

FOR THE RADIO LISTENER

shortwave magazine

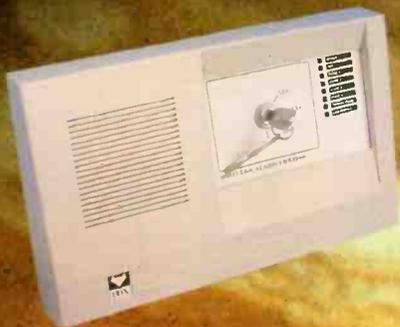
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short wave magazine

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The NASA picture of Jupiter was taken from the Macintosh version of the astronomy software Redshift. The original CD-ROM file size was 161Kb, but after Steve had worked on it with Photoshop on his Quadra 800 it ended up at 38Mbl



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Good Listening

SWM SERVICES

Subscriptions

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

Components for SWM Projects

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

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

Back Numbers and Binders

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

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

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

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (0202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (0202) 659950.

editorial



Vandalism

I suppose that we should be used to bureaucratic vandalism by now, but I find it difficult to understand how anyone with the slightest interest in trying to teach youngsters about science and engineering cannot appreciate the importance of radio. As a teenager I spent many a happy day at the Science Museum - mainly, I hasten to add, in the halls containing the railway exhibits. However, I also enjoyed the electrical exhibits - I seem to recall that electronics was not used as a term then. Radio fascinated me from the age of about eight and was my introduction to a career in electronics, so I am horrified by the decision to close GB2SM - a decision obviously made by some ill-informed museum bureaucrat with no real engineering knowledge whatsoever.

One reason I have heard put forward for the closure is that Science Theme Park - sorry Museum - exhibits should be of the 'hands-on' variety. I am looking forward to turning up at South Kensington and taking *Caerphilly Castle* out for a drive!

Dick Ganderton G8VHF

letters

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

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

Thank you for publishing the excellent article 'Overload Interference' by Joseph Carr in the April edition of the magazine.

I have just built two of the projects described (my first ever construction apart from antennas) and my receiver's performance has been transformed. I use a Lowe HF150 with a helical vertical (quarter wave at 9.5MHz) into a magnetic balun. Unfortunately I live within ten miles of the massive Brookmans Park m.w. transmitter. Up until now, I have been able to hear Radios 1 & 5 right up to about 18MHz as spurious signals. Having built the variable r.f. attenuator and the simple high pass filter (Fig. 6 in the article) I can't hear any spurious signals, not even on 1.8MHz Also, I cannot detect any insertion loss with both the units permanently in line.

I would recommend these two projects for any listener troubled by overload interference, construction isn't as scary as it seems and you'll transform a modest receiver into a top-flight one!

**Johnathan Kempster
London**

It's good to hear that you have 'Taken the bull by the horns' and attempted the projects. We are pleased that they have given good results.

Dear Sir

I have just received my copy of February '94 SWM, which is always of great interest. A. Webb of Gwent has a 'singing' discone, it seems, the same as I had at this windy QTH.

The solution was to lightly tension the elements

together with Nylon fishing line and a blob of glue at their lower ends!

**Charles Chenery
Auckland
New Zealand**

Has anyone else a solution to this perennial problem?

Dear Sir

Could you ask your readers if anyone has a circuit diagram for the Sangean ATS803A as my radio, which is a Matsui MR4099, has filters - wide (4.7kHz), narrow (2.3kHz).

I would like to improve my radio by adding new filters 6.2kHz (wide) and 2.7kHz (narrow).

**M. Formosa
Ely
Cardiff**

Is there anyone who can supply a diagram to help this reader, if so send it c/o the Editorial Offices and we will pass it on.

Dear Sir

In reply to Ivor Nathan and other readers in your columns about r.f. noise and pollution on the various wave bands, I had a similar experience myself until I bought and built a Howes ASL5 audio filter and fitted it between the receiver and the speaker. This eliminated about 75% of the noise problems and gave a cleaner signal and made listening a pleasure, rather than a problem.

As there are more electronic gadgets coming on the market daily, this filter will clear a lot of the problems with r.f. noise until, we hope, the boffins come up with improved engineering and make listening to the wave bands better.

**SWM Reader
Merseyside**

letters

Dear Sir

Firstly, what a brilliant magazine, keep it up, loads of information to be gained on what's around the band.

Now then, after reading *SWM* May and the preview of the Sony SW100 I decided to obtain one of these sets and wow, what a beauty. The performance is great, particularly in the following respects.

1. High sensitivity, using the 680mm antenna I could easily copy on a.m. anything that registered about S4-5 on my Icom IC735 plus 150ft l.w. at 30ft, and S2 on s.s.b. I copied the OH2TEN at S1 on my 735 set-up and could still hear it just as well on the Sony, not bad at 28MHz!

This sensitivity is maintained throughout the range except 160m where it seems to have a bit of a black hole, but still it says about it in the handbook. I could copy many beacons at around 300kHz.

2. Selectivity a.m. very good, especially with the synchronise a.m., no troubles on 6 or 7MHz!, at 5kHz, signal being quite adequately attenuated.

3. Resistance to overload a failing on most s.w. rigs, but this one was very good, 40ft wire with no a.t.u. clipped on the telescopic and no overload/crossmod etc! FM sensitivity seemed a little above average and much better than most domestic digital portables. Just a tip for owners.

Sometimes on switch-on, the audio mutes or fails to switch from clock to radio, if so, turn the main power off on the side and try again. It seems quite a few gadgets I have like this sometimes lock up or crash, but it's no real problem.

I thoroughly recommend this radio and no, I don't sell 'em or have any connection with Sony, etc. Still, I do miss having an S-meter on a radio that has almost everything.

PS. It picks up low power pirates at the top end of medium wave and 6.2MHz well too!

Andy Foad G0FTD
Whitstable
Kent

We thought it was a very impressive set too. A great deal of radio in a small case! The Editor was very sad to have to return it to Sony UK.

Dear Sir

I refer to your news item 'Southern Scanning & Shortwave' on page 7 of the July issue of *Short Wave Magazine*.

For some time, I had been trying to obtain a FRG9600 v.h.f./u.h.f. receiver and decided to try to telephone the number mentioned in your article.

After leaving a message on the Answerphone with my requirements, I received a call from Southern Scanning & Shortwave saying that one was available and we arranged a date and time for Bob Burrows G6DUN to call at my home address.

He duly arrived and gave me a complete demonstration of the set in my shack. The FRG9600 was in mint condition and I purchased it.

My purpose in writing to you is to say that I think that Southern Scanning & Shortwave are an excellent company to deal with and that radio amateurs and s.w.l.s are extremely fortunate to have a pair of lads who will bring equipment to their home and demonstrate it.

To have a demonstration in one's shack must be unique and I have nothing but praise for the enterprise shown by G3XAS and G6DUN. I hope their company prospers and that enthusiasts living on the south coast will use their services to the full. Good luck to them.

Harold McIntyre G3FLJ
Southampton
Hants

Dear Sir

This morning I called at my local Tandy store with the intention of purchasing a Netset PRO44 scanner, which was on special offer at £99.95.

I asked the Salesman if I could see one as they were locked in a glass display cabinet. He handed one to me without an aerial or batteries. I said that I would like to try it out properly and he replied 'We are not allowed to by law'. I could not believe this and was told it was 'company policy'. I wonder if his company know about this?

I told him to forget it and that he had just lost a sale, and I walked out. Do they

want to sell their products or not? No wonder the country is in financial trouble with policies like this.

Many thanks for a good read every month.

S. Wilde
Tamworth
Staffs

It is often very difficult for stores in areas that are subject to high levels of crime to offer the same level of customer support as stores that aren't. It is quite amazing the level of losses due to theft so you cannot blame stores for being cautious. However there is no excuse for a lack of co-operation, after all it can lose the sale!

Dear Sir

After the letter I wrote to *SWM* last year, I was delighted with the £5 voucher on publication (thank you *SWM*, it was most useful).

This time I have been prompted to write as a scanner enthusiast with advice for beginners.

After a recent trip to the countryside I realised just how much the hobby is dependant on location. Aware of the difficulty in buying that first receiver, I would urge you to consider whether or not your location is suited to the hobby at all.

Scanning may be an interesting pastime here in SE England and other metropolitan areas, but try convincing someone scanning in more remote areas, where all transmissions are much more scarce, that £500 was a

worthwhile investment.

I would suggest in these circumstances to avoid the circumstances to avoid the scanners with limited coverage as a wide band receiver will give you much more scope. Also an extended antenna will be essential.

I wonder how many people have realised to their expense that there were few transmission to listen to in their locality.

Fortunately, everyone can follow the developments in several modes of communication through *SWM* and its excellent columnists.

A. Provins
Reading
Berkshire

That's it for this month, keep your letters coming in - particularly if you have a query that needs solving.

Dear Sir

Thank you for an excellent publication, which I was privileged to discover this summer.

This is the first magazine I have bought which maintains a consistent standard month after month. Even for a beginner like myself, the magazine is 'unputdownable!'

I think it is a very clever idea to have each columnist use their home address for correspondence, thus ensuring a speedy response. One can see in these columns that your writers are a truly dedicated group of people, some even giving our their telephone number for important developments.

My one complaint is this - how come none of the questions in readers' letters are ever answered? That is the only question I will pose in this letter, because I don't think it will even be answered.

I am currently enveloped, engrossed and enthralled by the hobby of short wave listening. In September I hope to commence a course with our local radio club for the

amateur licence.

I would be most grateful if you would print my letter and address because I would like to get in touch with other short wave DXers and people contemplating study for their Radio Amateur licence in my area, especially younger DXers, about 16-17.

Thanking you.
Graham O'Sullivan
20 Kingsford Park
Grange
Douglas
Cork
Rep. of Ireland

*Well Graham many of the letters that we receive are asking for a response from our readers and don't really merit an answer from the Editorial Staff. However, as you will see this month we have a mail bag that does require some answers and comment. I hope that answers your query. I am very pleased that you enjoy *SWM*. Good luck with your RAE course.*

grassroots

rallies

August 27, 28 & 29: A Computer Fair including a Radio Rally and Electronics Fair is being held on the site of what used to be Walsall Airport, and is situated off the main A434 Aldridge to Walsall Road and is approx four miles from the A5, or five miles for Junction 7 of the M6 motorway. **Mr A. Wood** on (0543) 372807 after 5pm or anytime weekends.

August 28: The Fourth Gloucester Radio Rally is being held at Naas Lane, Quedgeley, Gloucester (off the old Bristol road). Doors open at 9am to 4pm. There will be a Bring & Buy, car boot sale and flea market stalls. For more details 'phone **Mike** on (0452) 503786.

August 28: The Galashiels Club are holding their Open Day at the Focus Centre, Livingstone Place, Galashiels, Scotland. Doors open at 11am till 4.30pm. There will be a Bring & Buy, traders, club stalls, a raffle and refreshments. **J. G. Campbell** on (0835) 822686.

August 28: The East Coast Amateur Radio & Computer Rally will be held at the Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Doors open at 10am to 4pm. There will be a Bring & Buy, and a bar and cafeteria available from 11am. Free car park and talk-in on S22 and SU22 (GB0CR). For further information contact (0473) 272002.

August 28: The 30th Torbay Rally will be held at Clenon Valley Leisure Centre, Paignton, Devon. Doors open at 10am. There will be trade stands, Bring & Buy, special interest displays, use of leisure facilities, restaurant and bar. Only four minutes walk away there is a beach, boating lake, steam railway and a flume water park. **John G3YCH, QTHR** on (0803) 842178.

August 28: Coleraine & District ARS Rally will be held at the Lodge Hotel, Coleraine, Co. Londonderry. Doors open at 12 noon. There will be the usual trade stands, a Bring & Buy etc. Refreshments will be available and there will also be a talk-in on S22. More details from **Jim G14ORI** on (0625) 52393.

August 29: The Huntingdonshire Amateur Radio Society are holding their Rally at St. Germain Street, Huntingdonshire. Admission is £1 per person and the car parking is free. There will be hot and cold refreshments available, and a talk-in on S22. Doors open at 10am. Further details from **David Leech G7DIU** on (0480) 431333.

***August 29:** Scarborough Amateur Radio Society will hold their radio electronics and computer rally at the Spa, South Foreshore, Scarborough. Doors open at 11am. Many traders, Bring & Buy, refreshments and bar. **Ross Neilson** on (0723) 514767.

***September 4:** The 9th Bristol Radio Rally and Bristol Computer and Electronics Market will be held at the Brunel Centre, Temple Meads Railway Station, Bristol. 10.30am to 5pm (disabled visitors 10.15am). £1 admission, accompanied children under 14 free, 40 plus traders, large Bring & Buy, raffle, refreshments, ample under cover parking at £1. Talk-in on S22. **Muriel Baker G4YZR** on (0275) 834282.

September 11: The 1994 BARTG Rally will be held at Sandown Exhibition Centre, Sandown Park Racecourse, Esher, Surrey. Doors open at 10.30am. Admission £1.50, DAPs £1.00, under 14s free if accompanied by an adult. On-site catering including hot and cold meals, snacks and beverages and a licensed bar. Over 250 tables, see the latest in radios, computers, software, books, equipment and much more. **Peter Nichol, 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB.** Tel/FAX: 021-453 2676.

***September 11:** The 13th Lincoln Hamfest will be held on the Lincolnshire Showground and Exhibition Centre, four miles north of Lincoln on the A15 Lincoln to Scunthorpe/Humber Bridge Road. Doors open 10.30am All the usual attractions, Bring & Buy, refreshments available, free parking, caravans welcome by prior arrangement. Entry fee £1, children under 14 free. **Sue Middleton (XYL G8VGF, QTHR)** on (0522) 525431.

***September 20-25:** The Live '94 Consumer Electronics Show is being held at London's Earls Court One - all levels. Doors open 9.30am to 7.30pm on Tuesday, Wednesday & Sunday and on Thursday, Friday & Saturday doors open 9.30am to 8pm. There will be many exhibitors from various electronic sectors, covering accessories, computers, photography, security, software and much, much more. For the latest information and to pre-book tickets their hotline number is (0891) 500103.

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 it be Hams, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. Aug 31 - Preparation for Bristol Radio & Computer Rally, September 4 - Bristol Radio & Computer Rally, 7th - 2m Worked all Bristol, 14th - Review of Bristol Radio & Computer Rally, 21st - Photographic equipment show & committee meeting. For more information ring (0275) 834282 on a Wednesday evening.

DEVON

Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. August 28 - TARS mobile rally, September 3/4 - SSB field day. Peter G4UTO. (0803) 864528.

DYFED

Aberystwyth & DARS: 2nd Thursdays, 8pm. Scout Hut, Plasrug Avenue, Aberystwyth. Aug 25 - GW0ARA on the air, listen on S17. Sept 3 - Across Wales Walk - RAYNET non-disaster event & Control at Pantycelyn, U.C.W., 8th - Preparation for JOTA. Katy GW0SFO. (0545) 580675.

EAST SUSSEX

Hastings Electronics & RC: 3rd Wednesdays, 7.45pm. West Hill Community Centre, Croft Road, Hastings. September 21 - Get together evening to meet other club members who may have a similar interest in the hobby. G3YFF on (0424) 830454.

EDINBURGH

Lothians RS: 2nd & 4th Wednesdays, 7.30pm. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. September 14 - President's address. GM4DIJ, QTHR on 031-337 7311.

ESSEX

Vange ARS: Thursdays 8pm. Barnstable Community Centre, Long Riding, Basildon, Essex. Aug 25 - Team quiz, September 1 - Junk sale, 15th - Rally reports/comments, 22nd - Waves and all that by John G4XTS. Doris. (0268) 552606.

FIFE

Dundee ARC: Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. September 13 - Enrolment and construction night, 20th - Lecture 'Viewing the bands - DIY panoramic reception' by Bill Wilson. GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

GRAMPIAN REGION

Aberdeen ARS: Fridays, 8pm. Queen Mother House, Aberdeen. Sept 2 - Junk sale, 9th - Wet string listening competition - Round 6, 17th - SARCON '94. Gordon Stuart GM7PXW. (0224) 780591.

GREATER LONDON

Crystal Palace & DRC: 3rd Saturdays, 7.30pm. All Saints Church Parish Rooms, Beulah Hill, London SE19. September 17 - EMC - Avoiding interference by R. Page-Jones G3JWJ,

Club Secretaries:

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

Chairman of the RSGB EMC Committee. Wilf G3DSC on 081-699 5732 or Bob on (0737) 552170.

Edgware & DRS: Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. Aug 25 - SSB field day briefing, September 3/4 - SSB field day. Rod Bishop. 081-204 1868.

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road SW19. September 9 - The 7th Cavalry, the POGO stick and guide to personal communications by Brian Cannon G8DIU. 081-540 2180.

HAMPSHIRE

Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross, Horndean. September 1 - Talk by Rob Mannion G3XFD, Editor of *Practical Wireless*. S. Swain (0705) 472846.

