | Lisnagarvey(BBC4) | Ireland (N) | 10 | L* | 1134 | Zadar(Croatian R) | Yugoslavia | 600/1200 | A*,C*,E*,K*,L*,N* | | | | | |
| 720 | Norte | Portugal | 100 | C*,E*,K*,L* | 1143 | Stuttgart(AFN) | Germany | 10 | A*,C*,E*,K*,L*,N* | | | | | |
| 720 | Stax | Tunisia | 200 | L* | 1143 | COPE via ? | Spain | 2 | A*,L*,N* | | | | | |
| 720 | Roads Rd.,Ldn(BBC4) | UK | 0.5 | C,E,L*,M,N | 1152 | RNE5 via ? | Spain | 10 | E*,L*,N* | | | | | |
| 729 | Cork(RTE1) | Ireland (S) | 10 | K*,L,M,N* | 1161 | Strasbourg(Fint) | France | 200 | A*,C*,E*,K*,L*,N* | | | | | |
| 729 | RNE1 via ? | Spain | ? | E*,K*,L*,N* | 1170 | Via Real | Portugal | 10 | M | | | | | |
| 738 | Paris | France | 4 | C,L | 1179 | SER via ? | Sweden | 600 | C*,K*,L*,N* | | | | | |
| 738 | Poznan | Poland | 300 | C*,K*,L* | 1179 | Solweborg | Sweden | 600 | A*,C*,E*,J*,K*,L*,N*,O* | | | | | |
| 738 | Barcelona(RNE1) | Spain | 500 | C*,E*,K*,L*,N* | 1188 | Kuurne | Belgium | 5 | C*,E*,K*,L*,N | | | | | |
| 747 | Flevo(Hilv2) | Holland | 40 | C,E,J*,L,M,N*,P* | 1188 | Reichenbach(MDR) | Germany | 5 | C*,E* | | | | | |
| 747 | Cadix(RNE5) | Spain | 10 | K* | 1188 | Stolnik | Hungary | 135 | K*,L* | | | | | |
| 756 | Braunschweig(DLF) | Germany | 800/200 | C,G*,K*,L*,N*,P* | 1197 | Munich(VOA) | Germany | 300 | E*,K*,N | | | | | |
| 756 | Bilbao(EI) | Spain | 5 | C*,K*,L* | 1197 | Virgin via ? | UK | ? | C,E,L,N,O | | | | | |
| 756 | Redruth(BBC) | UK | 2 | K*,L,M* | 1197 | Virgin via ? | France | 100 | K*,N*,O | | | | | |
| 756 | Sottens | Switzerland | 500 | C*,E*,G*,K*,L*,N* | 1206 | Bordeaux | France | 200 | C*,K*,L* | | | | | |
| 774 | Enniskillen(BBC) | Ireland (N) | 1 | K* | 1206 | Wroclaw | Poland | 200 | N* | | | | | |
| 774 | RNE1 via ? | Spain | ? | C*,E*,K*,L*,N* | 1215 | COPE via ? | Spain | ? | C*,E,L,M,N,D | | | | | |
| 783 | Burg | Germany | 1000 | C*,E*,G*,K*,L*,N*,P* | 1215 | Virgin via ? | UK | ? | C*,K*,N*,O | | | | | |
| 783 | Miramar(R Porto) | Portugal | 100 | K* | 1224 | Lelystad | Netherlands | 25 | C*,K*,L*,N* | | | | | |
| 783 | Dammam | Saudi Arabia | 100 | L* | 1224 | Virgin via ? | UK | ? | L*,M* | | | | | |
| 792 | Limoges | France | 300 | E*,K*,L*,P* | 1233 | Liege | Belgium | 5 | K* | | | | | |
| 792 | Sevilla(SER) | Spain | 20 | C*,E*,K*,L*,N*,P* | 1233 | Virgin via ? | UK | ? | C,E,I,N | | | | | |
| 801 | Munchen-Ismaning | Germany | 300 | C*,E*,K*,L*,M*,N* | 1242 | Marseille | France | 150 | C*,K*,M*,N*,O | | | | | |
| 801 | RNE1 via ? | Spain | ? | C*,E*,K*,L*,N* | 1242 | Virgin via ? | UK | ? | C,E,N | | | | | |
| 810 | Madrid(SER) | Spain | 20 | C*,E*,K*,L*,N* | 1251 | Marcelli | Hungary | 500 | C*,K* | | | | | |
| 810 | Westerglen(BBCScott) | UK | 100 | E*,F*,J*,L*,M,N | 1251 | Huisberg | Netherlands | 10 | E*,L*,N* | | | | | |
| 819 | Batra | Egypt | 450 | J*,L*,N* | 1251 | Dubai | UAE | 600 | L* | | | | | |
| 819 | Toulouse | France | 50 | C*,K*,L*,N* | 1260 | SER via ? | Spain | ? | E*,K*,L* | | | | | |
| 819 | Warsaw | Poland | 300 | E*,J* | 1260 | Gulldford (V) | UK | ? | C,L,N*,O | | | | | |
| 828 | Hannover(NDR) | Germany | 100/5 | E*,K* | 1269 | Neumunster(DLF) | Germany | 600 | C,E,G*,K*,L*,N* | | | | | |
| 828 | Rotterdam | Holland | 5 | C* | 1269 | COPE via ? | Spain | ? | C* | | | | | |
| 828 | Dujda-2 | Morocco | 100 | L* | 1278 | Dublin/Cork(RTE2) | Ireland (S) | 10 | C*,E*,L*,M,N* | | | | | |
| 828 | Barcelona(SER) | Spain | 50 | E*,N* | 1287 | RFE via ?</ | | | | | | | | |