HEREFORD & WORCESTER

Bromsgrove ARS: 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. Sept 13 - Technical topics/talk. Barry Taylor. (0527) 542266.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. August 28/29 - Sponsored special event station for Wood Green Animal Shelters at London Road, Godmanchester, Cambs, operating on v.h.f. and h.f. over the weekend, September 1 - The work of the Society and Novice Licence scheme by Hilary Clayton Smith G4JKS, 14th - Talk on the Novice Licence scheme by Robert G4OBE who is the Senior Instructor for the London area. John G7OCI. (0920) 466639.

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. September 20 - Equipment test evening by Ian Daniels G4VTD. A Messenger. 081-777 0420

Medway AR & TS: Fridays, 7.30pm. Community Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. September 10/11 - Strood Steam Festival outside event weekend. George Packham. (0634) 685585 or Alan Stanley. (0634) 201462.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. September 12 - Foxhunt, followed by a talk about contesting. Howard G1JGY. (0623) 423697.

OXFORD

Oxford & DARS: 2nd and 4th Wednesdays, 7.45pm. The North Oxford Grove House Club. Terry Hastings G0CFN. (0865) 863526.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. Aug 25 - Telford Rally Group meeting. August 25 - Telford Rally Group meeting, September 1 - Natter night, 8th - A visit to Powys Radio Club for a quiz night, 17th - Charity day, car boot sale/junk sale etc., 22nd - British Vintage Wireless Society by Pat Leggatt. Sheila Blumfield G0SST. (0743) 361935.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. Aug 25 - Club station on air and committee meeting, September 1 - Everyone can enjoy DXing by G3HTA, 8th - Morse Miscellany by G3KSK, 15th - Open evening to local schools, introducing amateur radio, 22nd - Satellite TVDXing by G4JHB. Cedric White. QTHR. (0258) 473845.

SUFFOLK

Sudbury & DRA: 1st & 3rd Tuesdays, Wells Hall, Old School, Great Cornard, Five Bells Public House, Bures Road, Great Cornard. September 6 - AGM, 20th - Natter & noggin night. Tony Harman G8LTY. (0787) 313212

WARWICKSHIRE

Mid Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St. Johns HQ, Warwick Div., 61 Emscote Road, Warwick. September 13 - Pacific crossing on Operation Rayleigh by John Layton G4AAL. Don on (0926) 424465.

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. September 12 - Opening night and 'Dayton '94' by Herb Asmusen O27SM & George Beasley G3LNS. Mr A Beasley G0CXJ. (0608) 682495.

WEST MIDLANDS

Sandwell ARC: The Broadway, Warley, RAE class on Monday nights, Morse class on Wednesday nights and RAE Novice class on Thursday nights. Three operating shacks, h.f./v.h.f./u.h.f., Phone, c.w., RTTY, AMTOR, Packet, all bands. Talks, outings, contest and demonstrations. For further information please ring 021-552 4619/021-552 4902.

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. September 7 - Monthly club meeting. Don Keeling. 021-458 1603.

West Bromwich Central Radio Club: Sundays, 7.30pm (talks begin at 8pm). The Sandwell Hotel (upstairs function room), High Street, West Bromwich. August 28 - Sandwell August Band Holiday Show and Extravaganza, 29th - King George V Playing Fields (Sandwell Farm), September 11 - General introduction and informal talk about his new appointment and issues of the day by Tony G0SKG. Ian Leitch. 021-561 2884 (home) or (0902) 353522 ext. 2093 (office).

WILTSHIRE

Salisbury Radio & Electronic Society: Tuesdays, 7.30pm. 3rd Salisbury Sea Scout Hut, St Marks Avenue, Salisbury. August 30 - Open Forum, Final Planning For Inter Club Quiz, September 6 - Inter Club Quiz, 13th - Digital Communication by Chris Angel, 20th - Jamboree On The Air Planning Evening. J David Kennedy. (0722) 330971.

Trowbridge & DARC: 3rd Wednesday, 8pm. The Southwick Village Hall, Southwick, Trowbridge. September 7 - Design and use of the log periodic dipole array by G0DAB, 21st - Natter night. Ian G0GRI. (0225) 864698.

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

junior listener

Following on from the item about abbreviations on the air, **Day Watson** has written to remind me of one that slipped the net. Quite often those sending Morse numerals abbreviate the number 0 (- - - -) to the letter T (-) to save time. This can be very disconcerting if you are concentrating on receiving some numbers and suddenly the letter T appears when you weren't expecting it. If you can think of any others please drop me a line.

Good Book

I've recently come across a new book that looks like it could be well worth adding to your technical library, especially if you like making antennas and experimenting with them. *Receiving Antennas Handbook* written by Joe Carr. I'm told that it should be in the *SWM Book Service* next month. It's not a good idea to skimp on the antenna, but that's often when the money runs out - especially if you are on a junior budget! Making your own can be good fun and doesn't have to be expensive. Even simple long wires or dipoles can be very effective.

All the instructions in the book are very easy to follow and older readers will be delighted to learn that all the measurements are in feet and inches! It covers long wires, dipoles vertical antennas, directional antennas, loop and l.f. antennas. So you should find something to interest you. Bearing in mind that the evenings start getting darker in the next couple of months, why not try and build a few antennas and do some experimentation with them in the autumn?

A couple of warnings. Ladders are very dangerous things - something we know to our cost in this household - and can inflict very unpleasant injuries. Be careful. Always get help if you are clambering around on a ladder or climbing trees to mount your antenna - better still get someone else to do it for you! Watch out for power lines too.

Money Short?

Not enough cash for a new scanner, what about part exchanging your existing radio/scanner for the one of your dreams. I'd forgotten all about part exchanging pieces of kit until I received a press release from Link Electronics about the new Tandy scanner.

The PRO-50 is the latest scanner from Realistic and it

replaces the PRO-41. It has 20 channels with a 6-digit liquid crystal display and a 2-digit memory number. It can search up and down its search channels and has the usual priority frequency. Gavin Taylor at Link Electronics reminded me at the end of his press release that they offer a part exchange service.

Most main dealers do offer this service and it can be a lot less hassle than trying to sell your kit privately. It's well worth a telephone call to check what sort of deal you can get.

Contact Gavin Taylor, Link Electronics, 216 Lincoln Road, Millfield, Peterborough PE1 2NE. Tel: (0733) 345731.



DIY QSL Cards

With the summer slowly slipping away, it's time to get down to some serious logging. For many this means seeking out some more of those interesting QSL cards. But what if you never tried QSLing, how do you start and where do you send your QSLs? The answer depends on whether you're dealing with amateurs or commercial broadcast stations. If your interest lies with amateur stations the best way is to join the RSGB and take advantage of their excellent QSL bureau. This is a wonderfully simple but effective system for sending and receiving QSLs throughout the world.

Once you have joined the RSGB you sort the QSLs you are sending into country order and send them to the Headquarters QSL Manager. There, all the cards for a particular country are grouped together and sent to the QSL manager for that country. The National QSL Manager then sorts them and sends them to the appropriate Regional Managers where they are then sent to the final destination. In order for this to work efficiently you have to send your own regional manager a supply of stamped self-

addressed envelopes. This system has been working reliably for many years now and is a great way of keeping your postage costs under control.

QSLing with commercial stations is not quite so easy, as you have to write direct to the station concerned. It's also a good idea to include an International Reply Coupon to help ensure you get a reply. Finding an address to write to can also be a problem and the simplest solution is to arm yourself with one of the broadcast listening guides such as the *World Radio TV Handbook*. When QSLing with commercial stations it's important to give them as much information as possible about the signal you heard. As well as signal strength and the programme details, make sure you include full details of your receiving station including the antennas.

One way of helping to make sure you get a reply is to make your own distinctive QSL card. With so many people having access to computers it's quite easy to make a striking QSL card by adding a few clip-art pictures to your card. To give you an idea of what can be done I've included my own first QSL card. It's a bit dated now, but then it is pretty old!



Christmas is Coming.....

I know we're just getting to the end of the summer holidays, but Christmas will be upon us quicker than ever, especially as my writing deadlines appear about six weeks before the magazine appears on the shelves. I want to start thinking about good Christmas presents. So if you have any really good ideas as to what should be included in the Dear Santa letter, let me know. Have you come across a good book that you think should be in everyone's Christmas stocking? Is your choice of radio such good value for money you think others should find it under the Christmas tree too? What accessories have you found to be the best and you now couldn't do without? Drop me a line so I can put them all together and let's see if we can write the best Dear Santa letter ever!



The New Classic

AR3030 General Coverage Receiver *Collins mechanical filter inside



The AR3030 receiver provides an ideal marriage of classical appearance on the outside of the cabinet with high tech DDS circuitry inside. Many features are supplied as standard ensuring the highest level of performance and capabilities straight from the carton box.

- Frequency coverage 30 kHz ~ 30 MHz
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- DDS with smooth 5Hz minimum tuning step
- Large custom rear illuminated LCD with frequency resolution to 10Hz
- Excellent stability for data & ECSS due to TCXO
- Collins 6kHz AM mechanical filter fitted as standard (2.4 kHz & 15 kHz ceramic filters are fitted for other modes)
- Easy to use keypad frequency entry featuring MHz, kHz and mtr entry
- 100 memory channels and dual VFO
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- True carrier re-insertion for SSB & CW modes with a switchable BFO for manual passband tuning
- Output sockets for headphones, speaker, FAX, record (with relay switching), RS232 & IF
- Supplied with low noise 240V mains power supply & English language operating manual

OPTIONS: Collins mechanical 500Hz CW filter. Collins mechanical 2.5 kHz SSB filter, CR400 record lead... to follow AM & NFM VHF converters, computer software.

As previewed in January 1994 SWM and reviewed in this issue of SWM by Mike Richards who reported:

"... the 3030 looks and feels like the top quality receiver it is..."

The standard of both mechanical and electrical construction is very high...

The frequency stability is excellent and well up to the standards required for the most demanding applications such as unattended FAX reception.

The 3030 should fare well in the presence of strong signals...

The 3030 is very much a receiver crying out to be used."

£699.00 inc VAT.

AOR (UK) Ltd.

Adam Bede High Tech Centre, Derby Road, Wirksworth,
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Please phone or send a large S.A.E. (36p) for full details. Fast mail order available for direct orders.

*Collins is a trade name of Rockwell International.



new products

Jackson Trims With Economy

The new C824-series of air spaced trimmer capacitors from variable capacitor specialist, Jackson Brothers, has been specifically designed to reduce costs without compromising performance in amateur radio and professional applications which do not involve high r.f. power levels.

The C824 trimmers, which are typically less than half the price of comparable components, are available with maximum capacities from 10 to 100pF. The minimum capacity for all types is less than 5pF and all components in the range have a maximum working voltage of 350V d.c. The units are constructed around a low-loss composition front panel, and feature aluminium rotor and stator vanes.

Primarily intended for panel mounting, the new trimmers require a single 9.5mm fixing hole. They have a standard 6.35mm (0.25in) spindle which operates through a full 360°, with no end-stops incorporated. Capacity varies linearly with the angle of shaft rotation.

The design of the new trimmers is based upon Jackson Brothers'



highly successful C804 series. In low power applications at frequencies of up to approximately 100MHz, C824 and C804 types are mechanically and electrically interchangeable, allowing the new units to be used as low-cost service replacements in existing equipment. The C804 range, with its ceramic front panel and silver-plated brass vanes is still available to meet more exacting requirements.

For further information contact, **Jackson Brothers Limited, Kingsway, Waddon, Croydon CR9 4DG. Tel: 081-681 2754. Fax: 081-681 3728.**

New Howes Kit

C M Howes Communications have added the Howes MW1 Medium Wave and 'Top Band' Receiver to their well known range of home construction kits. This project has been introduced with the interested 'junior operator' in mind. It is designed to be simple enough for a

first project whilst giving a respectable level of performance. Provision has been made for the inquisitive mind to explore the technicalities a little further, this includes an extra component so that the frequency coverage can be altered to other short wave bands.

The MW1 kit includes detailed, fully illustrated instructions and all the parts needed to build the project, except the battery and some solder. A small loudspeaker is being included free of charge as an introductory offer whilst stocks last (there is a socket for headphones, too). Price for the kit is £29.90 plus £4.00 P&P.

Further details are available by sending an s.a.e. to **C M Howes Communications, Eydon, Daventry, Northants NN11 3PT. Tel: (0327) 60178.** The Howes MW1 kit is also stocked by many amateur radio shops in the UK and abroad.

Low Power Coaxial Switch Offers High Reliability

Tesoel's Model TS 360-00 is a coaxial switch featuring low power consumption - the fail-safe actuator consumes only 220mA at 28V - is ideally suited for use in

telecommunication, avionic and instrumentation applications. Available from Anglia Microwaves Ltd., this highly reliable Swedish-designed switch is both lightweight and compact.

The switch comprises a s.p.d.t. fail-safe switch mode, a 'break

before make' switching sequence and a built-in position indicator contacts (60V/350mA max., 4V/10mA min). Extra high power is optional and for higher power applications special dielectric material can be incorporated to give a power handling capability of 1kW at 1GHz - average power handling is 200W for the 1GHz standard switch version.

Model TS 360-00 has 100ms switching time, an operating life of approximately one million operations and an operating temperature range of +40°C to +85°C. The unit, in a black aluminium cover, weighs 350 grams.

For further information please contact: **Anglia Microwaves Ltd. Tel: (0277) 630000.**

Five Function Digital RF Analyst™ RF1

The pocket-sized RF Analyst™ is designed to check and adjust antennas, feedlines and r.f. networks. It includes a



microprocessor, A/D converters and a low-distortion, levelled, sine-wave generator with a 4-digit frequency readout, continuously adjustable from 1.2 to 35MHz in five bands. It measures r.f. values of impedance (0-2000Ω), s.w.r. (1 to 15:1), Capacitance (0-9999pF) and Inductance (<0.04 to 300μH). The digital readout of all parameters is claimed to be unique in its price range.

The instrument connects to any antenna or feedline, and instantly reads out impedance and s.w.r. at any frequency in its range. Antennas are easily trimmed after noting their resonant frequencies with its miniature 'transmitter', minimising trips to the antenna. Feedline loss and phasing, Q, tuned-circuit resonance, and many other antenna and tuner parameters can be accurately measured and adjusted for best performance, even by inexperienced users.

L and C are measured at the r.f. frequency of interest, not at 1 or 100kHz as with other L/C meters. This is necessary to see the true r.f. values of these components.

Basic accuracy is 2.5 to 5% over most of its range. The unit fits in a shirt pocket and runs on a standard 9V battery. An illustrated manual is included.

The RF Analyst™ RF1 is available from: **Eastern Communications, Cavendish House, Happisburgh, Norfolk NR12 0RU. Tel: (0692) 650077. Fax: (0692) 650925.** Price, including delivery within Europe is £139.95.

Handheld TV Test Pattern Generator

Teletest, designed and manufactured in the UK by Ozan, is a brand new TV Test Pattern Generator. Whilst it has been designed with the TV repair engineers need in mind it is also an invaluable tool for all AV and TV enthusiasts.

There are four essential PAL test patterns; colour bars, grey scale, crosshatch and red purity. A 1kHz audio test tone is also generated by the Teletest.

The unit is powered by a 9V battery and fits in the palm of the hand, outputs are provided for r.f. via a 75Ω terminated coaxial socket which is preset to channel 36 with the audio sub carrier set to 6MHz for the UK (a 5.5MHz version is available for other countries). Two phono

sockets provide composite video signal terminated at 75Ω and the line out audio signal terminated at 1kΩ.

An external mains p.s.u. is included with the Teletest for continuous use. The Teletest is only available direct from Ozan and costs £99.00 plus VAT and carr. Further

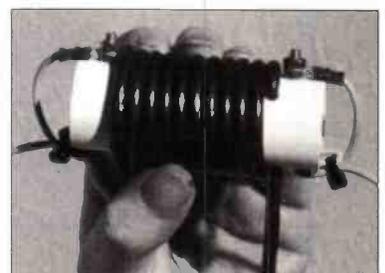
information can be obtained from: **Ozan, 37 Haviland Road, Ferndown Industrial Estate, Poole, Dorset BH21 7SA. Tel. (0202) 877270.**



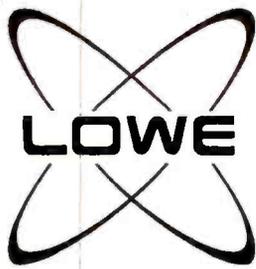
Four New Antennas From SRW

SRW announce that their latest antennas are now in production. The 'CobWebb Mk II', 'Spider', 'FlyTrap' and '5-element CobWebb' all feature low-loss transmission line transformer traps and pre-assembled resonators so no pruning or adjustment necessary. The 'Cobwebb Mk II' and '5-element Cobwebb' cover the 14, 18, 21, 24 and 28MHz bands, the Spider and FlyTrap 1.8, 3.5, 7 and 10MHz bands. The antennas can be bent to fit into small gardens. A FlyTrap has even been bent to form a triangle.