Local Radio Chart

| Freq (kHz) | Station | ILR BBC | e.m.r.p (kW) | Listener | Freq (kHz) | Station | ILR BBC | e.m.r.p (kW) | Listener |
|------------|-----------------------|---------|--------------|-------------------------------|------------|----------------------|---------|--------------|---------------------|
| 558 | Spectrum, London | I | 0.80 | B, C, D, E, F*, I, K, M, N | 1161 | Icy AM, Dundee | I | 1.40 | E, J |
| 585 | R. Solway | B | 2.00 | E, I, M, N | 1170 | Amber SGR, Ipswich | I | 0.28 | C, E* |
| 603 | Boss 603, Cheltenham | I | 0.10 | D, E, G, I, K, M, N | 1170 | GNR, Stockton | I | 0.32 | F*, H* |
| 603 | InvictaSG, Lit'lbrne | I | 0.10 | C, I, N | 1170 | SCR, Portsmouth | I | 0.12 | E*, L, N |
| 630 | R. Bedfordshire(3CR) | B | 0.20 | B, C, D, E, G, H*, I, K, M, N | 1170 | Signal G, Stoke-on-T | I | 0.20 | D, E, K |
| 630 | R. Cornwall | B | 2.00 | E, I, J*, N | 1170 | Swansea Snd, Swansea | I | 0.58 | E |
| 657 | R. Clwyd | B | 2.00 | E, I, M, N | 1170 | 1170AM, High Wycombe | I | 0.25 | C, E, H*, N |
| 657 | R. Cornwall | B | 0.50 | E, I, N | 1242 | InvictaSG, Maidstone | I | 0.32 | C, M*, N |
| 666 | Gemini AM, Exeter | I | 0.34 | E, G, I, N | 1242 | loW Radio, Wootton | I | 0.50 | E, I, L, N |
| 666 | R. York | B | 0.80 | C, D, E*, M, N | 1251 | Amber SGR, Bury StEd | I | 0.76 | C, E*, N |
| 729 | BBC Essex | B | 0.20 | C, E*, I, M, N | 1260 | Brunel CG, Bristol | I | 1.60 | E, I |
| 738 | Hereford/Worcester | B | 0.037 | D, E, H, I, K, N | 1260 | Marcher G, Wrexham | I | 0.64 | D, E |
| 756 | R. Cumbria | B | 1.00 | E | 1260 | SabrasSnd, Leicester | I | 0.29 | E, K |
| 765 | BBC Essex | B | 0.50 | B, C, D, E, I, K, M, N | 1260 | R. York | B | 0.50 | A |
| 766 | R. Maldwyn, Powys | I | 0.63 | D, E, I, N | 1278 | Gt. Yks G, Bradford | I | 0.43 | E |
| 774 | R. Kent | B | 0.70 | C, E*, I, M, N | 1296 | Radio XL, Birmingham | I | 5.00 | C, E*, G, I, K, N |
| 774 | R. Leeds | B | 0.50 | E | 1305 | Gt. Yks G, Barnsley | I | 0.15 | D, K |
| 774 | 3 Counties SG, Glos | I | 0.14 | E, I, K | 1305 | Premier via ? | I | 0.50 | C, E*, I, N |
| 792 | Chiltern SG, Bedford | I | 0.27 | C, E, H, I, K, M, N | 1305 | Touch AM, Newport | I | 0.20 | E*, I |
| 792 | R. Foyle | B | 1.00 | E, J* | 1323 | S.Coast R, Brighton | I | 0.50 | C, I, K, N |
| 801 | R. Devon & Dorset | B | 2.00 | E, G, I, N | 1323 | SomersetSnd, Bristol | B | 0.63 | D, N |
| 828 | Chiltern SG, Luton | I | 0.20 | C, E, H, K, N | 1332 | Premier, Battersea | I | 1.00 | C, E*, I |
| 828 | Magic 828, Leeds | I | 0.12 | D | 1332 | WGMS CG, Peterboro' | I | 0.60 | A, C, D, E, K, N |
| 828 | R. WM | B | 0.20 | E, K | 1332 | Wiltshire Sound | B | 0.30 | E, I, N |
| 828 | 2CR CG, Bournemouth | I | 0.27 | E, I | 1359 | BreezeAM, Chelmsford | I | 0.28 | C, E*, N |
| 837 | R. Cumbria/Furness | B | 1.50 | E | 1359 | Mercia CG, Coventry | I | 0.27 | C, K, M*, N |
| 837 | R. Leicester | B | 0.45 | C, D, E, I, K, M, N | 1359 | R. Solent | B | 0.85 | E, I |
| 855 | R. Devon & Dorset | B | 1.00 | E, J | 1359 | Touch AM, Cardiff | I | 0.20 | E |
| 855 | R. Lancashire | B | 1.50 | D, E, M | 1368 | R. Lincolnshire | B | 2.00 | E, K, N |
| 855 | R. Norfolk | B | 1.50 | C, I, N | 1368 | Southern Counties R | B | 0.50 | C, H, I, N |
| 855 | Sunshine 855, Ludlow | I | 0.15 | E, K, M | 1368 | Wiltshire Sound | B | 0.10 | E, I |
| 873 | R. Norfolk | B | 0.30 | C, D, E, I, K, N | 1413 | Premier via ? | I | 0.50 | B, C, E*, I, N |
| 936 | Brunel CG, W. Wilts | I | 0.18 | E, I, M, N | 1431 | Breeze AM, Southend | I | 0.35 | C, D, E*, I, N |
| 945 | Derby (Gam AM) | I | 0.20 | C, D, E, I, K, M, N | 1431 | 210 CG, Reading | I | 0.14 | D, E*, I, N |
| 954 | Gemini AM, Torquay | I | 0.32 | E, I, N | 1449 | R. Peterboro/Cambis | B | 0.15 | C, E, I, K, N |
| 963 | Viva, Southall | I | 1.00 | C, E, F*, H*, I, K, M, N | 1458 | R. Cumbria | B | 0.50 | E |
| 954 | Wyvern, Hereford | I | 0.16 | D, E, J | 1458 | R. Devon & Dorset | B | 2.00 | C, E*, I, N |
| 990 | R. Devon & Dorset | B | 1.00 | E, I, N | 1458 | Fortune, Manchester | I | 5.00 | D, E* |
| 990 | Gt. Yks G, Doncaster | I | 0.25 | D, E*, N | 1458 | R. Newcastle | B | 2.00 | E* |
| 990 | WABC, Wolverhampton | I | 0.09 | D, E, N | 1458 | Sunrise, London | I | 50.00 | C, E*, I, J, N |
| 999 | Gam AM, Nottingham | I | 0.25 | C, D, E, K, M, N | 1458 | Radio WM | B | 5.00 | E*, K, M* |
| 999 | Red Rose G, Preston | I | 0.80 | D | 1476 | CountySnd, Guildford | I | 0.50 | C, E*, G*, H*, I, N |
| 999 | R. Solent | B | 1.00 | C, E, I, N | 1485 | R. Humberside (Hull) | B | 1.00 | E* |
| 1017 | WABC, Shrewsbury | I | 0.70 | D, E, K, M*, N | 1485 | R. Merseyside | B | 1.20 | D, E*, G* |
| 1026 | R. Cambridgeshire | B | 0.50 | B, C, D, E, K, M*, N | 1485 | Southern Counties R | B | 1.00 | C, E*, I, N |
| 1026 | Downtown, Belfast | I | 1.70 | B, E, J | 1503 | R. Stoke-on-Trent | B | 1.00 | C*, D, E*, G*, I, K |
| 1026 | R. Jersey | B | 1.00 | C*, E, I, N | 1521 | MercuryXtra, Reigate | I | 0.64 | C, E*, H*, I, N |
| 1035 | Country 1035, London | I | 1.00 | C, D, E*, G, I, J, K, N | 1530 | R. Essex | B | 0.15 | C, I, N |
| 1035 | R. Sheffield | B | 1.00 | D, K | 1530 | Gt. Yks G, Huddersfd | I | 0.74 | D, E* |
| 1035 | N. Sound, Aberdeen | I | 0.78 | E | 1530 | Wyvern, Worcester | I | 0.52 | E*, I |
| 1035 | W. Sound, Ayr | I | 0.32 | E | 1548 | R. Bristol | B | 5.00 | C*, E, I |
| 1107 | Moray Fth, Inverness | I | 1.50 | E | 1548 | Capital G, London | I | 97.50 | C, E, I |
| 1116 | R. Derby | B | 1.20 | A*, C, D, E*, K, M*, N | 1548 | City G, Liverpool | I | 4.40 | C*, D, E* |
| 1116 | R. Guernsey | B | 0.50 | C, E*, I, L, N | 1548 | Gt. Yks G, Sheffield | I | 0.74 | C*, E*, K |
| 1152 | Amber, Norwich | I | 0.83 | C, D, E*, N | 1548 | Max AM, Edinburgh | I | 2.20 | E* |
| 1152 | Clyde 2, Glasgow | I | 3.06 | E | 1557 | R. Lancashire | B | 0.25 | D, E* |
| 1152 | GNR, Newcastle | I | 1.80 | E* | 1557 | Mellow, Clacton | I | 0.125 | C, D, E*, N |
| 1152 | Lon. Newstalk, London | I | 23.50 | D, E*, I, L, M*, N | 1557 | Northants SG | I | 0.76 | E*, K |
| 1152 | Pic'ly G, Manchester | I | 1.50 | D, E | 1557 | Sth Coast R, So ton | I | 0.50 | E*, I, N |
| 1152 | PlymSnd2CR, Plymouth | I | 0.32 | E | 1584 | KBCB, Kettering | I | 0.04 | C, E, K, M*, N |
| 1152 | Xtra-AM, Birmingham | I | 3.00 | E*, K | 1584 | London Turkish R | I | ? | C*, H, N |
| 1161 | R. Bedfordshire(3CR) | B | 0.10 | C, K, N | 1584 | R. Nottingham | B | 1.00 | D, E*, H, K, M* |
| 1161 | Brunel CG, Swindon | I | 0.16 | E, I, N | 1584 | R. Shropshire | B | 0.50 | E*, I |
| 1161 | Gt. Yks, Hull | I | 0.35 | D, E | 1584 | Tay, Perth | I | 0.21 | E*, J |
| 1161 | Southern Counties R | B | 1.00 | C, E*, I, N | 1602 | R. Kent | B | 0.25 | C, E*, I, N |

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

Listeners:-

- (A) Tim Allison, Middlesbrough.
- (B) Leo Barr, Sunderland.
- (C) Paul Bowery, Burnham-on-Crouch.
- (D) Martin Dale, Stockport.
- (E) Gerry Haynes, while in Talgarth, Powys.
- (F) Francis Hearne, while in S.W. London.
- (G) Simon Hockenhill, E. Bristol.
- (H) Sheila Hughes, Morden.
- (I) George Millmore, Wootton, loW.
- (J) Tom Smyth, Co. Fermanagh.
- (K) Andrew Stokes, Leicester.
- (L) Andrew Stokes, while in N. France.
- (M) Norman Thompson, Dadbly.
- (N) John Wells, East Grinstead.

R. Havana Cuba 11.705 (Eng to Europe 2100-2200) 35433 at 2100 in Middlesbrough; WWCR Nashville, USA 12.160 (Eng to Europe? 1400-2300) 33333 at 2125 in Stalbridge; R. Japan via Moyabi, Gabon 11.865 (Eng to Europe 2100-2200) 35333 at 2130 in E. Bristol; WYFR Okeechobee, USA 11.580 (Eng to Europe, Africa 2100-2300) 33222 at 2155 in Rugby; UAER Abu Dhabi 11.970 (Eng to N. America 2200-0000) 34544 at 2340 in Burnham-on-Crouch.

Broadcasts from several continents may be heard in the **9MHz (31m)** band. During the morning R. Vlaanderen Int, Belgium 9.925 (Eng to Europe 0730-0755) was 33222 at 0730 in Morden; R. Netherlands via Bonaire, Ned. Antilles 9.720 (Eng to Australia, NZ 0730-1025) SIO222 at 0730 in Co. Fermanagh; R. New Zealand Int 9.700 (Eng to Pacific areas 0715-1206) 43222 at 0845 in Truro; DW via Antigua, W. Indies 9.690 (Ger to Australia? 0800-1000) 24332 at 0910 in Oxted; R. Australia via Shepparton 9.860 (Eng to Pacific, Asia 0630-1200) 25542 at 0927 in Wallsend.

After mid-day R. Singapore Int 9.530 (Eng to Asia 1100-1400) was 33553 at 1305 in Larnaca, Cyprus; Voice of Vietnam, Hanoi 9.840 (Eng to Far East 1330-1400) 44444 at 1340 in Ross-on-Wye; R. Australia via Darwin 9.615 (Eng to Asia 1100-1755) SIO333 at 1513 in Gt. Yarmouth; Voice of Hope (KHBN), Palau 9.965 (Fil, Eng, Hin, Ur to Asia [Eng ident 1450]) 44434 at 1557 in Penmaenmawr; Voice of Vietnam, Hanoi 9.840 (Eng to Africa 1600-1630) 54444 at 1620 in Herstmonceux; TWR Manzini, Swaziland 9.500 (Eng to E. Africa 1600-1700) 44434 at 1700 in Burnham-on-Crouch.

Later, R. Netherlands via Talata Volon, Madagascar 9.605 (Eng to S/E/W. Africa 1730-1930, E/C/W. Africa 1930-2025) was 32433 at 1936 in Newry; R. Bulgaria, Sofia 9.700 (Eng to Europe 2000-2100) 54554 at 2015 in Bridgwater; AIR via Delhi? 9.950 (Hin, Eng to W. Europe 1945-2230) 35444 at 2040 in Chester; VOA via Gloria, Portugal 9.760 (Eng to Europe, N. Africa M. East 1700-2100) 32223 at 2100 in Stalbridge; R. Australia via Carnarvon 9.645 (Eng to S. Asia 2100-2300) 52332 at 2101 in Bushey Heath; RCI via Sackville? 9.805 (Eng to Europe, M. East, Africa 2100-2230) 54444 at 2113 in Middlesbrough; Monitor R. Int via WSHB 9.355 (Eng to Europe 2000-2200) 43333 at 2150 in Kilkeel; RRI Jakarta, Indonesia 9.680 (Ind to Asia? 0600-1710; 2300-0200) 25523 at 2200 in Guildford; Voice of Turkey, Ankara 9.445 (Tur to USA 2200-0000?) 44444 at 2220 in Rugby; Voice of Russia 9.530 (Eng WS) SIO333 at 2250 by Francis Hearne in N. Bristol; AWR Alajuela, Costa Rica

Macclesfield; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to S/S.E. Asia 1300-1500) SIO444 at 1300 in Co. Fermanagh; UAER, Dubai 13.675 (Eng to Europe 1330-1355) 43443 at 1335 in Herstmonceux; WYFR via Okeechobee 13.695 (Eng to N. America 1300-1400) 33332 at 1352 in Oxted; DW via ? 13.610 (Swa?, Eng to Africa, S. Asia 1500-1650?) SIO444 at 1457 in Doncaster; R. Netherlands via Flevo 13.700 (Eng to S. Asia, M. East 1330-1525) 34233 at 1500 in Newry; R. Pakistan, Islamabad 13.590 (Eng to M. East 1600-1630) 43333 at 1600 in Norwich; UAER, Dubai 13.675 (Eng to Europe 1600-1640) 33233 at 1630 in Oadby; WWCR Nashville, USA 13.845 (Eng to E. USA 1400-0100) 33333 at 1630 in Burnham-on-Crouch; VOA via Selebi-Phikwe, Botswana 13.710 (Eng to Africa 1630-1900) 44444 at 1728 in Stockport.

Later, WJCR via Millerstown, USA 13.595 (Eng 12hrs, Chin 12hrs) was 25232 at 1826 in Bushey Heath; WEWN Birmingham, USA 13.695 (Eng to Europe 1900-2000) 55444 at 1920 in Ross-on-Wye; RCI via Sackville 13.650 (Eng to Europe, M. East, Africa 2100-2230?) 35333 at 2115 in E. Bristol; RCI via Sackville 13.690 (Eng to Europe, M. East, Africa

2100-2230?) 44444 at 2140 in Rugby; WHRI South Bend, USA 13.760 (Eng to E. USA, Europe 1500-2200) 35222 at 2145 in Barton-on-Humber.