For further information contact: **SRW Communications Ltd., Astrid House, The Green, Swinton, Malton, N. Yorks, YO17 0SY. Tel: (0653) 697513.**



SRW transmission line transformer trap.



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A "turbocharged '225"! The HF225 Europa is probably the best receiver to use if you are a dedicated broadcast band DXer. We've replaced the standard AM filters with 7, 4.5 & 3.5kHz, giving excellent selectivity for winking out those weak tropical band stations. The SSB filter stays at 2.2kHz to allow for exhalted carrier reception. We're also fitting magnetically shielded coils and low-noise switching diodes in the bandpass filters which reduces residual noise in the receiver. The Europa model includes the KPAD1 frequency controller and the synchronous detector fitted as standard.

All for just £699.00

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SP150



Advance Information New module for the HF150 series receivers

The SP150 is a combined audio filter, amplifier, and speaker combination that can be used with any shortwave receiver or transceiver. When used with the Lowe HF150, it will also provide S Meter indication once the HF150 has a very minor modification.

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HF150M



The world's most popular short-wave receiver just got a younger brother! The HF150 Marine is now available! A stylish white cabinet with tropicalised PCBs make the HF150M the ideal basis for broadcast, maritime mobile and WEFAX and NAVTEX reception in the harsh environment of the high seas. Complete with mains PSU and DC lead for 12V operation, the HF150M will complement the chart table or main cabin on any boat.

Available now, just £429.00

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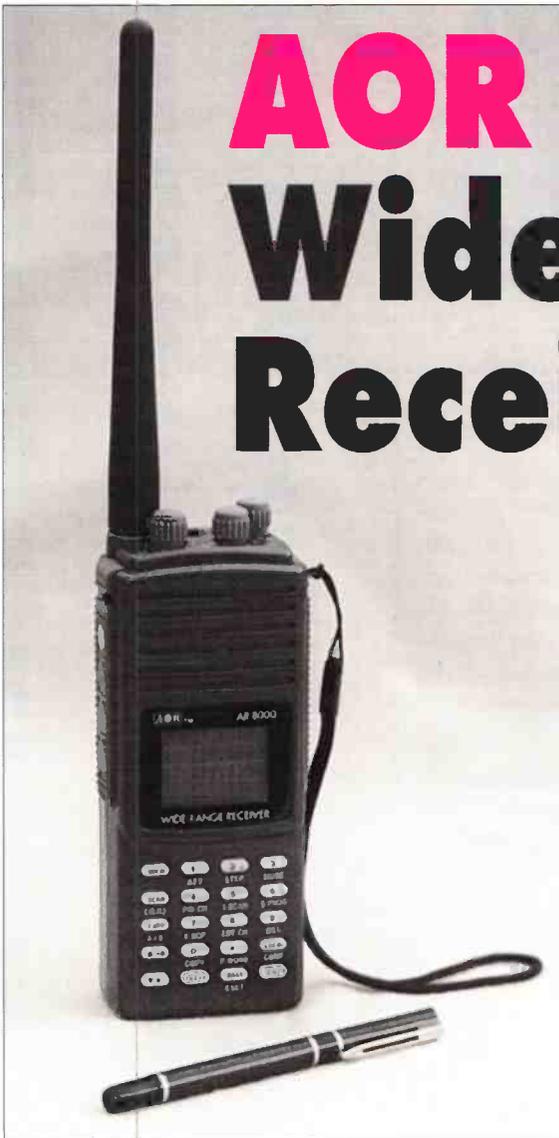
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**"Don't forget Lowe's open day, Saturday 10th September.
Visit our Shortwave room for the best choice in receivers"**

AOR AR8000

Wide Band Receiver

AOR have a reputation for producing high quality scanning equipment so the launch of the new AR8000 has been eagerly awaited. John Waite takes a look at this new scanner.



One could argue that once you've seen one scanner you've seen them all - not true. The AR8000 represents a significant step forward, particularly where portables are concerned. Not only does the AR8000 feature continuous coverage from 500kHz through to 1.9GHz, but it has tuning steps down to 50Hz, a 2.4kHz s.s.b. filter and true carrier reinsertion on s.s.b. and c.w. All this is supplemented by a versatile display system, twin v.f.o.s and 1000 programmable memories.

Smart Display

One of the significant changes with the new AR8000 is the addition of a versatile dot matrix display system. This gives total flexibility in the use of the display space and provides a foundation for

many of the new features. One particularly powerful option that makes good use of the new display is the BAND SCOPE. This provides a graphic display of the channel activity over the five channels above and below the current tuned frequency. This is just one example of the increased flexibility and there are many more to be found as you explore the features of the AR8000.

Getting Going

Thanks to the clear panel markings and excellent user manual, getting started with the AR8000 was really very easy. The power for the AR8000 could be supplied in a number of ways, but in most cases the internal battery compartment will be used. This held four AA size cells and could operate from Ni-Cads or dry batteries. For

mains power the supplied power unit delivered the required 12V d.c. at 300mA via the external power socket. There was also an adapter for running the AR8000 from a car cigar lighter.

The antenna connection used a good quality BNC connector, so external antennas could easily be used. Whilst the internal miniature speaker provided remarkably good sound quality, you could connect headphones/ear piece to the 3.5mm socket on the top panel.

Two Radios in One?

One of the problems facing designers of state-of-the-art equipment is how to incorporate all the advances of new technology whilst not over complicating the operation. This is particularly true when dealing with

portable receivers as there's very little physical space for any extra controls. AOR have tackled this problem by introducing two operational modes called New User and Expert.

The New User mode provides a set of operational features and pre-sets that will suit the needs of most. For example, when scanning the AR8000 is set to stop on any signal that opens the squelch and then pause for a further two seconds after the signal disappears. This is probably the most common setting and is likely to satisfy most people most of the time.

In Expert mode the operator is given complete control of the scan stop settings and can adjust the timings and the type of signal - more on this later.

Closely associated with the New User mode is the automatic parameter settings. Here the AR8000 automatically

sets the frequency steps, receive mode, etc., in line with a stored band plan. The plan was tailored to the country where the receiver was supplied, so this was a really useful option. You could confidently tune around the bands and the receiver would automatically configure itself for the selected frequency. The Expert/New User system was certainly a neat way of combining advanced features with simple operation.

Frequency Selection

In addition to the usual tuning options with UP/DOWN buttons and a twenty way rotary control the AR8000 included direct frequency entry. This used the front panel keypad and included options to correct mistakes as you went. Perhaps the most significant aspect of the basic frequency selection was the provision of two v.f.o.s. Each of the v.f.o.s could be adjusted separately and switching between the two was by a single button press that acted as a toggle. In addition to holding different frequencies, each v.f.o. could retain a full set of operating parameters such as mode, attenuator, step size, etc.

The dual v.f.o.s also included an option to equalise the contents of the v.f.o.s. You could even use them as the basis of a manual frequency search and set the receiver searching between the two v.f.o. frequencies using the mode and frequency steps stored in the selected v.f.o. The provision of two v.f.o.s is a real boon and makes monitoring split frequency transmissions a dream. The manual search is also a lot easier to set-up than most traditional systems.

An important aspect of any manual tuning or searching is the provision of a good range of frequency steps. As you would expect the AR8000 has total flexibility here. In New User mode the steps were pre-set with 19 settings to cover all the normal requirements between 50Hz and 500kHz. If you have any special needs you can switch to Expert mode and set-up any frequency steps you like with a resolution of 50Hz. One particularly interesting feature was the

provision of a step off-set. This lets you off-set the start point for the first step.

This is perhaps best illustrated with an example. If you're looking at the u.h.f. cellular band, you'll find that, although the channel spacing is a conventional 25kHz, the band starts at 917.125MHz i.e. a 12.5kHz off-set. By using the step off-set facility of the AR8000 you can be sure of accurate tracking throughout any band.

1000 Memories

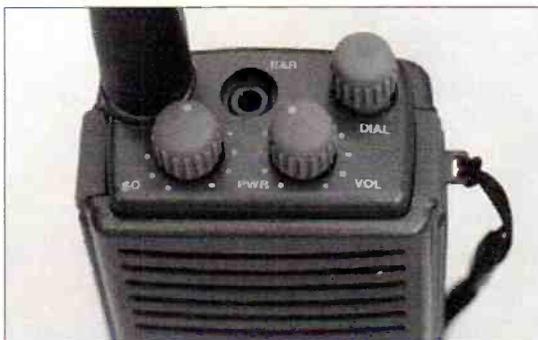
Every scanner needs a good set of memories to form the foundation of the whole scanning process. The AR8000 is extremely well set-up with a total of 1000 user programmable memories available. Just having lots of memories is only part of the answer as you have to be able to find the required stations easily. The AR8000 has a couple of tricks up its sleeve to solve this problem. The first is to group the 1000 memories into 20 bands of 50 memories. These can then be used by the operator to group similar transmission types together.

The real gem though is the text option that lets you store a separate seven character comment in every memory location. This feature is very comprehensive

AOR have provided an enormous character set, which include, accented European letters and even Japanese symbols. The option to store a comment was available every time you manually saved a frequency and you could add these comments at any time. Entering the text was done using the rotary tuning knob to select the required letter and the left and right cursor keys to build up the comment. This proved very quick and easy to use and was really helpful when trying to keep track of stored frequencies. To help identify the twenty banks of memories, each is assigned a letter of the alphabet. The first ten use the letters A-J whilst the last ten use lower case a-j. Another feature associated with the final ten memories is

that they can be protected from prying eyes by the use of a four-digit password.

As if all this wasn't enough, there was even a set of memory editing routines so that you could alter and tidy-up the memories. With this you could swap, move, copy or change any memory channel. This was great for general housekeeping and for



transferring details from an auto stored memory to its final home.

For the icing on the cake, all the memory information was stored in an EEPROM so there was no need for a battery back-up or capacitor system to give long term protection to your valuable memories.

Scanning

As you would expect from a top flight scanner the receiver modes provided were very comprehensive. In New User mode the AR8000 used a set of general purpose scanning options that will probably suit the needs of most users. This was set to scan all memories with data and would wait on any signal that lifted the squelch, then paused for two more seconds before recommencing the scan. You could enhance this basic system by restricting the channels that are included in the scan. The easiest way to do this is to scan one or more of the 20 banks - this is easily set-up.

An alternative but very powerful scanning option is the Select Scan. By using this you can build-up your own custom scan using combinations of memories from any of the 1000 available. I found this particularly useful when operating portable at an airfield or air show site. You could make a select scan of all the local frequencies and so

ensure you catch all the action.

The Expert mode gave access to total customisation of the scanning options. By entering the Scan Edit mode you could adjust the delay times, engage audio scan, set the level signal level and restrict the scan to specific receive modes.

Just to complete the scanning options there was a total re-configurable priority channel system for monitoring those important frequencies.

Searching

Although scanning is important to the v.h.f./u.h.f. enthusiast, it's the search options that are used to seek out all those interesting local

frequencies. The AR8000 is loaded with facilities designed to make this as easy as possible. For a start you can have up to twenty pre-programmed searches stored in the search memories. To get you started, the AR8000 comes with the first 10 search memories pre-programmed with amateur bands, civil and military aviation, marine plus p.m.r. allocations.

As with the individual memories, you could assign a seven letter comment to each stored search to make life easier. You can also employ the auto memory mode to automatically store all active frequencies into a chosen memory bank. This makes the search process extremely powerful and easy to use.

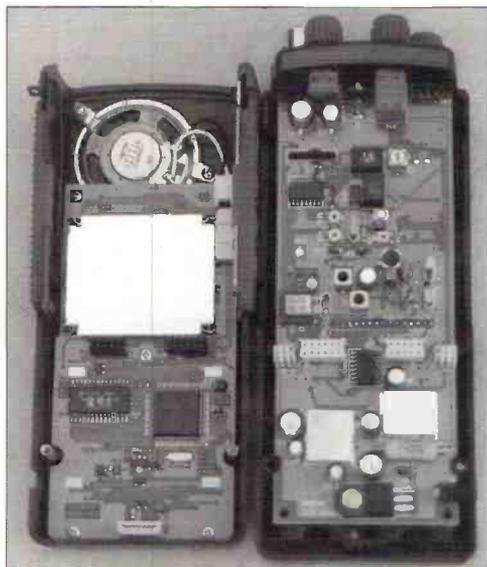
As with the scanning options, entry into the Expert mode enabled all the search parameters to be tailored to suit individual needs.

More Expert Facilities

In addition to the sophisticated options already covered, the AR8000 gave the operator access to a range of detailed system settings. The first is the power save feature which is particularly appropriate for portable operation. Using this you can adjust the duration of the power on and off cycles to provide the best compromise for your listening.

The range of five special

Specifications



Frequency Range:	500kHz to 1900MHz
Modes:	a.m., n.f.m., w.f.m., u.s.b., l.s.b., c.w.
Frequency Steps:	Any multiple of 50Hz up to 999.995kHz
Sensitivity:	
	2-30MHz: s.s.b. 1 μ V (10dB s:n) a.m. 3 μ V (10dB s:n) n.f.m. 1.5 μ V (12dB SINAD)
	30MHz - 1.0GHz: s.s.b. 0.25 μ V (10dB s:n) a.m. 1 μ V (10dB s:n) n.f.m. 0.35 μ V (12dB SINAD) w.f.m. 1 μ V (12dB SINAD)
	1-1.3GHz : n.f.m. 1 μ V (12dB SINAD)
	1.3-1.9GHz: n.f.m. 3 μ V (12dB SINAD)
Selectivity:	s.s.b. 4kHz (-6dB), 15kHz (-50dB) a.m./n.f.m. 12kHz (-6dB), 25kHz (-60dB) w.f.m. 180kHz (-6dB), 800kHz (-50dB)
Antenna:	50 Ω BNC
Output:	120mW in 8 Ω
Power Requirements:	4.8V Nicad, 6V Manganese, ext 9-16V d.c.
Power Consumption:	160mA nominal, 110mA standby, 20mA power save
Memories:	50 channels x 20 banks total = 1000
Pass Memories:	50 channels x 20 banks = 1000
Priority Channel:	1
Search/Scan Rate:	30 per second
Size:	153mm (H) x 69mm (W) x 40mm (D)
Weight:	350g

functions enabled the operator to adjust the following:

- Time for v.c.o. and p.l.l. to lock.
- Time for the squelch to determine if a signal is present.
- Time to wait before deciding if valid modulation is present.
- The level of modulation required to stop the search/scan.
- Time squelch waits to determine if the signal is above the threshold level.

As you can see, these are very advanced features and I would advise you leave well alone unless you're sure of what you're doing.

Remote Control

The AR8000 even includes a number of remote control operations to complete its range of features. The first of these is the facility to transfer memory information between two AR8000 receivers. To do this you need the optional CU-8232 interface fitted to each receiver. In New User mode you can simply transfer all memories in one hit. When in expert mode you can select exactly which memory banks you want to transfer. I can see that this could be a really handy way of transferring information between friends.

Using the same interface and some dedicated software,

you can link your AR8000 to a computer for full remote control. This gives the AR8000 the versatility to become an effective base station receiver. (This option is available soon, When it's released we will be featuring a review - Ed.)

On Air

Despite the provision of coverage below 30MHz, the real reason for buying any scanner must be primarily to explore the v.h.f./u.h.f. bands. In this area the AR8000 was great to use. AOR have used their years of expertise well to create a sophisticated receiver that's very user friendly. The ease with which manual scans could be set up was particularly good and enabled me to track down all the local stations very quickly. Combine this with the ability to add text comments and working with stored memories becomes a real pleasure.

The sensitivity of the AR8000 was about right and there was good image rejection. Although most of the tests were carried out with the supplied short antenna, I did experiment with external antenna systems. On v.h.f. this worked very well and the AR8000 handled the strong local signals with no signs of distress. This was especially good considering the high sensitivity of the AR8000. Looking through the measured results with the review model,

the sensitivity showed remarkable consistency throughout the v.h.f./u.h.f. spectrum. Between 30 and 950MHz the sensitivity ranged as follows: a.m. -115 to -121dBm and n.f.m. -106 to -114dBm. Although not measured for this review, the audio distortion levels appeared to be very low. This was most noticeable when monitoring the air bands as the a.m. audio was remarkably clean.

Moving onto the m.w. and h.f. coverage the performance was acceptable for this type of receiver. Affordable technology has not yet advanced to the point where a wideband portable receiver can start to approach the performance of a dedicated h.f. communications receiver. Despite this the AR8000 has a few very positive points. When using the s.s.b. receive mode it was good to see that proper carrier re-insertion has been used. This pays dividends in many areas not the least of which is the received audio quality. More importantly, the frequency stability is excellent.

Just to prove the point, I connected the AR8000 to my computer using the basic JVFX interface and attempted FAX reception. This is a critical test as the receiver needs to remain within about 50-100Hz of the original frequency for at least 15 minutes to produce a decent image. The AR8000 achieved

this with ease. The most critical aspect of achieving success on h.f. was choosing the correct antenna system. Like all wide range portable receivers, the front end of the AR8000 is wide open and very susceptible to overload from strong signals. The ideal solution is to use a preselector between the antenna the AR8000 as this will suppress the strong out-of-band signals. Second choice is to use an a.t.u. to provide a degree of filtering and some adjustable attenuation.