Good reception from some areas was noted in the **11MHz (25m)** band. During the morning Slovak R. Int, via Velke Kostolany 11.990 (Eng to Australia 0830-0857) was 44444 at 0830 in Morden; SRI via ? 11.640 (It, Eng, Fr, Ger, Port to Australia, S. Pacific 0830-1100) 33333 at 0915 in Truro; R. Ulaanbaatar, Mongolia 12.000 (Eng to Asia 0910-0940) 23232 at 0925 in Scalloway; SRI via ? 11.640 (Eng, Fr, Ger, It to Far East, S.E. Asia 1100-1300) 34443 at 1122 in Stockport; VOIRI Tehran 11.930 (Eng to Asia 1130-1230) 34322 at 1138 in Newry.

In the afternoon R. Bulgaria, Sofia 11.605 (Eng to Asia 1230-1330) was SIO312 at 1233 in Macclesfield; FEBC Bouca, Philippines 11.995 (Eng to India, S.E. Asia 1300-1600) 23332 at 1350 in Chester; Voice of the Mediterranean via Cyclops, Malta 11.925 (Eng, Ar to N. Africa 1400-1600) SIO323 at 1400 in Co. Fermanagh; R. Norway Int via Sveio 11.840 (Eng 1400-1430 Sunday) 32432 at 1405 in Herstmonceux; BBC via Kranji, Singapore 11.750 (Eng to

Far East 1100-1800) 52432 at 1450 in Bushey Heath; AIR via Aligarh? 11.620 (Baluchi to Pakistan 1500-1600) SIO223 at 1535 in Gt. Yarmouth; Voice of Greece, Athens 11.645 (Gr, Eng?) to Europe 1500?-1600?) 32323 at 1537 in Penmaenmawr; R. Jordan via Al Karanah 11.940 & 11.970 (Eng 1500-1730) 34334 at 1600 in Oadby; R. Australia via Carnarvon 11.660 (Eng to S. Asia 1430-2057) 44434 at 1615 by R. Frost in Felixstowe.

Later, R. Pakistan, Islamabad 11.570 (Eng to Europe 1700-1800) was 34443 at 1725 in Kilkeel; DW via Sri Lanka? 11.785 (Eng to W. Africa 1900-1950) SIO333 at 1924 in Doncaster; DW via Wertachtal? 11.865 (Eng to W. Africa 1900-1950) 54444 at 1940 in Norwich; R. Netherlands via Madagascar 11.655 (Eng to E/C/W. Africa 1930-2025) 34333 at 1942 in Oxted; R. Kuwait via Kabd 11.990 (Eng to Europe, N. America 1800-2100) 44334 at 1955 in Woking; BBC via Ascension Is 11.835 (Eng to Africa 1930-2100) 35553 at 2027 in Wallsend; R. Thailand, Bangkok 11.805 (Eng to Europe 2030-?) 44333 at 2044 in Bridgwater; R. Anhanguera, Brazil 11.830 (Port 0900-0300) 33523 at 2052 by Richard Reynolds in Guildford;

Tropical Bands Chart

| Freq (MHz) | Station | Country | UTC | DXer | Freq (MHz) | Station | Country | UTC | DXer |
|------------|-----------------------|---------------|------|---------------------|------------|-----------------------|---------------|------|-----------------------|
| 2.310 | ABC Alice Springs | Australia | 1750 | D,G,H,I,L | 4.850 | AIR Kohima | India | 0035 | D,FP |
| 2.325 | ABC Tennant Creek | Australia | 1800 | D,G,H,I,L | 4.850 | Ulan Bator 1 | Mongolia | 1555 | L |
| 2.485 | ABC Katherine | Australia | 1912 | D,G,H,I,L,Q | 4.860 | V of Kingsway(Feeder) | India | 1845 | I,L,O,P,Q,R,S,T |
| 2.850 | KCBS Pyongyang | N.Korea | 2110 | G | 4.862 | V of Zaire, Bukavu | Zaire | 1611 | S (logged on 4.848) |
| 3.205 | R Ribeirao | Brazil | 0310 | G | 4.865 | R Alvorada, Londrina | Brazil | 0040 | D |
| 3.220 | CPBS 1, Beijing | China | 2125 | G | 4.865 | PBS Lanzhou | China | 1505 | D,F,G,I,L,N,P,S |
| 3.220 | Channel Africa | S.Africa | 0320 | G | 4.870 | R.Cotonou | Benin | 1905 | D,G,Q,T |
| 3.220 | R Kara, Lome | Togo | 1853 | D,F,G,I,L | 4.875 | R.Roraima, Boa Vista | Brazil | 0150 | G |
| 3.223 | AIR Simia | India | 1626 | G,I,L,R | 4.879 | R.Bangladesh | Bangladesh | 1545 | D,G,I,L,S |
| 3.230 | R.Sol de Los Andes | Peru | 0102 | P | 4.885 | R.Clube do Para | Brazil | 0155 | G |
| 3.230 | SABC Meyerton | S.Africa | 1844 | C,D,G,I,L,P,S | 4.885 | R.Difusora Acreana | Brazil | 2245 | D |
| 3.240 | TWR Shona | Swaziland | 1816 | C,G,I,L,PR | 4.885 | KBC East Sea Nairobi | Kenya | 1855 | D,I,G,I,Q |
| 3.245 | AIR Lucknow | India | 1620 | G,I,L,R,T | 4.890 | RFI Paris | via Gabon | 0400 | C,P |
| 3.250 | R.Luz Y Vida | Honduras | 0350 | G | 4.890 | R.Port Moresby | New Guinea | 2000 | G,Q |
| 3.250 | R.Pyongyang | N.Korea | 2155 | D | 4.890 | ORTS Dakar | Senegal | 0445 | T |
| 3.255 | R.Educadora Cariri | Brazil | 0010 | D | 4.895 | R.IPB AM C'po Grande | Brazil | 0628 | S |
| 3.255 | BBC via Maseru | Lesotho | 1948 | C,F,G,I,P,Q | 4.895 | Voz del Rio Arauca | Colombia | 0035 | D |
| 3.268 | AIR Kohima | India | 1625 | L | 4.895 | AIR Korseong | India | 1702 | I |
| 3.270 | SWABC 1, Namibia | S.W.Africa | 2015 | C,D,F,G,I,P,S,T | 4.895 | Pakistan BC | Pakistan | 1859 | F,G,I,L,Q,S,T |
| 3.290 | SWABC 2, Namibia | S.W.Africa | 1709 | C,D,G,I,P,S,T | 4.900 | V of the Strait 2 | China | 1450 | G,I,L |
| 3.300 | R.Cultural | Guatemala | 0400 | C,G,S | 4.900 | SIBC Colombo | Sri Lanka | 1708 | G,I,T |
| 3.305 | R.Western, Daru | Pap.N.Guinea | 2028 | F | 4.905 | R.Nat.N'ojamena | Chad | 0430 | D,G |
| 3.306 | ZBC Prog 2 | Zimbabwe | 2050 | C,F,G,I,L,P,Q,S,T | 4.905 | CPBS 1, Beijing | China | 2210 | G |
| 3.315 | AIR Bhopal | India | 1645 | G,I,L,R,T | 4.910 | RTG Conary | Guinea | 2245 | D,S |
| 3.320 | R.France Int. via ? | France? | 1909 | IP | 4.910 | RII Bukittinggi | Indonesia | 1635 | G |
| 3.320 | SABC Meyerton | S.Africa | 1746 | B,D,G,I,L,S | 4.910 | R.Zambia, Lusaka | Zambia | 1832 | G,I,L,S |
| 3.325 | R.Liberal | Brazil | 0618 | H | 4.915 | PBS Guangxi, Nanning | China | 1515 | G |
| 3.325 | FRCN Lagos | Nigeria | 2000 | D,G,I,L,Q,S,T | 4.915 | GBC-1, Accra | Ghana | 2033 | B,C,D,F,G,L,M,P,Q,S,T |
| 3.335 | CBS Taipei | Taiwan | 2050 | D,G,I,L,Q,R,S | 4.915 | KBC Cent Sca Nairobi | Kenya | 1910 | G,Q |
| 3.345 | AIR Jaipur | India | 0054 | C | 4.920 | R.Quito | Ecuador | 0645 | G,S,T |
| 3.345 | AIR Jammu | India | 1723 | A,G,I,L,Q,R,T | 4.920 | AIR Madras | India | 1655 | F,G,I,L,Q,S,T |
| 3.345 | Channel Africa | S.Africa | 1855 | G,I,L | 4.925 | R.S.Miguel,Riberaita | Bolivia | 0125 | G |
| 3.356 | R.Botswana | Gaborone | 2110 | C,G,S | 4.925 | R.Mozambique,Maputo | Mozambique | 1617 | S |
| 3.365 | GBC R-2 | Ghana | 2000 | D,F,G,I,L,P,Q,S,T | 4.927 | RII Jambi | Indonesia | 1700 | G,I,S,T |
| 3.365 | AIR Delhi | India | 1655 | G,I,L | 4.931 | R.Internacional | Honduras | 0410 | G |
| 3.370 | R.Beira | Mozambique | 1708 | I | 4.935 | KBC Gen Sca Nairobi | Kenya | 2032 | G,I,P,Q,S,T |
| 3.377 | R.Nacional, Mulenvos | Angola | 0414 | C | 4.940 | AIR Guwahati | India | 1718 | G,I,L,Q,S,T |
| 3.380 | NBC Blantyre | Malawi | 1955 | G,I,L,P,T | 4.945 | R.Illimani, La Paz | Bolivia | 0145 | G |
| 3.390 | R.Candip Bunia | Zaire | 2235 | D | 4.945 | R.Difusora | Brazil | 2250 | D |
| 3.395 | ZBC Gweru | Zimbabwe | 0400 | G,T | 4.950 | R.Nacional, Mulenvos | Angola | 1945 | G,S,T |
| 3.905 | RRI Banda Aceh | Indonesia | 1515 | G | 4.950 | AIR Jammu | India | 1705 | D,G,I,L,T |
| 3.915 | BBC via Kranji | Singapore | 1706 | B,D,F,I,L,M,O,P,Q,S | 4.955 | R.Cultura, Campos | Brazil | 0045 | D |
| 3.940 | PBS Hubei Wuhan | China | 2130 | D,G | 4.955 | R.Nac. de Colombia | Colombia | 0405 | G,T |
| 3.945 | AIR Gorakhpur | India | 1540 | G,I | 4.960 | Mulenvos | Angola | 2032 | G |
| 3.950 | Qinghai PBS, Xining | China | 2310 | G | 4.965 | Christian Voice | Zambia | 1720 | G,I,L,S,T |
| 3.955 | BBC via Skelton | England | 2130 | C,D,E,F,M,O,P | 4.970 | PBS Xinjiang | China | 1612 | G,I |
| 3.965 | RFI Paris | France | 2114 | A,C,D,F,N,O,P | 4.970 | R.Rumbos, Caracas | Venezuela | 0035 | D |
| 3.970 | N. Menggu PBS, Hohhot | China | 2300 | S | 4.975 | R.Tupi, Sao Paulo | Brazil | 2115 | G |
| 3.970 | RFE Biblis | Germany | 2200 | D | 4.975 | Fujian 1, Fuzhou | China | 1543 | L |
| 3.970 | R.Korea | Korea | 2013 | B,H,J,N,P | 4.975 | R.Uganda, Kampala | Uganda | 2031 | L,N,P,Q,S,T |
| 3.975 | R.Budapest | Hungary | 2200 | C,D,E,M,N,O,P | 4.980 | PBS Xinjiang, Urumqi | China | 1535 | D,G,I |
| 3.975 | RRI Surabaya | Indonesia | 1515 | G | 4.980 | Ecos del Torbes | Venezuela | 2135 | D,G,P,S,T |
| 3.980 | VOA via Munich | Germany | 2154 | F | 4.985 | R.Brazil Central | Brazil | 0105 | D,G,S,T |
| 3.985 | IRRS | Italy | 1952 | J | 4.990 | Hunan 1, Changsha | China | 1510 | D,G |
| 3.985 | China R via Sri | Switzerland | 2200 | D,F,F | 4.990 | AIR Ext.Service | India | 0030 | D,N |
| 3.985 | SRI Beromunster | Switzerland | 1845 | D | 4.990 | FRCN Lagos | Nigeria | 1857 | G,I,L,P,Q,T |
| 3.995 | DW via Julich | Germany | 2200 | A,C,F,K,U | 4.995 | R.Andina, Huancayo | Peru | 0230 | G |
| 3.995 | DW via Meyerton | S.Africa | 2133 | D,P | 5.005 | R.Nacional, Bata | Equ.Guinea | 2032 | G,I,L,P,Q,S,T |
| 4.003 | RRI Padang | Indonesia | 1530 | G,I | 5.005 | R.Nepal, Kathmandu | Nepal | 1648 | D,F,G,I,L,R,T |
| 4.035 | Xizang PBS, Lhasa | Tibet | 1525 | G,S | 5.009 | R.TV Malagasy | Madagascar | 1715 | G,I,L |
| 4.130 | CPBS Minority Sce | China | 2145 | G | 5.010 | R.Garoua | Cameroon | 1755 | S |
| 4.330 | Xinjiang BS, Urumqi | China | 1520 | G | 5.010 | Guangxi 2, Nanning | China | 2300 | G,S |
| 4.409 | R.Eco, Reyes | Bolivia | 2345 | G | 5.010 | AIR Thiru puram | India | 0120 | G,N |
| 4.460 | CPBS 1, Beijing | China | 2110 | G | 5.015 | R.Brazil Tropical | Brazil | 0050 | D,S |
| 4.470 | R.Movima | Bolivia | 2335 | G | 5.020 | PBS-Jiangxi Nanchang | China | 2120 | D,G |
| 4.500 | Xinjiang BS, Urumqi | China | 1620 | F,G,I,L,P | 5.020 | Voz del Upano, Macas | Ecuador | 2250 | D |
| 4.650 | R.Santa Ana | Bolivia | 2355 | G | 5.020 | La V du Sahel,Niamey | Niger | 2033 | D,F,G,I,L,N,Q,S,T |
| 4.735 | Xinjiang, Urumqi | China | 1515 | C,D,F,G,I,L,P | 5.020 | SIBC Tamil Home Sce. | Sri-Lanka | 1601 | F,I,L |
| 4.747 | R.Huanta 2000 | Peru | 0020 | D | 5.025 | R.Parakou | Benin | 2117 | F,G,L,P,S |
| 4.750 | Xizang BS, Lhasa | Tibet | 2300 | D,F,G,I | 5.025 | R.d'Transamazonia | Brazil | 2310 | D |
| 4.753 | RRI Ujung, Padang | Indonesia | 2130 | G | 5.025 | R.Uganda, Kampala | Uganda | 1950 | G,I,P,S,T |
| 4.755 | R.Educ CP Grande | Brazil | 0020 | D,G,S | 5.030 | ABR Thimpu | Bhutan | 1434 | I |
| 4.760 | R.Yunnan PBS,Kunming | China | 2220 | D,F,G,S | 5.030 | WW Latin America | Costa Rica | 0435 | G,S |
| 4.760 | AIR Port Blair | India | 1724 | D,G,I,L,Q | 5.035 | R.Apapereida | Brazil | 0735 | G |
| 4.760 | ELWA Monrovia | Liberia | 2115 | G,I,L,P,S,T | 5.035 | R.Bangui | C.Africa | 2033 | D,F,G,I,Q,S,T |
| 4.765 | Brazzaville | Pep.Rep.Congo | 2052 | G | 5.040 | PBS Fujian, Fuzhou | China | 2225 | G,I |
| 4.770 | RFRN Kaduna | Nigeria | 2035 | C,D,G,N,S,T,U | 5.040 | L.V. de Yopal | Colombia | 2050 | D,G |
| 4.775 | AIR Guwahati | India | 1712 | G,I,L,Q,T | 5.045 | R.Cultura do Para | Brazil | 2255 | D,G |
| 4.777 | R.Gabon, Libreville | Gabon | 2035 | C,G,P,Q,S,T | 5.045 | RRI Yogyakarta, Java | Indonesia | 1700 | G |
| 4.783 | RTM Bamako | Mali | 2047 | D,F,G,P,Q,S,T | 5.047 | R.Togo, Lome | Togo | 2031 | D,F,G,I,L,P,Q,S,T |
| 4.785 | R.Tanzania | Tanzania | 0438 | P | 5.050 | GFBC Nanning | China | 1700 | F,Q |
| 4.790 | Azad Kashmir R. | Pakistan | 1613 | G,I,L,N,P,S,T | 5.050 | Voice of the Strait | China | 2230 | G |
| 4.790 | R.Atlantida | Peru | 0135 | G | 5.050 | AIR Alzawi | Libia | 1536 | L,S |
| 4.795 | R.Douala | Cameroon | 0622 | S | 5.050 | R.Tanzania | Tanzania | 2031 | D,G,I,L,Q,S,T |
| 4.795 | La Voz de los Caras | Ecuador | 0405 | G | 5.055 | RFD Cayenne(Matoury) | French Guiana | 0440 | D,G,S,T |
| 4.800 | CPBS 2 Beijing | China | 2302 | F,G | 5.055 | TWR Manzini | Swaziland | 0440 | T |
| 4.800 | AIR Hyderabad | India | 1610 | G,I,L,N,S,T | 5.060 | PBS Xinjiang, Urumqi | China | 1534 | D,G,I,L,S,T |
| 4.800 | LNBS Lesotho | Maseru | 0305 | G,P | 5.060 | Sist d'Em Progreso | Ecuador | 2305 | D |
| 4.805 | R.Nac.Amezonas | Brazil | 2115 | D,F,G | 5.065 | R.Candip, Bumia | Zaire | 1704 | G,I,T |
| 4.815 | R.Difusora, Londrina | Brazil | 0815 | G | 5.075 | Caracol Bogota | Colombia | 0405 | D,G,N,S,T |
| 4.815 | R.diff TV Burkina | Ouagadougou | 2120 | D,G | 5.083 | R.Mundo, Cosca | Peru | 2255 | G |
| 4.815 | R.Pakistan Karachi | Pakistan | 1558 | L | 5.097 | R.Eco, Iquitos | Peru | 0010 | G |
| 4.820 | La Voz Evangelica | Honduras | 0415 | G | | | | | |
| 4.820 | AIR Calcutta | India | 1541 | G,I,L,T | | | | | |
| 4.825 | R.Cancao Nova | Brazil | 0630 | S | | | | | |
| 4.825 | V of Selva | Peru | 0445 | G | | | | | |
| 4.828 | ZBC R-4 | Zimbabwe | 1908 | G,I,Q,T | | | | | |
| 4.830 | R.Botswana, Gaborone | Botswana | 1908 | F,G,P,Q,S,T | | | | | |
| 4.830 | R.Tachira | Venezuela | 2240 | C,D,G | | | | | |
| 4.832 | R.Relejo | Costa Rica | 0700 | G,S,T | | | | | |
| 4.835 | R.Tezulutlan, Coban | Guatemala | 2340 | D,F | | | | | |
| 4.835 | RTM Bamako | Mali | 2015 | D,F,I,L,P,Q,S,T | | | | | |
| 4.840 | Helionjiang, Harbin | China | 2110 | G,I,L,S | | | | | |
| 4.840 | AIR Bombay | India | 1703 | D,G,I,L,Q,R,S,T | | | | | |
| 4.840 | R.Andahuaylas | Peru | 2340 | D | | | | | |
| 4.845 | RTM Kuala Lumpur | Malaysia | 1607 | F,G,I,L | | | | | |
| 4.845 | DRTM Nouakchott | Mauritania | 1856 | D,G,I,P,Q,S,T | | | | | |
| 4.850 | R.Yaounde | Cameroon | 2101 | P | | | | | |