Summary

The AR8000 is a truly remarkably little receiver that's packed with sophisticated, but easy to use, features. As a portable receiver it has features that many base station units are unable to match. The provision of h.f. coverage was a real bonus and this was a good implementation though h.f. through a scanner is never up to the standards provided by a dedicated h.f. receiver. Overall I thought the AR8000 was a refreshingly new scanner that will find favour with many scanning enthusiasts. The AR8000 costs £449 and is available from **AOR (UK) Ltd., Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbys DE4 4BG. Tel:(0629) 825926.** My thanks to AOR for the loan of the review model. ■

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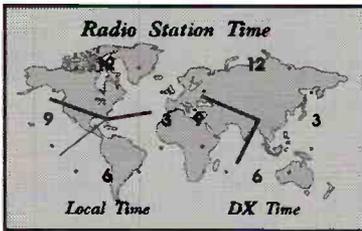
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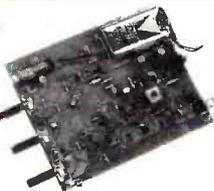


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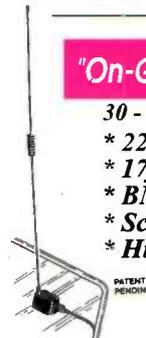
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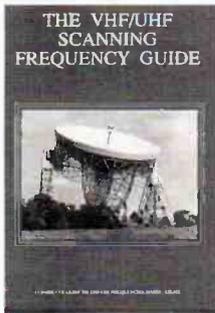
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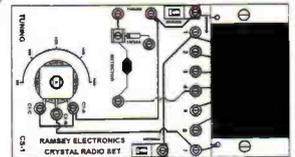
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news

NTech Communications Move

Recently appointed as distributor for Hoka Electronics, NTech Communications have moved to 8 The Crescent, Willingdon, East Sussex, BN20 9RN. Tel/Fax: (0323) 483966.

Listener Saves The Day

It must be every listener's dream to pick up a mayday signal from a vessel in distress. That is exactly what happened to Ron Oswald on 17 July this year as he scanned the bands with his Icom receiver.

"I immediately dialled 999 and was put through to Dover Coastguard," Ron said. "I was astounded when they said they couldn't hear it."

The mayday call was made by the Swedish skipper of the yacht *Aida* which had lost its rudder off Beachy Head, Eastbourne. The captain, sailing single-handed, did not require assistance but wanted to alert any nearby shipping of his position.

Ron observed that, "Dover Coastguard would transmit to the yacht and the yacht would reply. I then had to dial 999 and relay the message back to Dover."

A rescue helicopter was despatched to monitor the *Aida's* progress and the yacht eventually limped safely into the port of Newhaven.

Gail P. Stevens

Radio and TV DX News

Further erosion of the Band 3 (former UK) TV spectrum is likely with the news that South Yorkshire's Supertram Light Rapid Transit System has received seven Band 3 channel allocations to use between their 25 trams and HQ. Each double ended tram will have a Philips FM1200 mobile transceiver in the driver's control cabs, though only the controlled cab unit will operate. And 'Trunked Radio Networks' (who operate the 'Wavelength' network) has an additional 200 Band 3 radio channels allocated for increasing regional networking. The new licences will open further comms systems in the following areas - Nottingham/Derby; Norwich/Norfolk; Birmingham and South/M5; Bristol Channel; Exeter/Plymouth; Yorkshire/Leeds/Humberside/Grimby; Southampton/South Wilts; Bedfordshire/Cambridge; Thames Valley/M3; London/East Kent; Aberdeen/Glasgow; Edinburgh/Cumbria/Glasgow.

The Luxembourg CLT is to launch a third channel - RTL Club terrestrially in parts of Germany from their Cologne studio from September and later via satellite delivery on Astra 1D.

A letter from our contact in Bahrain advises the local terrestrial TV services as follows: chs. E4/10 local Arabic service; ch.E44 Egyptian satellite TV; ch.E46 MBC satellite TV; ch.E55 local (Bahrain) English language service; ch.E57 BBC WS satellite TV - which could change to the new BBC World Service TV, currently linked into Orbit's Rome Studio via Eutelsat 1 F4 and thence via compression across the Middle East on

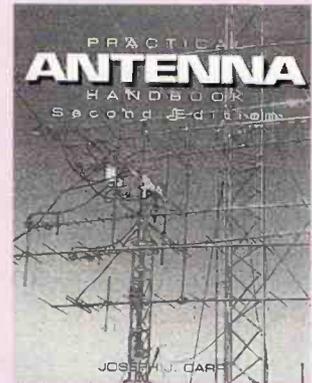
More additions to the SWM Book Service

Practical Antenna Handbook Second Edition

Joseph J. Carr

A new addition to the SWM book service, this second edition may be the most extensive volume available anywhere on communications antennas. It is the only book you will find that offers so many useful projects. Joseph J. Carr gives you all the practical, nuts and bolts information you need to make antennas work. He also tells how to extend that work into new projects. In addition to including a new chapter on small-loop direction finding antennas and all-new BASIC computer programs for antenna design and impedance matching, Carr covers a wide variety of antenna types: high frequency dipole, vertically polarized h.f., multi-band and tunable wire, hidden and limited space, directional phased-vertical and directional beam, v.h.f./u.h.f. transmitting and receiving antennas, antennas for shortwave reception, microwaves antennas, mobile, marine and emergency antennas.

560 pages, £23.95 plus carr (£1.00 UK, £1.75 overseas surface).



Arabsat 1D @ 20° East.

China will open her first commercial TV station - Guangzhou (Canton) Television Company (CTV) early August with eight hours of general entertainment and local news. The French are installing the main studio complex which will make use of the latest digital production equipment.

BBC Northern Ireland are hoping for involvement in the Irish Republic's Gaelic channel - Telefis Na Gaeilge - which is opening during 1996.

The GBC - Gibraltar Broadcasting Corporation - has been granted a new channel which GBC will use to open a second programme service on a Band 3 channel which it is hoped will give coverage along the Costa de Sol coast up to Fuengirola and the many ex-Britons now resident. The new transmitter is most likely to be sited at Freeport, Gibraltar and hopefully be at least 5 kW. The DTI have also identified a

further TV channel that could be utilised by the GBC. The long term plans will be to move all of GBC's transmitters to u.h.f. The new allocations have been reached in consultation with the Spanish authorities.

Cyril Willis (Kings Lynn) has successfully received North American TV signals via multiple hop Sporadic E in June. Wednesday 22nd weak system M signals were logged from 2245BST on chs. A2,A3 - but unidentified. Saturday 25th from 2057-2200BST Cyril logged chs. A2,3,4 though only ch. A2 provided recognisable pictures: at 2100 male announcer over classical music/Baroque documentary and 17th Century life, buildings etc, 2145 female news announcer and weather forecast which mention of Chicago. Signal quality was very poor and positive identification was impossible. Can anyone help identify Cyril's ch.A2 signal please?

Major Blow to Amateur Radio - GB2SM to Close



In a shock announcement from the Science Museum it was revealed that from 7 November 1994 the museum radio station will close down. The comprehensive station features reception capabilities for satellites, FAX and RTTY modes. The amateur radio station section of the display has the famous call sign GB2SM, which has acted as an international ambassador for the museum for nearly 40 years.

Speaking on behalf of the Science Museum, Graham Farmelov, Head of Education Interpretation said, "The station exhibit no longer reflects the contemporary image of modern communications required by the broader audience attending the museum".

The space currently used by GB2SM will be given over to a display relating to data communication superhighways-something which would not have been possible without radio amateurs developing data communications in the first place!

This decision will be a major loss to the promotion of radio and communications as a hobby.

Anyone wishing to comment on the closure should write to the museum at the following address: **Sir Neil Cossons, The Science Museum, Exhibition Road, London SW7.**

Radio Amateurs Examination Courses

The following establishments have informed us of new courses:

North Trafford College, Talbot Road, Stretford, Manchester, are offering various courses from September. Enrolment dates are 31 August, 1 and 2 September. Details are as follows:

Theory	Monday evening or Wednesday morning
Computing for Radio Amateurs	Tuesday morning
Electronics Servicing/Construction	Tuesday afternoon
Morse Code (intermediate level)	Tuesday evening
Morse Code (Beginners)	Wednesday afternoon

For further information **Tel: 061-872 3731**

Newbury College classes start Wednesday 14 September 1900-2100. The course will have a practical emphasis, with 'hands on' experience with amateur radio equipment provided by the course tutor G3NDS. Further details: **Tel: (0635) 37000/35353 quoting course 99018A.**

Reddish Vale Evening Centre are running both an RAE and a Morse course
RAE is a course of 25 sessions leading up to the exam in May 1995. The Morse course is 25 sessions for all levels of ability up to 20 w.p.m. Several tutors will be available to cater for all levels. Both sessions will be held on Monday evenings between 1900 and 2100, beginning on Monday 26 September. Enrolment for the courses takes place on the evenings of 12, 13 and 15 September, between 1900 and 2000. Further details from: **Dave Wood, Tel: 061-430 6246, most evenings.**

Arnold and Carlton College of Further Education, Digby Avenue, Mapperley, Nottingham, are offering three courses, a 30 week course starting 14 September every Wednesday, 1830 - 2115, a 12 week course starting 15 September every Thursday this is an intensive course and not intended for beginners, time as above, lastly a Morse class for both beginners and those wishing to brush up their speed to test level, every Wednesday evening 1900 - 2100 starting 14 September.

West Nottinghamshire College of Further Education, Derby Road, Mansfield, have a courses commencing 12 September held every Monday for 28 weeks 1900 -2100. Further details for both above centres can be obtained from: **Alan Lake G4DVW Tel: (0602) 382509.**

Kingston College announce their '94/'95 RAE course. The college is also a City and Guilds examination centre and external candidates are welcome. Enrolment will take place on the evening of Monday 5 September in the **Engineering Department at Kingston College, Kingston Hall Road, Kingston-upon-Thames KT1 2AQ. Tel: 081-546 2151 ext. 2066 for further information.**

Trowbridge and District Amateur Radio Club have informed us that the RAE course will be offered to prospective Radio Amateurs at the club head quarters which are located at Southwick Village Hall, Nr. Trowbridge, Wilts. The course commences September 1994. Further details can be obtained from the course tutor, **Chris Parnell G0HFX Tel: (0225) 764874 evenings or Ian G0GRI the club secretary Tel: (0225) 864698 evenings.**

An RAE course is being held at the **Newsted Woods School**, Avebury Road, Orpington, Kent. Starting 22 September course will be held on Thursday evenings 1930-2130. Enrolment should be at least 2 weeks before the start of the course, this can be done by post to, Bromley Adult Education College, Church Lane, Prince's Plain, Bromley BR2 8LD. Tel: 081-462 9184. The course leads up to the May 1995 examination which will be held at the school. For further details contact the course tutor, **A.E. Betts. Tel: 0689 831123.**

The City of Westminster College will be running an RAE evening course commencing early September for May '95 exam. Both class A and class B licences, will be catered for, i.e. a Morse course will run concurrently. It is hoped that an 'Advanced Morse' course will be conducted taking candidates up to 22/25 w.p.m. Professional College lecturers will conduct the courses. Prospective candidates should contact **The Science and Technology Dept. Tel: 071-723 8826 for details.**

Joseph Priestly College is to run three part-time courses starting in September at its Alec Beevers Centre in Hunslet, South Leeds. Two one year City and Guilds courses 733 (Novice) which starts 29 September and runs on Thursday 1900-2100. and 7651 RAE starting 13 September 1900-2100 on Tuesdays. A morse course will run for 13 weeks on Wednesdays 1900-2100. For more details **Tel: (0532) 711994.**

Avondale Adult Education Centre announce their RAE course for 1994, enrolment week starts 13 September, the course tutor Rik Whittaker will be available Monday and Tuesday evening of that week. The course will run Tuesdays 1900-2100. With new funding arrangements for Further and Adult Education some students may be entitled to **free tuition**. In addition, course members are offered free access to Stockport Radio Society for the duration of the course. Further information can be obtained from **Rik Tel: 061-427 4730**

Pyramid Power

The Scarborough Special Events group will be on the air as GB30FYD during the weekend of 17 - 18 September 1994 to celebrate the 30th Anniversary of RAF Fylingdales.

The world-famous 'Golf Balls', landmarks on the bleak North Yorkshire Moors since September 1964, have now vanished to be replaced by a solid-state Phase Array Pyramid. This makes Fylingdales the most sophisticated radar in the world-wide chain of Ballistic Missile Early Warning Stations - BMEWS.

Operation of GB30FYD will be on 3.725 and 7.055MHz with some 144MHz as well - but obviously no 70cm activity! - from 0900 to 1800 on both days. Short wave listener reports will be most welcome and all reports will receive the full-colour QSL card specially produced for this event. This will be the first time that amateur radio has operated from within the base.

The All Ireland International Radio and Hobbies Exhibition

During 7 and 8 October the Armagh and District Radio Club will host the second All Ireland International Radio and Hobbies exhibition.

This year's event promises to have even greater impact than the first exhibition held in Dundalk last year.

From March 1994 until March 1995, Armagh is holding the most ambitious year long festival ever staged in Ireland - Armagh Together 1994/5. The exhibition is set to be the highlight of the festival.

For further information contact: **John R. Ashe G18RLE, 49 Deans Walk, Sleepy Valley, Richhill, Co. Armagh, N. Ireland BT61 9LD.**

Droitwich Memories

Between 27 August and 8 October the Droitwich Spa Heritage Centre will celebrate the 60th anniversary of the opening of Droitwich Transmitting Station with an exhibition entitled 'Radio Remembered'. Alongside details of the station's history will be working exhibits of studio equipment from the 30s, 40s, and 50s and wireless sets from the early days of 'Droitwich Calling'.

Many items on display have been kindly donated by *Ariel* readers in response to last year's letter from Assistant Engineer-in-Charge John Phillips. Entrance is free. For further information please phone the centre on **(0905) 774312**

Lowe Electronics Announce New Module

The SP150 provides audio filters (high pass, variable low pass and variable notch), a 10W audio amplifier and speaker that can be used with any short wave receiver or transceiver. When used with the Lowe HF150 it will also provide 'S' meter indication after a minor modification to the HF150. Price is due to be announced shortly.





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Optional enhancements:
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MB150 Mobile/marine mounting bracket

EUROPA

A "turbocharged '225"! The HF225 Europa is probably the best receiver to use if you are a dedicated broadcast band DXer. They've replaced the standard AM filters with 7, 4.5 & 3.5kHz, giving excellent selectivity for winking out those weak tropical band stations. The s.s.b. filter stays at 2.2kHz



to allow for exalted carriers reception. They're also fitting magnetically shielded coils and low-noise switching diodes in the bandpass filters which reduces residual noise in the receiver. The Europa model includes the KPAD1 frequency controller and the synchronous detector fitted as standard.

All for just **£699.00**

Yupiteru MVT-7100

- s.s.b., n.f.m., w.f.m., a.m.
 - 530kHz–1650MHz
- 12 Month Warranty

£389.99

Carriage £5.00



Second-hand equipment

Lowe HF-125 shortwave receiver. 30kHz - 30MHz, AM, FM, USB, LSB, CW. C/w mains power unit and manual. **£269.00.**

Yupiteru MVT-6000 Base/Mobile scanning receiver, 25 - 550MHz & 800 - 1300MHz, AM, FM, WFM. C/w mains unit and manual. **£225.00.**

Yupiteru MVT-7100 handheld scanner. 500kHz - 1650MHz. AM, FM, WFM, USB, LSB. This is complete and as new. **£295.00.**

JIL SX-400N base station scanning receiver, 25 - 550MHz. All modes. This unit is an excellent semi-professional scanning receiver. **£225.00.**

Yaesu FRG-9600 base station scanning receiver. 60 - 905MHz. AM, FM, WFM, WAM, USB, LSB, CW. C/w mains unit and manual. **£299.00.**

AOR 1500-EX handheld scanning receiver. 500kHz - 1300MHz. All modes. This unit is complete with all accessories and is as new. **£279.00.**

Sangean ATS-803A portable short wave receiver, two months old. **£99.00.**

AOR-3030 h.f. communications receiver. 100kHz to 30MHz all-mode receiver. This unit has got a slightly dented case, therefore, we are offering this unit with full 12 months warranty and all complete. **£599.00.**

Lowe Europa communications receiver. (This unit is a shop demonstrator and is as new and offered with a full 12 month warranty). **£599.00.**

Sony ICF-7600D portable short wave receiver (mint condition). **£129.95.**

PK-232MBX terminal unit. Decode, Packet, AMTOR, RTTY, c.w. and FAX. (Needs to be used in conjunction with a computer). **£279.95.**

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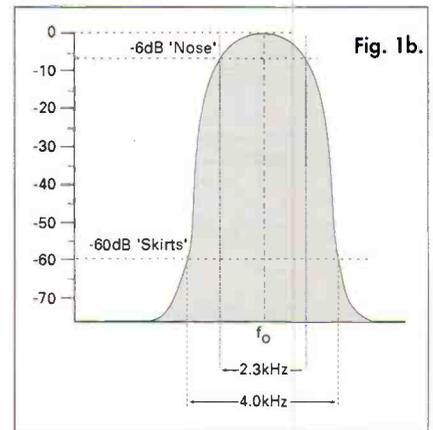
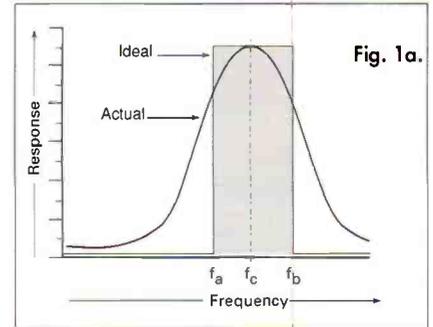


Receiver Specifications Explained 2

In the second part of our series, Peter Buchan takes a look at that all important attribute of any receiver's characteristics - selectivity.

Now that the sensitivity of a receiver has been examined we should turn our attention to the selectivity characteristics. Selectivity is a broad and relative term, because it can describe the characteristics of tuned circuits or filters, with bandwidths ranging from several megahertz to only a few tens of hertz. In more specific terms, selectivity is used to select either individual frequencies, or a band of frequencies, to the exclusion of others. The band (band-pass, pass-band, bandwidth), of frequencies required is governed by the mode used for communication, be it f.m., a.m., s.s.b., or c.w. Ideally, the selectivity of a receiver should have selectivity curves as per the 'ideal' curve shown in Fig. 1a. In practice, though, selectivity curves look more

Fig. 1: (a) Showing an ideal shape for a filter. Shape factor for this filter would be 1.0. (b) Shows more realistic shapes for practical filters. These would have shape factors from 1.5 for the s.s.b. filters to about 2.0 for the narrow 250Hz c.w. filter. (c) Indicates how one obtains the shape factor for a filter and also how the -6dB nose and -60dB skirts are expressed.



like the 'actual' curve.

To give figures of merit to selective circuits they are given a 'shape factor'. A characteristic curve is examined and a note made of the frequencies where the response has fallen to -6dB, and -60dB, above and below the centre frequency. Divide the pass-band at -60dB, by the pass-band at -6dB and you have the shape factor in Fig. 1b. An ideal shape factor would, of course, be 1. The -6dB 'nose' and -60dB 'skirts', Fig. 1b, as they are called, also indicate the bandwidth at

these points as expressed in the manufacturer's brochure. For example: s.s.b. 2.3kHz at -6dB; 4.0kHz at -60dB. Shape factor 1.74.

Designs by manufacturers of amateur radio equipment dictate that the 'front-end' of communications receivers, have a wide bandwidth from antenna input to the first

mixer. Bandwidths range from 1.5 to 5MHz, and a typical receiver front-end response is shown in Fig. 2, unbroken line. Here, the signals between 7 and 10.5MHz will be amplified and presented to the first mixer. The broken line curve shows the next band up, 105MHz to 15MHz. After the first mixer there will probably be found a 2-pole monolithic filter, (single block/self-contained), with a bandwidth of about 15kHz. This filter

continued on page 22

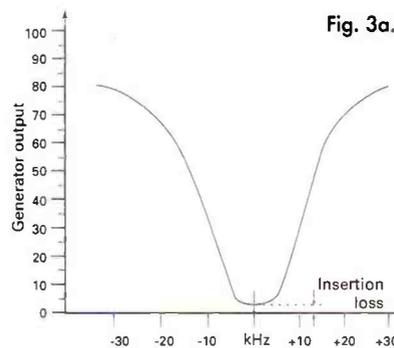
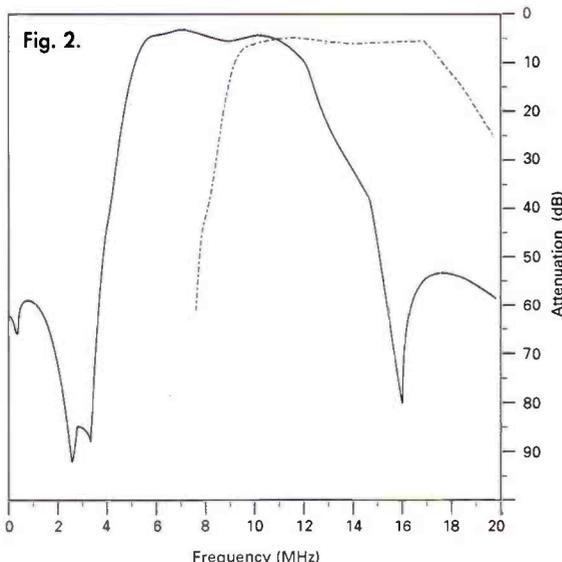
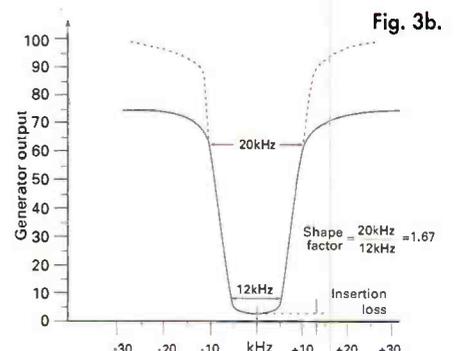


Fig. 2: (a) A typical front end filter characteristic. These are usually formed by overlapping a low-pass and high-pass filter. The overlapped sections define the band-pass of the receiver for the particular range. The dashed line indicates the shape of the next filter range.



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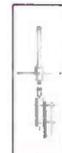
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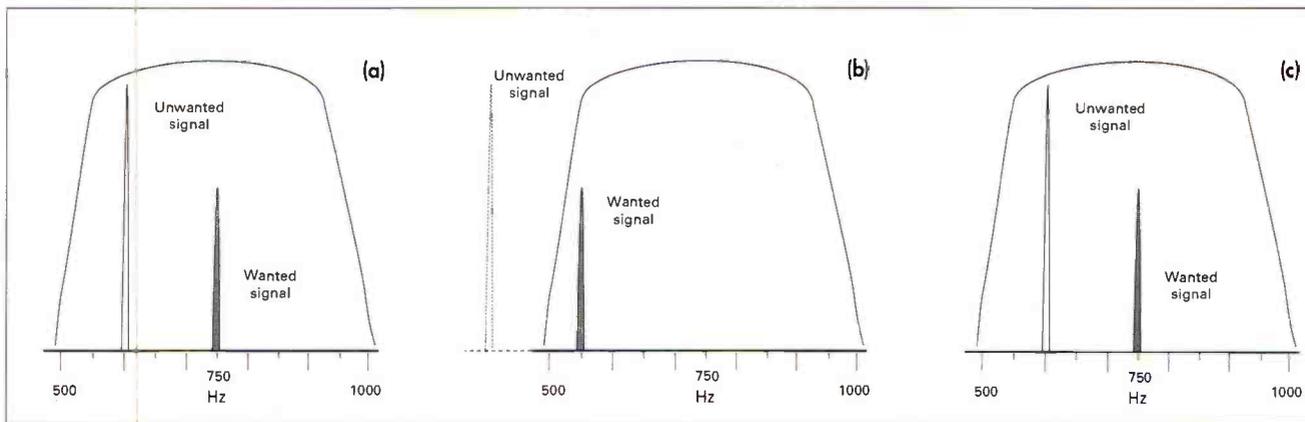


Fig. 4: (a) A typical situation where a wanted c.w. signal is overshadowed by a stronger one and both signals are in the pass-band of the filter. (b) shows how the unwanted signal may be dropped off the lower edge of the filter by re-tuning the receiver. This does change the received c.w. note. (c) and d shows how an i.f. shift control may be used to isolate the wanted signal, leaving the c.w. note the same.

continued from page 19

defines the maximum bandwidth for this particular receiver, it would be used for f.m. reception. Perhaps at this point some clarification of the term bandwidth should be made. It is important when expressing bandwidth to make it clear whether one is talking of the -3dB bandwidth, (often known as the half power bandwidth), or bandwidth at some other point, as for instance expressed in the calculation of the shape factor. (i.e. -6dB is one quarter power bandwidth). So it is worth keeping this question in mind when examining characteristics.

Returning to the 15kHz filter found after the first mixer. The centre frequency of this filter will be governed by the manufacturer's choice of the first i.f. frequency. The popular frequencies nowadays seem to be either 70, or 45MHz for the first i.f. with a second i.f. somewhere around 9MHz. Third intermediate frequency stages are at 455kHz, with a fourth at 100kHz. Filtering for a.m., s.s.b. and c.w. will be carried out at either the second or third i.f. frequency, or indeed both, and often for c.w. at 100kHz. Other i.f. frequencies are used, but the foregoing seem to be the most popular. The centre frequency of the filters, then, will be that of the i.f. where the filtering is to take place. The filters will be designed to pass only the band of frequencies considered necessary to convey the information content of the signal. It is possible to resolve s.s.b. signals using a 1.5kHz filter.

Establishing the shape factor of the various filters between -6 and -60dB does not tell the whole story. What happens below -60dB is of considerable importance especially for strong adjacent signal performance. If the filter flattens out quite sharply below -60dB, then the receiver will not be anything like as quiet as one with filters which continue to descend below -60dB, to -90 or -100dB. Most manufacturers nowadays seem to offer filters which have skirts that continue down to -90dB and a little beyond. They will certainly not be inexpensive filters, but the improved performance might make the investment worthwhile. Don't forget that filters are usually an extra, except for a 2.5kHz s.s.b. and a 6.0kHz a.m. filter, which are usually included in the price.

By stating that the receiver will be quiet with a -90dB filter skirt, does not necessarily refer only to the 'noise' performance of the receiver. Though such a filter must reduce both received and receiver noise, it also very effectively cuts-off the side bands of adjacent stations. This is evident when using a.m. reception on the broadcast bands. Steep sided filters can make the stations slide down the filter skirt, and disappear like magic, as the receiver is tuned through the band. This effect allows 'quiet' reception (or non-interfered with), reception of the weaker stations.

The curve in Fig. 3a may be plotted by tuning a signal generator through the pass-band, keeping the filter output constant. This is achieved by increasing the output of the generator by an amount

equivalent to the attenuation caused by the filter skirts. These curves are plotted the other way up, to show how the generator input is varied, in dB, to keep the filter output voltage constant, as the signal is tuned through the pass-band. Looking at Fig. 3b, assuming the wanted signal was at the centre frequency of the filter, then signals at either ± 10 kHz of that frequency would have to be 60dB greater to match the amplitude of the wanted signal. Having said that, Fig. 3b also shows that the filter characteristic opens out considerably after passing the 60dB point. This, in fact, makes the filter less effective at frequencies beyond 10kHz either side. For example, at 15kHz either side a 70dB greater signal would match the wanted one, but if the filter design had taken the skirts further then something like a 90dB greater signal would be required.

In practical terms what does this mean? Well, if the wanted signal were, say, 3 μ V (about S5), then at 15kHz out from the centre frequency a signal 70dB greater would be about S9+35dB. If, however, the skirts had been extended the skirts would have to be about S9+65dB. Something approaching 100mV at the antenna input, and that is an extremely strong signal. Some recent test reports show that this level of selectivity is becoming more common.

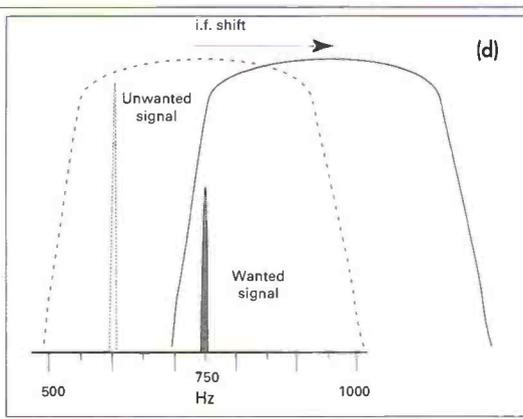
It is possible when using c.w. to tune out interfering signals by simply dropping the unwanted one off the upper or lower edge of the filter, as in Fig. 4a & b. This

does mean that the note of the wanted signal will be changed, but might be an acceptable trade-off for a clear channel. It is here that the i.f. shift, (similar to i.f. slope tuning), fitted to many of today's receivers/transceivers, can come into its own.

Fig. 4c & d show the effect graphically. The i.f. shift enables the c.w. note to remain the same whilst shutting out the unwanted signal. Of course, this is also very useful when using s.s.b. Having tuned in a s.s.b. signal the frequency can only be moved slightly or the voice will become unintelligible. Therefore to be able to shut out the unwanted signal without having to re-tune the receiver is invaluable.

The effect is that the centre frequency of the filter is changed - but this is not the case. It is the i.f. signal that is shifted above and below the pass-band of the filter. This is accomplished using a VCXO (voltage controlled crystal oscillator), and a mixing process which gives the desired result of being able to move the (i.f.) signal about within the pass-band of the filter. Fig. 4c & d shows that the wanted signal is unmoved whilst the interfering signal, also unmoved, is now outside the filter pass-band - the i.f. signal being shifted slightly h.f. Placing the filter about the wanted signal to the best effect is obviously going to be an acquired skill, especially with s.s.b.

Another variable selectivity feature found on the more expensive receivers is the Pass-Band Tuning (PBT), also known as Variable-Bandwidth Tuning (VBT). These, and the i.f. shift, use some quite



only covers the modern approach, there has been no mention of front-end selectivity as found on the older receivers. The days of the low gain two r.f. stage front ends have made way for the veritable 'barn door' front ends, which at last seem to have been brought under control. Of course the problem of 'tracking' the tuned stages of the older receivers has gone. This was overcome by

complicated circuitry within the Phase Locked Loop and Mixer boards, to produce the desired effect. They are particularly useful if one has bought a receiver without the additional filters, and only the 2.5kHz s.s.b. and 6.0kHz broadcast filters are fitted as standard. The PBT is particularly effective for c.w. reception.

For the PBT two i.f. stages and filters are used, one i.f. remains fixed whilst the other is moved across the face, as it were, of the fixed one. See **Fig. 5a & b**. There is another feature that is now almost standard on most receivers - the 'notch-filter'. Although perhaps this is not strictly involved in the selectivity of the receiver, it most certainly is 'selective'. The role of the notch-filter is really self-evident and is provided to virtually eliminate unwanted carriers. This it does very effectively but is so sharp that a small adjustment of receiver tuning requires re-adjustment of the notch-filter.

In addition to the filtering that is carried out at the i.f. frequencies, there are often found audio filters, though again, these are usually only found on the more expensive equipment. These filters are variable, and allow the operator to peak a c.w. signal, or to enhance the reception of s.s.b. signals by judicious cutting off of interfering signals above and below the wanted signal. They are of course very useful when wanting to narrow the pass-band for the reception of broadcast stations and are effective in doing so. But all of this is done at audio frequency.

This brief look at selectivity

providing pre-selectors, which were very popular for a while, but eventually these were put aside for the relatively very much cheaper methods used today.

One must remember that, no matter how good the selectivity is, if an interfering signal enters the pass-band, such as splatter from badly adjusted, and over driven amplifiers, there is nothing one can do about it but grin and bear it, and regrettably there is plenty of opportunity to have to do just that nowadays.