9.725 (Eng to C/S.America 2300-0100) 34333 at 2300 in Scalloway; R.Cancao Nova, Brazil 9.675 (Port 24hrs) 34443 at 2300 in Woking; HCJB Quito, Ecuador 9.745 (Eng to N.America 0030-0430) 43333 at 0230 in Norwich.

Some of the long distance transmissions in the **7MHz (41m)** band come from KTBN via Salt Lake City 7.510 (Eng to N.America 0000-1600), rated 25232 at 0642 in Bushey Heath; Monitor R.Int via WSHB 7.535 (Eng [Various Sat/Sun] to Europe 0400-0955) 43343 at 0830 in Herstonmouex; WEWN Birmingham, USA 7.465 (Eng to Europe 1000-1200) SIO333 at 1153 in Macclesfield; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) 53444 at 1820 in Chester; R.Thailand via Ulanthani? 7.295 (Eng to Europe 1900-2000) 45554 at 1907 in Wallsend; VOIRI Tehran 7.260 (Eng to Europe, M.East 1930-2027) 43443 at 2010 in Middlesbrough; WEWN Birmingham, USA 7.425 (Eng to N.America 2000-1400) 24222 at 2127 in Burnham-on-Crouch; AIR via Aligarh? 7.412 (Hi, Eng to Europe 1745-2230) 45544 at 2207 in Woking; Monitor R.Int, via WSHB 7.510 (Eng to Europe 2100-2355?) 44544 at 2258 in Bridgwater.