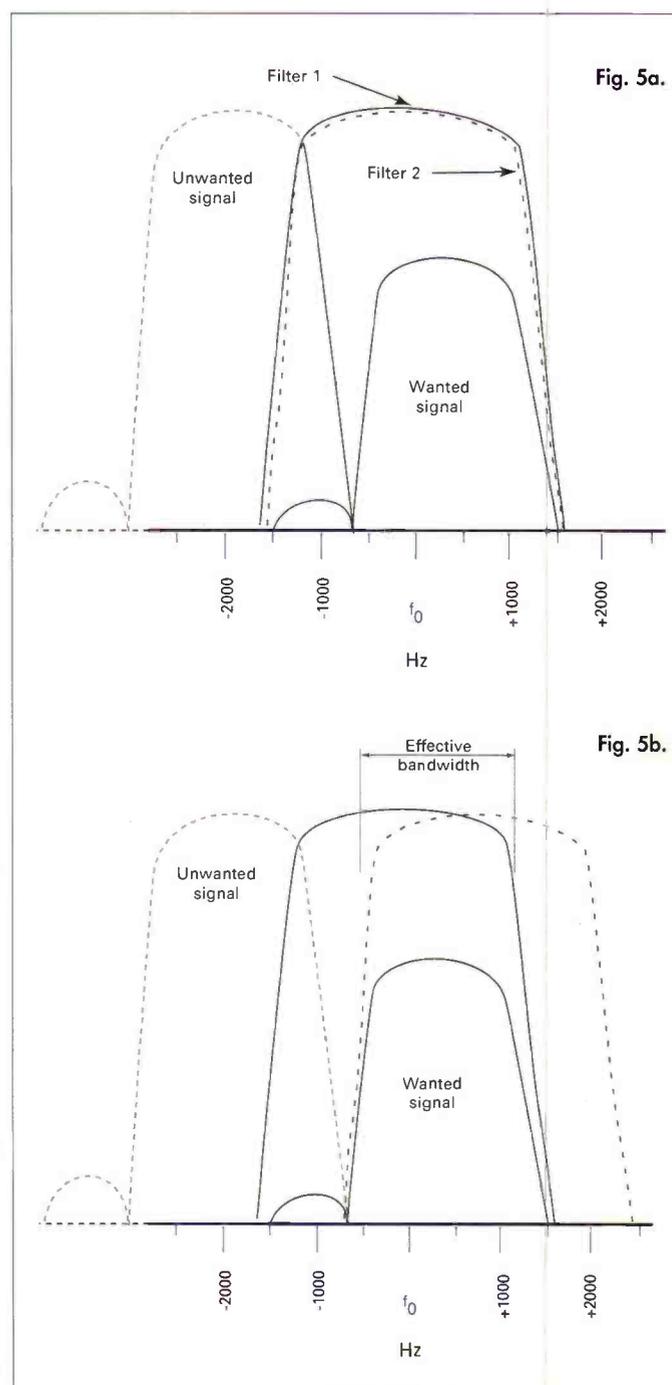
Looking into the front-end of the receiver from the point of view of the signals, what is it that they actually see? Well, to start at the antenna there will be literally thousands of signals present upon it, but the receiver is only capable of selecting those whose frequency lies between say 0.5 and 30MHz. This fact indicates to the signals that selection will take place. Further, let us assume that the receiver is using the front-end filters as shown in **Fig. 2a**, where a further very definite selection is made. Here only signals between 7 and 10.5MHz will be accepted without attenuation. But, as we already know, only a minute fraction of these present will be allowed

Fig. 5: (a) Filter 1, pass-band (continuous line), and Filter 2 pass-band (dashed line) overlap, their centre frequencies are the same. (b) Here Filter 2 i.f. frequencies have been moved across to the right. The net result is that the effective receiver bandwidth is very much reduced, but nevertheless enclosing the wanted signal whilst rejecting the unwanted one.

through the following 15kHz filter. So the signals as they each occupy their particular place in the spectrum are confronted with a series of ever narrowing doors that only a selected few are allowed through. The actual selection, of course, is made by the operator, or at least is under the control of the operator. As the signals progress through the various stages of the receiver, further selection will take place, although these selections will be taken from signals whose frequency has been changed. Frequency changing takes place in the mixer circuits and

it is here that local oscillators are used. When the ultimate selection is made by using the 250Hz, or even the 100Hz, filter for c.w. reception, it is vital that the mixer local oscillators are stable. Drift in these oscillators would be intolerable with such narrow bandwidths. It is in this area that progress has been made by utilising frequency synthesis. Stability, at least long term stability, has reached a high standard and variations of only a few parts per million is commonplace. Short term stability of the

continued on page 25



Collisions in the Solar System

Comet Shoemaker-Levy 9 hits Jupiter

The week of 16 to 22 July was an historic one for astronomers everywhere. For months we waited with anticipation for the series of collisions marking the end of comet Shoemaker-Levy 9 as it impacted the top of planet Jupiter's frozen atmosphere. Although discovered only last year, the comet's orbit was analysed and found to have been in a highly eccentric orbit around Jupiter since 1970.

In July 1992 it grazed the planet, passing within some 40000km. This exceedingly close approach caused severe gravitational disruption of the comet, breaking it into a string of some 20 pieces. The scene was then set for its discovery a few months later, followed by impact of the fragments during the week starting 16 July.

Jupiter has been an interesting planet to observe optically ever since the invention of the telescope. Its appearance is one of constantly changing colourful belts and spots. Another fascinating aspect of Jupiter is its radio emission. Radio waves from Jupiter were first detected in 1955, on frequencies between 500kHz and 40MHz. If you view the planet using any optical aid, you will soon observe its four large moons (natural satellites), of which the innermost is called Io. Astronomers believe there

is a vast tube of magnetic flux between Jupiter and Io, along which electrons spiral. Radiation received on earth is believed to be caused by electrons escaping from this flux tube. The process is not continuous, so high frequency radiation is not constant - but sporadic. Radio astronomers have found a correlation between the movement of Io around Jupiter and the detection of this radio emission.

A good short wave receiver fitted with a suitable antenna, preferably a directional loop or dipole antenna, can receive this radiation - best heard around 21MHz. I have used my h.f. receiver to monitor such radiation, but you need to correlate the movement and position of Jupiter and Io in order to stand a reasonable chance of detecting it. There is little point in tuning in while the planet is on the opposite side of the earth, or when it is on the far side of the sun.

The 'sound' of Jupiter can be described as similar to that of waves on a beach, or shingle hitting a tin roof. Technically it is the rapid modulation of white noise!

High frequency emissions from Jupiter are normally strongest around 21MHz, and this frequency normally penetrates the atmosphere. Under conditions of high solar activity, the upper F layer of the ionosphere, (known as the Appleton layer,) can block out this frequency

During the week commencing 16 July 1994, fragments of comet Shoemaker-Levy 9 hit the planet Jupiter. The following pictures were recorded on 20 July, shortly after one of the larger fragments penetrated its atmosphere. Each fragment is believed to have caused an enormous explosion many miles below the surface of Jupiter's atmosphere. The explosion pushed dark material (shown here as dark 'blobs' near the south pole) to the top of the atmosphere. Because of the planet's rapid rotational rate, these dark areas are seen to rotate with the planet during a period of a few hours.

These images were taken by Lawrence Harris using a 10 inch (25cm) SCT telescope in Plymouth. A CCD camera is mounted behind a Barlow lens and produces an electronic image for relay to a computer. The images are later enhanced to reduce the effect of atmospheric turbulence. The use of a laser printer at the CFE is acknowledged.

Lawrence Harris, our 'Info in Orbit' columnist, has been involved in astronomy both as an amateur and, for more than 18 years, as a professional. He also writes on astronomy for his local paper.

Here he recounts his experiences of the recent cosmic activities around Jupiter.



band completely.

Jupiter also emits radiation between 100 and 1000MHz (v.h.f. - u.h.f.). This is believed to be caused by electrons spiralling inside the planet's own magnetic field, and is called synchrotron radiation. Suitable equipment for its reception includes a high-gain, steerable antenna and a low-noise amplifier, so such monitoring remains the province of the well-equipped amateur.

Interest in monitoring radio emission during the comet's collision was because of the uncertainty of the likely effects following the expected explosions. It was difficult enough to predict whether the impacts would actually leave their mark on Jupiter. Predicting the effect on Jupiter's 21MHz radio emissions was in a field of its own! Radio astronomers around the world tuned their receivers to monitor Jupiter, while optical

astronomers prayed for clear weather.

In Plymouth we had clear skies for most of the period and I used my 25cm Schmidt-Cassegrain Telescope, fitted with eyepieces for optical work, or the CCD camera (charge-coupled device) for electronic imaging. A few hours after the first impact I was astounded to see a huge dark spot the size of the Earth appear near the southern polar region. Jupiter has an equatorial diameter almost 143000km (over ten times that of the Earth), so each dark area exceeded the size of our planet. This was history in the making.

During the hours following later impacts, more dark areas appeared on Jupiter's surface. I continued to record some video sequences of the movement of the spots, collecting an occasional image for computer processing.

We are unlikely to see such drama again. Astronomers will continue to search the skies for near-Earth asteroids and smaller fragments, as well as those near the outer planets. An American team called Spacewatch is currently involved in this survey.

Occasionally one will provide cause for excitement, but Shoemaker-Levy 9 was definitely in a class of its own. ■



Receiver Specifications 2

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mixer local oscillators however is another matter and perhaps this can be looked at later.

Operators may enhance the apparent selectivity of their receivers by providing an antenna matching unit, not one of the 'L' type units because these are really only high or low-pass filters. What is needed is a band-pass matching unit where the selectivity may be quite high. Such a unit provides pre first mixer selectivity and at the same time can be made to match the antenna to the receiver. ■

Abbreviations

a.m.	amplitude modulation
c.w.	continous wave (Morse)
dB	decibels
dBm	decibels (ref. 1mW)
f.m.	frequency modulation
h.f.	high frequency
i.f.	intermediate frequency
kHz	kilohertz
MHz	megahertz
mV	millivolts
PBT	pass-band tuning
s.s.b.	singlesideband
V	volts
VBT	variable-bandwidth tuning
VXCO	voltage controlled crystal oscillator
W	watts
µV	microvolts

APPENDIX

For -3dB bandwidth the power has been reduced to one half. That is $P_2 = 0.5P_1$ and $P_2/P_1 = 0.5$.
 $10 \cdot \log_{10} 0.5 = -3\text{dB}$.

For the same -3dB bandwidth the voltage, or current, has been reduced by a factor of 0.707.

That is $V_2 = 0.707V_1$ and $V_2/V_1 = 0.707$.

$$20 \cdot \log_{10} 0.707 = -3\text{dB}$$

The same argument goes for the current.

S9 is the same as -73dBm, assuming 50µV across 50Ω for S9.

$$P_{S9} = (50 \times 10^{-6})^2 / 50$$

$$= 50 \times 10^{-12} \text{ W}$$

Now, $10 \cdot \log_{10} 50 \times 10^{-12} / 1 \times 10^{-3} = -73\text{dBm}$.

$$S9+20\text{dB} = -73+20 = -53\text{dBm}$$

S meter	6dB (µV)	5dB (µV)	4dB (µV)	5dB (dBm)
S9+20dB	500.0	500.0	500.0	-53
S9+10dB	158.0	158.0	158.0	-63
S9	50.0	50.0	50.0	-73
S8	25.0	28.0	31.6	-78
S7	12.0	15.7	20.0	-83
S6	6.0	8.8	12.6	-88
S5	3.0	5.0	8.0	-93
S4	1.5	2.8	5.1	-98
S3	0.8	1.6	3.2	-103
S2	0.4	1.0	2.0	-108
S1	0.2	0.5	1.3	-113

Dressler ARA 2000 Active Antenna

The choice of antenna for use with a v.h.f. - u.h.f. scanner is quite often a difficult one to make. For many listeners space limitations preclude the use of discones or beams. In these instances it would seem to make sense to consider some form of active antenna.

The antenna needs of a wide band receiver, or scanner, dictate that any design must be broad band if it is to be of any use. The traditional wide band antenna for use with a scanner is the discone mounted either in the loft or outside on a suitable pole. The main disadvantages of this arrangement can be summed up as feeder cable losses.

An active antenna system can be made physically smaller than a passive system - the electronics compensating for the effects of incorrect matching and electrical element lengths. It is possible to design out the feeder losses by making the amplifier part of the antenna itself. However, there are disadvantages. Very strong signals can easily overload

the scanner's input circuitry causing intermod. distortion.

As the prize for helping us by returning a completed Readers' Questionnaire form we gave away a Dressler ARA 2000 Active Antenna, kindly donated by South Essex Communications Ltd. Before presenting it to the winner, Ian Shields of York, we tried it out using a Trident TR-2400 hand-held scanner that we happened to have in the offices. Although we were only able to give the antenna a quick test we are hoping to publish Ian's comments on the antenna later on in *SWM* after he has installed it.

The ARA 2000 has a large printed circuit board with the actual antenna etched into the copper foil. The p.c.b. also carries the wide band amplifier and impedance matching network. The amplifier uses a monolithic microwave integrated circuit to give a low noise figure with good overload performance over the 2GHz bandwidth of the antenna. The antenna element is housed in a u.v. stabilised plastics tube sealed against the ingress of water. This allows the unit to be mounted outside. An N type

connector is fitted in the recessed bottom plate and up to 50m of 50Ω coaxial cable can be used with the unit. Power is fed to the antenna from the 12V mains adaptor via the coaxial cable and RSM 2000 Remote Supply Unit. This unit is housed in a metal box to give r.f. shielding and is fitted with BNC sockets for the r.f. cables and a phono socket for the d.c. supply. The two lengths of RG-58 coaxial cable - one 15m the other about 1.6m long - have N type moulded plugs at one end and BNC at the other! So you will need to find a BNC to N type adaptor or a short coaxial cable with 50Ω BNC plugs at both ends - unless your receiver is fitted with N type sockets.

Quick Test

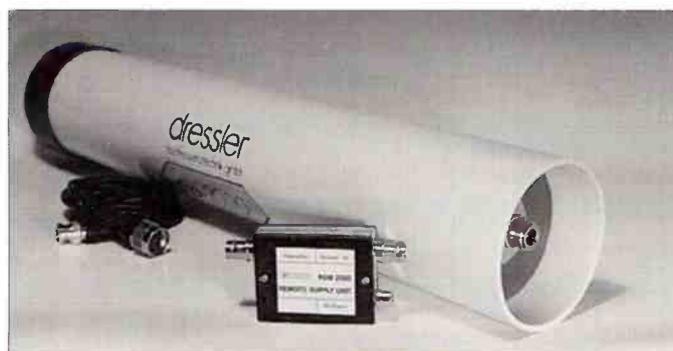
Our quick tests using the Trident TR-2400 scanner showed that there was a considerable improvement in the signal, as shown by both listening and the bar-type S meter on the scanner. The noise level with no signal was, of course, significantly increased, but overall the antenna seemed to give an improvement in signal input to the scanner. For these tests we were only able to compare the ARA-2000 with the 'rubber duck' whip supplied with the scanner. With the antenna properly installed the improvements



in signal should be significant. The AR-2000 costs £299 from **South Essex Communications Ltd, 292 Francis Road, Leyton, London E10 6NQ. Tel: 081-558 0854.**

Specification

Frequency Range:	50MHz - 2GHz
Noise Figure:	1 - 2.5dB
Gain:	11 - 13dB below 1.5GHz 10 - 11dB above 1.5GHz
3rd Order Intercept Point:	+40dBm below 500MHz +43dBm above 500MHz
Output Impedance:	50 - 75Ω
Socket:	N type (see text)
Cable:	RG-58 coaxial. Max length 50m, 15m supplied with moulded plugs fitted.
Power:	12.5 - 15V d.c. 200mA. Mains adaptor and remote supply unit supplied.
Dimensions:	450mm x 90mm dia.
Weight:	2.5kg
All figures quoted are the manufacturer's.	



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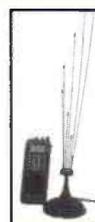
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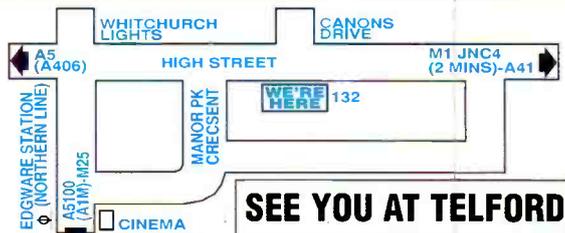
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*From Mike Richard's Review in this issue of SWM



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Carriage B

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R818* OUR PRICE £199 SAVE £20 C

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Lowe Europa

So you thought the HF225 was good - then you should try the Europa! Kevin Nice did and as a result he bought one. Read on and find out why.

It is over five years since the original HF225 was launched. This was in turn a development of the HF125, which when launched was a very radical receiver design. In contrast to the Japanese products, which have, by and large, very busy some would say cluttered front panels. The Europa in common with its ancestors has a very minimal front panel layout. Don't be deceived in to thinking that this makes it any less of a performer.

The Europa is described a turbo-charged HF225 - a very apt choice of phrase. This is a very refined and powerful package with lots of get up and go. The turbo package offers as standard fitment items that are optional on the standard HF225. These are the direct entry keypad, synchronous a.m. detector, f.m. detector, and whip antenna amplifier. The a.m. filters have been replaced with 7, 4.5 and 3.5kHz items. Inductors and switching diodes have been replaced in the bandpass filters with superior specification devices, resulting in lower residual noise. The whole package then offers

The receiver is very compact and is ideal as a portable or base station set. Weight is about 1.9kg (2.6kg with optional internal ni-cads batteries fitted).

Tuning

The receiver covers a frequency range of 30kHz to 29.999MHz, which is covered in one continuous range. If you have the time and good enough

muscles in your hand, wrist and arm you can tune from one end of the range to the other just by turning the main tuning knob. The tuning rate is variable and depends on which mode is selected and the speed that the tuning knob is actually turned .i.e. if you rotate it quickly then the tuning rate is increased by a factor as follows. Predictably the tuning rate is the slowest for s.s.b. and c.w. modes, this being in 8Hz steps with a rate of 1.6kHz per revolution, essential for accurate resolution of phone and data signals. The fast rate is twelve times faster. For a.m. the tuning step is 50Hz with 9kHz per revolution fast rate is ten times faster. The f.m. rate utilises 125Hz steps with a normal rate of 25 per revolution, fast rate being four times the speed. Finally synchronous a.m. (a.m.s.) is the same as s.s.b. and c.w. to enable easy lock on for the phase lock loop circuitry.

With the above set-up it's very easy to traverse set bands, though rather more difficult to shift large frequencies steps. No matter, there are three ways around this difficulty. Firstly, MHz up and MHz down buttons which are self-explanatory. Each depression of these buttons shifts the receiver's v.f.o. frequency up or down by 1MHz. Secondly and most useful the external keypad allows direct entry of any desired frequency in kilohertz. Lastly the 30 memories allow your favourite frequencies to be maintain for later recall by a simple key sequence, these memories do not, unfortunately, store mode or filter selection.



Connecting it Up

I eagerly connected a random length wire antenna to the 600Ω terminal on the rear of the receiver - there is provision for open wire input and SO259 socket for either low impedance

coaxial feeder or the optional plug-in telescopic whip. The antenna input required is selected by a 3-way slide switch between the SO259 and the 600Ω connectors, selecting the whip position places a wide band amplifier in circuit. Other

Specifications

Frequency Range: 30kHz-30MHz continuous

Sensitivity:	30kHz -2MHz:	a.m.	s.s.b.	f.m.
		<1.2μV	<1.0μV	<0.6μV
	2-30MHz:	<0.9V	<0.9μV	<0.5μV

Selectivity:	i.f. filter (kHz)	B/W (kHz) @ -6dB	Shape factor 6:60 dB
	2.2	2.3	1:1.5
	4.0	5.9	1:1.7
	7.0	8.8	1:1.5
	10.0	10.5	1:2

Dynamic Range: Reciprocal mixing effects 2.2kHz filter
>80dB at 5kHz from wanted signal
>90dB at 10kHz from wanted signal
>80dB at >100kHz from wanted signal

Intermodulation effects 2.2kHz filter at 10kHz signal separation,
3rd order intercept point > +3dBm
Intermodulation-free dynamic range > 85dB at >50kHz signal separation,
3rd order intercept point > +12dBm
Intermodulation-free dynamic range > 93dB

Spurious responses:

Images:	At +90MHz	>75dB rejection
	At +910kHz	>90dB rejection
Fixed responses:	At 45MHz	>85dB rejection
	At 455kHz	>100dB rejection
	At 22.5MHz	>75dB rejection

Power Supply: 12V d.c @ 300mA
250V a.c. with supplied mains adapter
Internal Ni-cads (option)

Dimensions: 235x109x204mm.

Weight: 1.9kg (2.6kg with batteries)



RC818 (SSP £219.99)

Multi-band Digital Preset Stereo World Radio with Cassette Recorder

This flagship model demonstrates the leading edge of Roberts technology. With a clear LCD display of all functions, it has 5 tuning methods, 45 preset stations, dual-time display, standby and clock/alarm plus a cassette section for timed recordings from the radio. Provision is made for single side-band and CW transmissions as well as stereo FM on headphones and stereo record/playback of cassettes.

Comes complete with a mains adaptor.

- 5 Tuning methods – direct frequency keying, auto-scan, manual scan, memory recall and rotary
- 45 memory presets
- SW metre bands from 120m to 11m
- BFO control for reception of CW and SSB
- FM stereo on headphones
- AM wide/narrow filter
- Waveband coverage: LW 150-519 kHz; MW 520-1620 kHz; SW 1.621-29.999 MHz; FM 87.5-108 MHz
- Radio standby function



- Pre-programmable radio to tape recording
- LCD display
- Signal strength and battery condition indicator
- Sleep timer
- Safety lock switches
- Adjustable RF gain
- 700 mW Power output

R817 (SSP £189.99)

Multi-band Digital Preset Stereo World Radio

Offers all the outstanding features of the RC818, minus the cassette section.

An unequalled combination of value, quality, technology and choice....in short....

ROBERTS

R808 (SSP £119.99)

Multi-band Digital Preset Stereo World Radio

The R808 has all the advanced features of the R817 with the exception of BFO (Beat Frequency Oscillator) but in a more compact case specially designed for the regular traveller.

R621 (SSP £69.99)

10-Band Compact Stereo World Radio (FM/MW/SW1-8)

All the functions of a much larger model are combined in this compact radio with clock/alarm. Easy SW bandspread tuning with LCD tuning/stereo indicator and FM stereo on ear or headphones. The clock/alarm shows dual time on a backlit display with up to 60 min sleep timer and snooze with wake to radio or buzzer. Comes complete with soft carrying pouch and stereo earpieces.



R101 (SSP £59.99)

9-Band Miniature World Radio (FM/MW/SW1-7)

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items sited on the rear panel are, 3.5mm sockets for keypad, record out and External speaker, 12V d.c. power in is via a coaxial socket and is supplied via an external 'in-line' mains power supply. Lastly there is a rotary control for adjusting the f.m. squelch threshold. With all the connections made it was on with the listening.

Around the Bands

This receiver is addictive and easy to use. It comes supplied with an excellent user's manual, but frankly it doesn't need one. I only read it after hours of listening. What the manual does provide though, is a good basic introduction to short wave listening for complete beginners. Anyone who has never owned or operated a communications receiver could use this receiver to good effect in next to no time.

But back to using the set. I found the Europa a joy to use, with extremely high power broadcast stations in the 7MHz band where things can get very crowded. - here the a.m. filters definitely proved their worth. - and with very weak crowded maritime beacons where the standard 200Hz filter is 'out of

this world'.

The set is very stable and I had no problems decoding many FAX stations with the receiver left unattended for many hours. Dynamic range proved to be very good and I encountered no perceivable problems with overload on very strong signals.

A very useful feature is a permanently enabled noise blanking circuit which proved to be very effective in dealing with motor and thermostat generated noise.

Nuts and Bolts

The Europa is a double conversion superhet using up-conversion to the high frequency first i.f. of 45MHz and a second i.f. of 455kHz for the selective filters. This design gives good i.f. image rejection at all tuned frequencies in the h.f. band, coupled with good filter shape factor in the 455kHz i.f.

There is no r.f. stage before the first mixer. This, coupled with use of a high performance transistor-tree mixer gives the Europa a high dynamic range and good resistance to strong signal overload. A four pole crystal filter with a bandwidth of 15kHz in the first i.f. (45MHz,

limits the signals fed to the second mixer and removes image responses from the second i.f.

Most of the receiver's gain is derived from the second i.f. stage, where amplifiers and filters are interspersed in a chain. The Europa uses ceramic multi-element filters in the second i.f. and switches in as many as possible for a selected bandwidth.

All the switching and tuning functions are under the control of a dedicated microprocessor which receives commands from the user via the front panel and sends information to the receiver control register and p.l.l. system via serial busses. The logic circuits are mounted separately from the main r.f. and i.f. circuits on a p.c.b. behind the front panel. The control system is designed to use the 'static idle' principle, whereby there are no signals other than the basic clock, in the system until the operator requires a change in receiver condition. The logic responds to the user's commands and then returns to its static state. This method of operation virtually eliminates any chancespurious signals from the control system being picked up by the receiver's input stages.

Criticisms

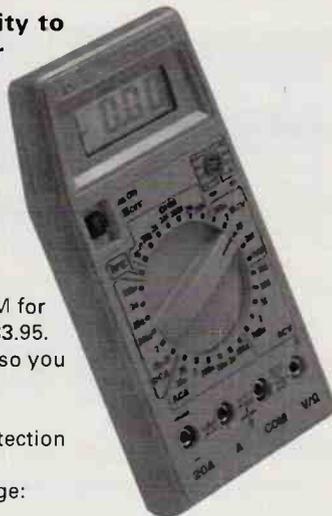
None - well almost none. the display is sometimes quite difficult to read in high ambient light due to its construction and back lighting arrangement. Several in-car stereo manufactures have had a similar arrangement in the past and have with out exception dropped the format in favour of superior solutions.

Win One

Priced at **£699 inc. VAT**, this receiver offers a very good price/performance ratio. If you want to avoid flashy front panels and gimmick engineering this is the ideal choice - a down to earth, well engineered work horse wireless. **Many thanks to Lowe Electronics Ltd. Chesterfield Road, Matlock, Derbyshire, DE4 5LE. Tel: 0629 580800** for the loan of the review model which has kindly been donated as a prize for a forthcoming competition, so watch these pages and you may be lucky enough to win the review model for your own station.

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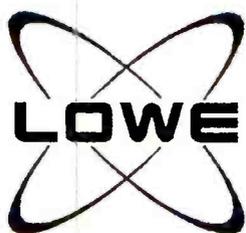
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SoftWave consists of a remote receiver, built into a screened box plus an interface card that plugs into your PC and of course the software. You will need to have a IBM PC type computer, and we recommend at least a 386 type with 4MB RAM and 6MB hard disk space. A maths coprocessor is also desirable. You will also need DOS 5.0 and Windows 3.1 or higher.

The built-in map-driven station database makes selecting world band radio stations very easy and you can change the "personality" of the receiver to give you just the functions you need for various applications. You get no less than six receiver functions with SoftWave:

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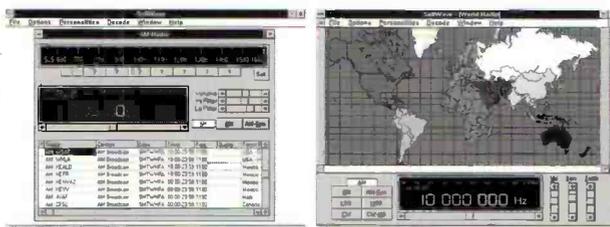
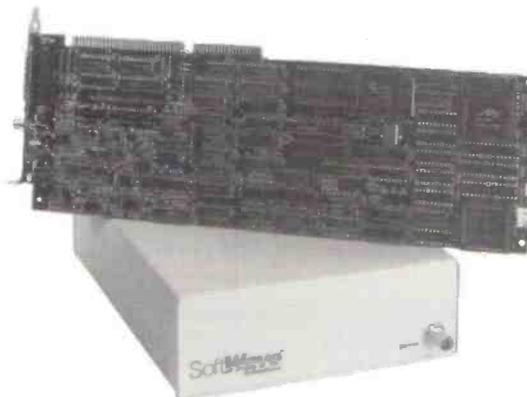
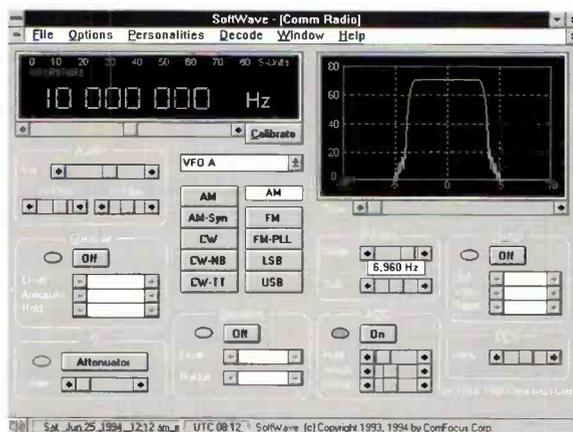
As you would expect, the specification and facilities are also excellent:

- ◆ Frequency range: 0.5 to 30MHz and 108 to 174MHz
- ◆ Tuning resolution: 1Hz
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- ◆ Dynamic range: 97dB
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SoftWave is unique. Being software driven, upgrades should be straightforward. Already planned are decoders for FAX, RTTY, SSTV and these will become available in due course.

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(Also available at Martin Lynch in London)

Donna Vincent brings you an interesting and informative article on how to prevent your radio equipment from being stolen.

Is Your Scanner Secure?

Crime prevention and short wave listening are not necessarily two terms that you would normally link together. However, even by just thinking of them in the same sentence could save you a lot of money, anxiety and heartache.

Securing your short wave radio, scanner and amateur radio equipment should be a high priority. So what advice is offered? I recently spoke to Keith Cook, Crime Prevention Officer for the Poole Borough and you'd be well advised to read and take note of the following.

Preventable

Many of the burglaries that occur today on property are preventable. A high percentage of the burglaries committed are carried out by the 'opportunist' thief. The opportunist tends to look for windows that have been left open or doors that have been left unlocked. This type of thief doesn't want to spend a lot of time breaking into a house or cause a lot of noise in the process. Therefore, rule number one is obviously to have all accessible doors and windows on your property fitted with locks.

Of course much of the

advice on protecting your property is just plain old common sense but statistics show that plenty of people just don't bother. So, what extra precautions can you take to stop your precious radio equipment being stolen in the event of a burglary?

Fortunately, with the hobbies of short wave listening and amateur radio being specialised, the equipment is not necessarily at a high risk from being stolen from domestic property. However, if an opportunist thief thinks he can 'get a quid' for it the risk is always there.

Make An Inventory

A sensible thing to do is to make an inventory of the equipment that makes up your short wave station or amateur shack. The inventory should include model numbers, descriptions, any distinguishing features and most importantly serial numbers. Once this is has been done you should put the inventory in a safe place.

By having an inventory you are increasing the chances of getting your equipment back in the event of it being stolen and then later recovered. It not only

helps you, but the Police as well. The quantity of unclaimed, unidentifiable goods is becoming more and more of a problem for the Police.

Of course making an inventory is not going to do much in deterring a thief from taking your radio equipment in the first place. One thing that is, however, is to make it as difficult as possible for the equipment to be taken.

Things that you can do yourself include making sure that all the connectors and cables belonging to the main unit are as hard as possible to detach. This can be done by dropping cables behind your workbench so that the thief has to physically move it to release the cables.

If this sounds a bit too easy and not much of a deterrent, think about it - with the design of some of today's scanning and amateur equipment special connectors are often needed for the power cables and antenna sockets. If the thief takes only your radio, he could be in for a shock when he tries to sell it on as the chances are that it won't be much use without all the specially supplied cables etc. Not being able to steal the full set-up easily may just be enough to stop it being taken altogether.

Security Marks

Another valuable tip offered is to mark your equipment with identifying marks. This can be done in a variety of ways. Marking your radio with a marker pen that only shows up under ultraviolet light, or hand engraving it are just two preventative measures that you can carry out very easily.

You need to remember though that it's more effective to mark your equipment using your postcode **and** house number or name because this enables the owner to be pinpointed exactly. The engraving method is obviously more permanent, as it's virtually impossible to remove and therefore has a slight advantage over the marker pen method.

If you decide to opt for the engraving method you can make it even more effective by engraving the details somewhere where they will be highly visible. The advantages of marking your radio equipment in this way are high as by doing so you are lessening the chances of it being sold on. If it's marked with someone's name or address it could make it more difficult for the thief to sell it and may just make him think twice about stealing it.

Fox Security Wireless Home Burglar Alarm

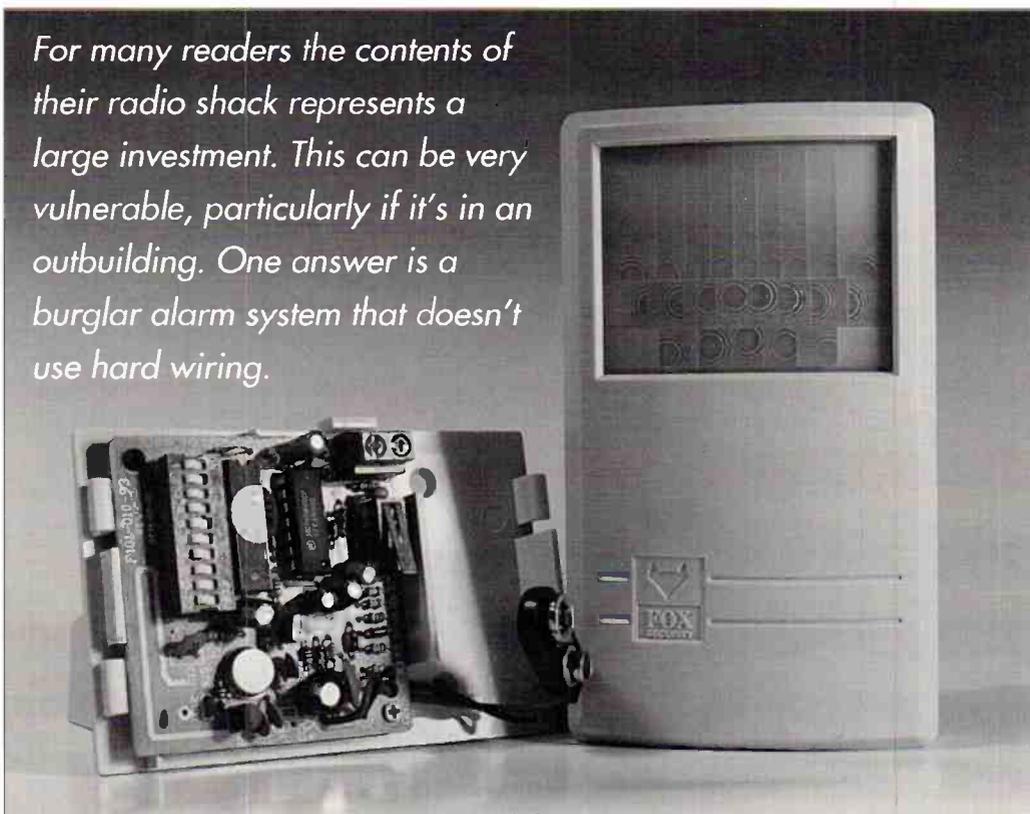
Most burglar alarm systems require a lot of installation - wires running around the house to connect up door and window sensors or motion detectors, outside siren boxes, etc. If the equipment you want to protect is in an outbuilding the problems become even greater with the need to conceal the cable between the house and the outbuilding. The solution to that particular problem should be obvious to readers of this magazine - replace the cable by a radio link!