Many of the broadcasts in the **6MHz (49m)** band originate from stations in Europe and Scandinavia but some may be received from more distant places. They include R.Nigeria, Ibadan 6.050 (Eng, Yor, Edo, Iga, Urh 0430-2305), rated 54544 at 0525 in Guildford; HCJB Quito 6.050 (Eng 0700-0830) 54545 at 0800 in Penmaenmawr; WEWN Birmingham, USA 5.825 (Eng to Europe 2100-1000) 34323 at 0849 in Sunderland; VOA via Philippines 6.110 (Eng to S.Asia 1400-1800) 34333 at 1522 in Bushey Heath; R.Australia via Shepparton 6.090 (Eng to Asia 1500-1900) 53343 at 1705 in Norwich; R.Orman via Seeb 6.085 (Ar to 1700-2200) 43433 at 1853 in Burnham-on-Crouch; WVHA via Scotts Corner, USA 5.850 (Eng to E.U.S.A 2100?-2200?) 45544 at 2158 in Bridgwater; R.Nac da Amazonia, Brazil 6.185 (Sp 0900-0200) 35443 at 2206 in Woking; VOFC Taiwan via WYFR Okeechobee, USA 5.950 (Eng/Chin to USA 2200?-2300) 22222 at 2212 in Truro; CKZN St.John's, Newfoundland 6.160 (Eng [Rly CBN] 0930-0500) 22222 at 2305 in Kilkeel; BBC via Antigua, W.Indies 5.975 (Eng to C/S.America 2100-0600) 44434 at 2308 by Ted Harris in Manchester; WHRI Noblesville, USA 5.745 (Eng to E.U.S.A 2200-1500) 35333 at 2315 in Barton-on-Humber; R.Nederlands via Bonaire, Ned.Antilles 6.165 (Eng to N.America 2330-0125) 24322 at 0045 in Newry.

QUARTERLY LIST OF EQUIPMENT USED

- UMS for November, December '95, January '96**
- * Tim Allison, Middlesbrough: Lowe HF-225 + r.w.
 - * Leo Barr, Sunderland: Sony ICF SW7600G + r.w. in loft.
 - * Charles Beardon, Gibraltar: Sangean ATS 803 + a.t.u. + 5m wire of Howes AA2.
 - * Darren Beasley, Bridgwater: Yaesu FRG-100 + a.t.u. + 15m wire.
 - * Paul Bowley, Burnham-on-Crouch: Sangean ATS 803A + 40m wire.
 - * Kenneth Buck, Edinburgh: Lowe HF225 + r.w. in loft or i.w. screened loop or s.w. loop.
 - * Frederic Collin, Tokyo, Japan: Sony ICF SW7600G + MFJ556 a.t.u. + 12m wire.
 - * Robert Connolly, Kilkeel: JRC NRD 525 + Datong AD370.
 - * Bernard Curtis, Stalbridge: Tatung TMR 7832 + r.w.
 - * Martin Dale, Stockport: Sangean ATS 803A + Howes a.t.u. + 23m wire.
 - * John Eaton, Woking: Lowe HF-225 + a.t.u. + r.w.
 - * Jim Edwards, Wigan: JRC NRD-535 + 30m wire.
 - * David Edmondson, Wallsend: Trio R-600 + Balun + invert V trap dipole.
 - * Stan Evans, Herstonmouex: Kenwood R2000 + Balun + 11m wire in loft.
 - * Peter Gordon-Smith, Kingston, Moray: Icom R-72 + a.t.u. + inverted V dipole.
 - * David Green, Doncaster: Grundig Yacht Boy 400 + 6m wire in loft.
 - * Michael Griffin, Ross-on-Wye: Lowe HF-225 + a.t.u. + 45m wire.
 - * Ted Harris, Manchester: Roberts RC18.
 - * Gerry Haynes, Bushey Heath: Kenwood R5000 + Mag Balun + 40m wire.
 - * Gerry Haynes, while in Talgarth: Kenwood R5000 + Kwaio loop.
 - * Francis Heare, N Bristol: Sharp WOT370 + r.w.
 - * Francis Heare, while in S.W.London: Sharp WOT370.
 - * Simon Hockenhill, E Bristol: Roberts RB17 or Bush TR130.
 - * Sheila Hughes, Morden: Sony ICF7600CS + loop or Panasonic AD48 + 15m invert L.
 - * Rhoderick Ilman, Oxford: Kenwood R5000 + AN-1 or Mag Balun + r.w.
 - * Stephen Jones, Oswestry: Matsui Hi-Fi.
 - * Laurence Mason, Hassocks: Roberts RB1 or Grundig Yacht Boy 400 + 4m wire.
 - * Eddie McKeown, Newry: Tatung TMR 7802.
 - * Mary McPhillips, Co.Monaghan: Grundig Satellit 700.
 - * George Millmore, Wootton, Lo.W: Sangean ATS 803A or Rascal RA17L + loop.
 - * Fred Pallant, Stronington: Trio R-2000 + Howes CTUB a.t.u. + r.w.
 - * John Pary, Larnaca, Cyprus: Realistic DX-400 + r.w.
 - * Roy Patrick, Derby: Lowe HF-225 + 22m wire.
 - * Cliff Pinder, while in Appleby: JRC NRD 525 + Yaesu FT770 + 15m wire.
 - * Peter Pollard, Rugby: Sony ICF-2001D + r.w.
 - * Martin Price, Shrewsbury: Lowe HF-150 + AD270 or r.w. or Matsui MR 4099.
 - * Philip Rumbaut, Macclesfield: Int Marine Radio R 7000 + r.w.
 - * Richard Reynolds, Guildford: Sangean ATS 803A + a.t.u. + 10m T.
 - * Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or r.w. or Grundig Yacht Boy or Matsui MF4099.
 - * Eric Shaw, Chester: Lowe HF225 + 7m wire.
 - * Chris Shorten, Norwich: Matsui MF4099 + 10m wire.
 - * Cliff Smith, Scalloway, Shetland: Lowe HF-150 + a.t.u. + 20m wire.
 - * Tom Smith, Co.Fermanagh: Sangean ATS 803A or Morphy Richards R191.
 - * John Stevens, Largs: Hamamatsu HQ 180 or Icom R-70 + loop or r.w.
 - * Andrew Stokes, Leicester: Lowe HF-150 + 15m wire or Sony Walkman.
 - * George Tebbitts, Penmaenmawr: Lowe HF-225 + r.w.
 - * Norman Thompson, Dabry: Matsui MR4299 + 20m wire in loft.
 - * Phil Townsend, London: Lowe HF-225 + preselector or a.t.u. + r.w.
 - * Ted Wadden-Wincent, Gt.Yarmouth: Grundig Satellit 3400 or Sangean ATS 803A.
 - * Robert Weygood, Milford Haven:

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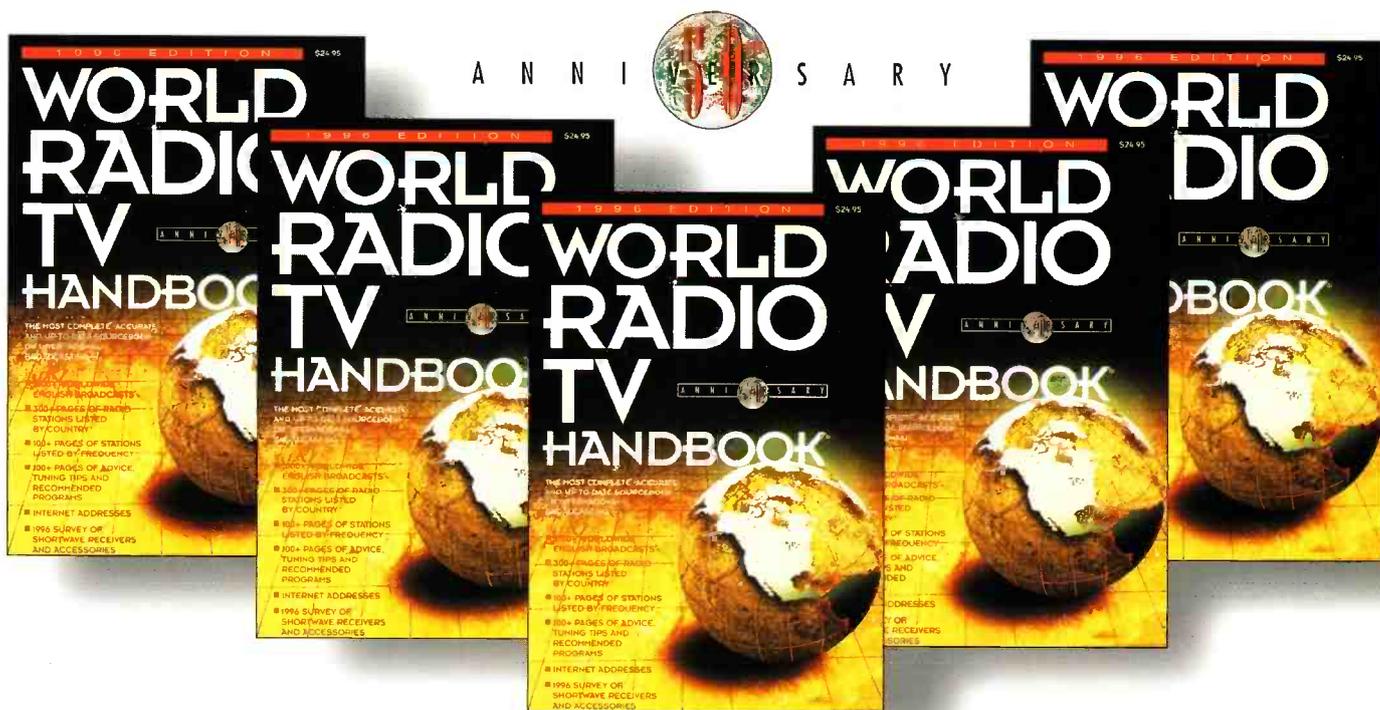
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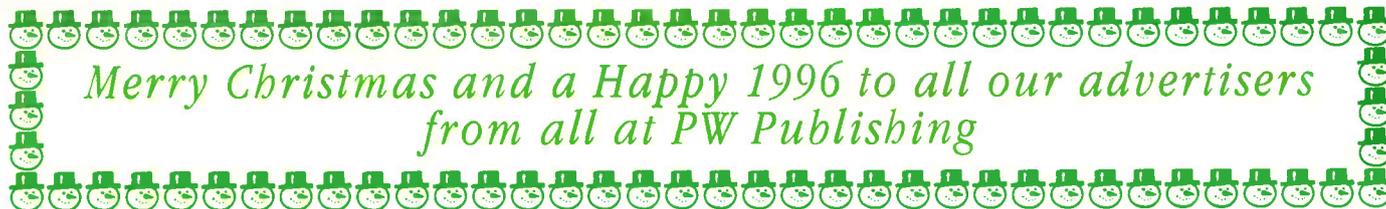
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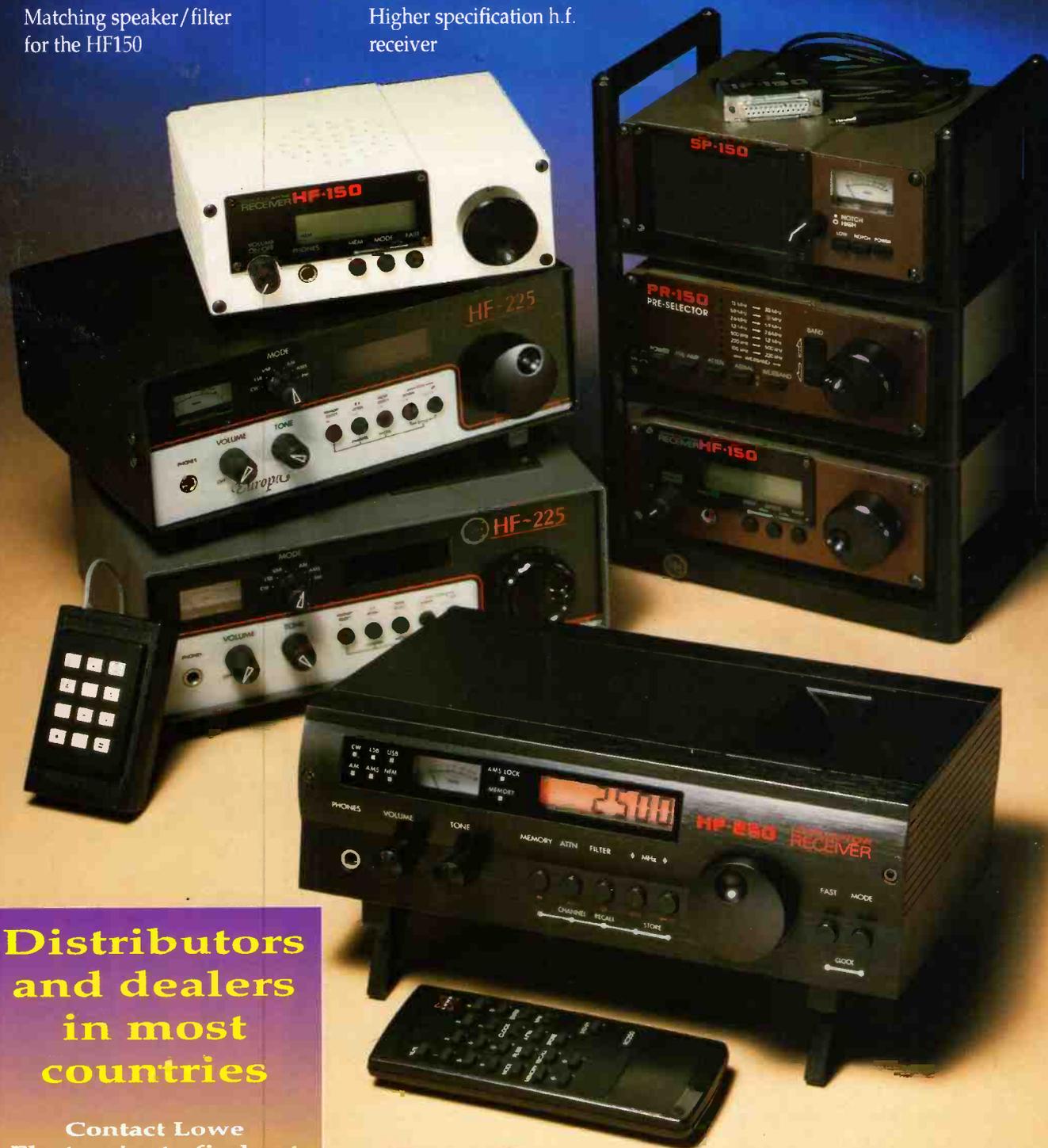
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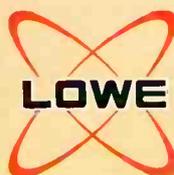
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