The Fox Security Wireless Home Burglar Alarm does just that. We asked one of our readers, whose radio shack is at the bottom of his garden, to install and comment on the Fox Model FSS7500. For reasons of security no photographs or specific details of his installation will be given in this review - you wouldn't want a potential burglar to know all the details of the installation, would you?

Vulnerable

The average radio enthusiast's home is readily identifiable as having a high probability of containing some valuable equipment that is readily disposable. Even the simplest of s.w. listening stations will have antennas that are different to the normal - especially to trained eyes. That long wire strung from the tree at the bottom of the garden to the highest point on the house and then disappearing into the radio room is a dead give-away. If you are into the more dedicated modes then the number and visibility of the antennas will increase. If the radio room is a wooden 'shed'

For many readers the contents of their radio shack represents a large investment. This can be very vulnerable, particularly if it's in an outbuilding. One answer is a burglar alarm system that doesn't use hard wiring.



in the garden it is very vulnerable.

The property used for this test has upvc double glazed windows and doors all round with security locks, so that the actual house itself is probably about as secure as it can be. The owner has always resisted fitting a conventional burglar alarm on the grounds that it could signal the presence of something in the house worth protecting, whilst not really deterring the determined professional thief. The opportunist burglar would probably be put off trying to gain access thorough the windows and go on down the road to older properties with decaying wooden window and door frames!

However, the radio room is 25m away from the house at the bottom of the garden. With an increase in what can only be organised burglaries

in the area - including the next door neighbour's place - with the targets seemingly being outbuildings containing easily removed small tools and equipment, it seemed sensible to try to install some form of alarm that would, hopefully, scare off any intruders.

Passive infra-red security lights are already fitted, but cannot cover all the plot. The solution is an alarm linked to the house by a radio link. The Fox FSS7500 meets this need.

Installation

The alarm is supplied as a complete kit ready for installation. As well as the main control panel, you also get a wireless passive infra-red detector, a wireless contact transmitter, two-button key-fob transmitter, magnetic reed switch, cable, instruction manual and the

necessary hardware to complete the installation.

The instruction manual is easily understood and no difficulty was found in actually installing the various components. The control panel needs to be mounted on a wall somewhere where it can be conveniently reached to either activate or turn off the alarm. Obviously it needs to be close to a suitable mains socket, although it is recommended that a separate feed is installed with its own fuse at the consumer unit.

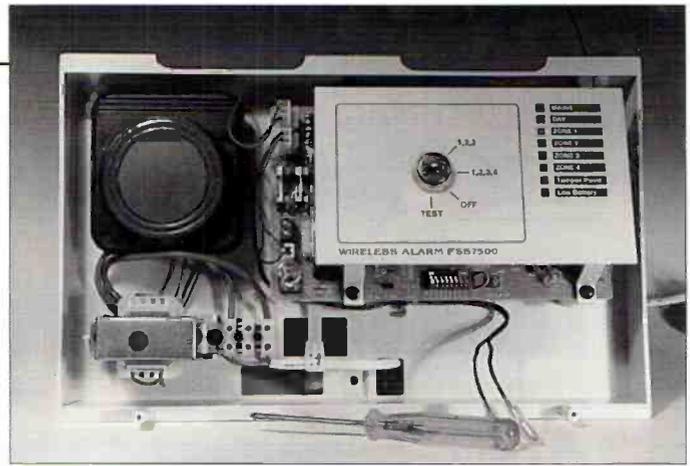
The wireless contact transmitter unit, like the wireless passive infra-red detector, is powered by a PP3 style battery inside the unit. Tests showed that the transmitter unit was able to communicate with the main control box in the house from anywhere within the perimeter.

Fox Security Wireless Home Burglar Alarm

Although the wireless passive infra-red detector in the kit offered the simplest solution to monitoring the radio room, it was decided that fitting the magnetic reed switch in series with some form of window breaking detection would be even better and not prone to false alarms from any small furry creatures that might manage to gain entry. Maplin stock, self-adhesive window foil and terminals, so these were purchased and fitted to each window. The foil is in the form of a thin metallic tape that is stuck to each window pane about 25mm in from the frame. If the glass breaks, so will the tape. This opens the loop and the contact transmitter unit is activated, transmitting a coded signal to the control box in the house. This signal tells the panel which 'zone' the unit is in. The same thing happens if

the door is opened. If the burglar tries to be clever and opens the unit to disconnect the battery, the anti-tamper system operates the alarm. A special signal is also transmitted when the battery is getting low.

The control panel is capable of monitoring up to four 'zones' and it is also possible to activate the system with 'Zone 4' switched out. This is usually arranged to allow the alarm to be activated at night and yet still allow you to move around designated areas of the house without setting the alarm off. In this case Zone 4 has been designated to the radio room so that the alarm can be left on with the downstairs area of the house still protected by another set of switches and PIR units while you are enjoying yourself at the bottom of the garden.



Siren

The control panel has provision for fitting an external siren if it's felt that the internal one is not audible enough. It does produce an ear-piercing and very unpleasant 120dB noise - but this might not be enough to deter someone trying to get into your radio room. There is also provision for a back-up rechargeable battery inside the box. The instructions do not, however, give any details as to exactly what the battery should be.

Setting Up

Once everything is in place the setting up of the system is straightforward and is detailed in the manual. The system can be operated either by the key

which fits into the switch on the main panel or by using the remote key-fob.

Price

Unlike most reviews it is not really possible to state how well the system works - until the worst happens and a real burglar activates it! It is hoped that, in this case, we will always be unable to tell you how well it performs!

The Fox Security FSS7500 costs £99.99 plus £3.70 carriage from **Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR. Tel: (0800) 136156.** We would like to thank Maplin Electronics for the loan of the review system.



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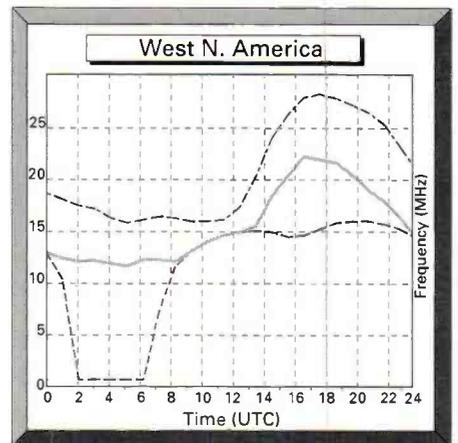
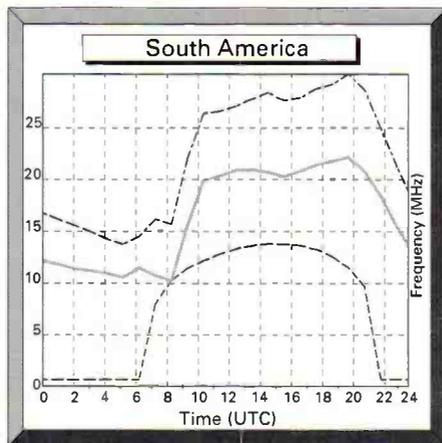
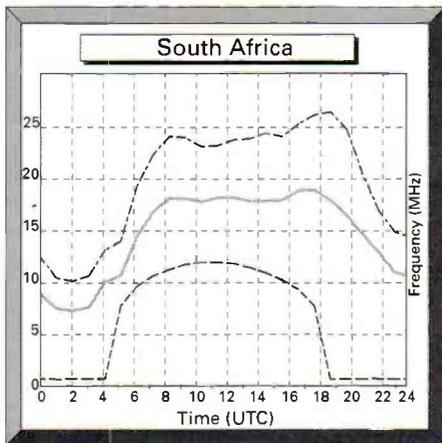
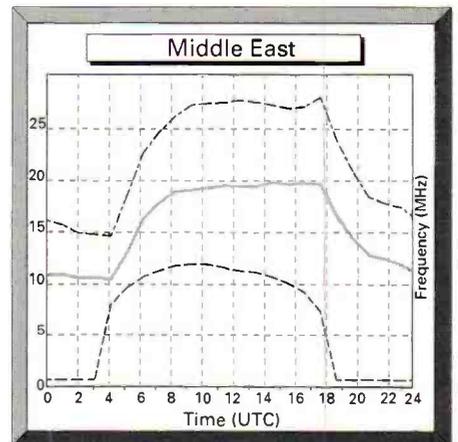
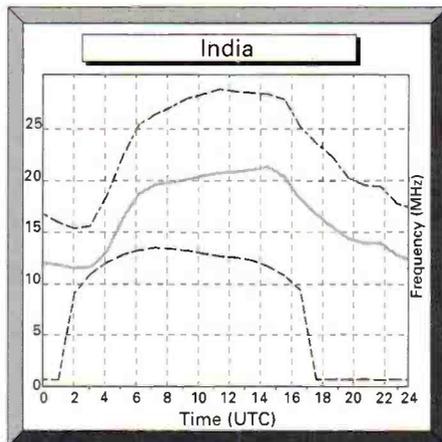
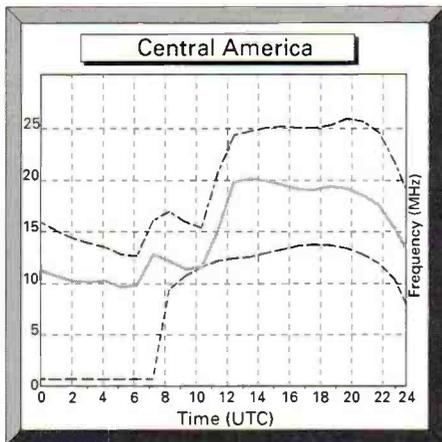
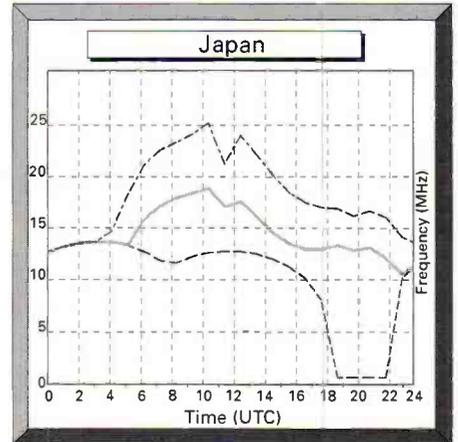
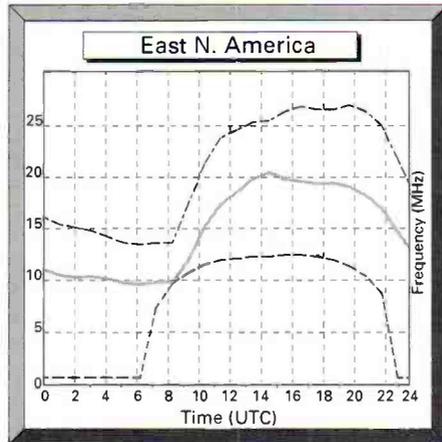
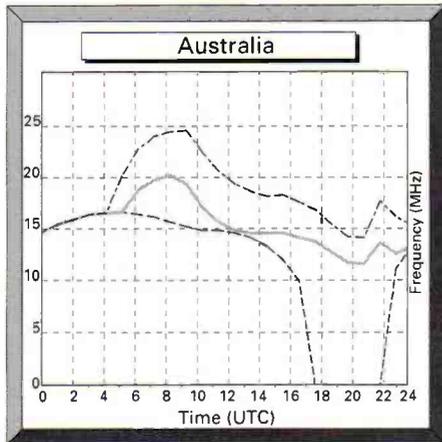


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World Propagation Forecasts September



How to use the Propagation Charts.

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

Frequency). The chances of success below this frequency are very slim.

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

Lastly, the upper dashed line, represents the maximum usable frequency (MUF) a 50% probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By

selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.



Mike Richards takes a closer look at the heart of d.s.p. technology whilst reviewing the JPS NIR-10 advanced noise reduction and filtering system from Lowe Electronics.

The NIR-10 is a more sophisticated version of the NTR-1 that I reviewed in the July issue and features a wider range of operating modes plus more scope for the operator to optimise the characteristics for different listening conditions. As you can see from the photographs the NIR-10 is a very compact unit and is housed in a particularly substantial aluminium case. With the exception of the standard 6.3mm headphone jack, all connections were on the rear panel with all except power using phono jacks.

The interconnections have been kept extremely simple starting with a high impedance audio input that can be fed from either a line or speaker output. The processed output of the unit is fed directly to an external speaker where the NIR-10 can supply up to 2W into a 3.2Ω load. Power connection was via a conventional coaxial power socket and required an external power source capable of delivering 11 to 16V at up to 1A maximum.

With all the connections made, getting started was helped by the 174 x 142mm, 31-page manual which included a useful Quick Operation section to get you going. If you're new to d.s.p. devices, I would strongly recommend you spend some time with the manual before you start so as to avoid being disappointed.

Noise Reduction Modes

Advances in d.s.p. have meant that accessories such as the

NIR-10 can now be produced at prices affordable by individuals. Perhaps the feature that sets d.s.p. apart from other forms of filtering or noise reduction is its ability to adapt to a range of incoming signals. Whereas many conventional systems provide a range of features to cope with most signals, they need the operator to decide and set the best settings. With d.s.p. much of this work is done automatically and the adaptation is much closer to the optimum.

The major operating mode of the NIR-10 is NIR (Noise and Interference Reduction) hence the product name. This system analyses the incoming signal and attempts to reject all signals that are not speech components. This provides a reduction in all types of noise and heterodynes. Although the NIR-10 adapts itself to the characteristics of the received signal, the degree of noise reduction is continuously adjustable via a rotary knob on the front panel. Using this mode the specification claims a general white noise reduction of up to 20dB and single tones or heterodynes reduced by around 40dB. This is pretty impressive by any standards.

In practice I found this level of performance was attainable but the NIR level control required careful adjustment when dealing with weaker signals. With these weak signals you find that as the noise reduction level is increased there comes a point where the spurious noise generated by the d.s.p. software exceeds the noise reduction benefits. However, even with very weak signals, there was a distinct improvement in readability.

Incidentally, the spurious noise generated by the d.s.p. unit can best be described as a collection of swirling synthetic tones. This is where the software has mistakenly identified noise components as potential speech and allowed individual bursts to pass through to the output.

Another noticeable feature of the NIR mode is the adjustment period of about 1 second while the software analyses and adapts its filtering to suit the incoming signal. Although this may at first seem slow, the processor will have performed thousands of calculations in that period.

Specialist Modes

Utility listeners will find the PEAK mode particularly attractive. This is enabled by the front panel switch and automatically analyses the incoming signal as passes only coherent tones. Although this does work with speech, it's at its best with RTTY and c.w. signals. The response time was very rapid and the process was completely automatic. I tried this with great success on all utility modes except h.f. packet. Here all was OK providing the frequency was busy, if it was quiet, I found the response time of the d.s.p. adaptation was too slow and the front end of the packet was often clipped. All is not lost though as the NIR's bandpass modes were excellent under these conditions.

The last of the adaptive modes is the notch filter. As with the peak mode, the notch was completely automatic and was able to provide a 50dB notch for up to four automatically tracked tones.

This was great for getting rid of interference heterodynes and featured a 3ms response time.

The final noise reduction mode was the bandpass filter which used pre-set parameters so the NIR-10 didn't have to adapt itself to the incoming signal. To provide the necessary flexibility there were three bandwidths available; NARROW, 250Hz, MEDIUM, 600Hz and WIDE, 1800Hz all selectable using the toggle switch on the front panel. Adjustment of the centre frequency of the filter over the 300Hz to 3kHz audio spectrum was done with the front panel located rotary NIR/BP control.

DSP Background

If you missed my coverage of the analogue to digital conversion in the NTR-1 review, here's a quick resume. Before we can carry out any clever digital manipulations of our signal, we first need to convert it into a form that the processor can understand, i.e. numbers. The device that does this is called an analogue interface converter or AIC. This takes repeated snap shots of the incoming signal and converts the signal voltage to a number in much the same way as a digital voltmeter does.

In order to give a good representation of the signal, these snap shots, or samples as they're really called, have to be taken at least twice as frequently as the period of the highest frequency signal to be processed. For a speech communications system this would mean taking a sample of the signal at least 6000 times every second! This series of numbers is then fed to the digital signal processor for

handling through its software program.

Once the signal has been processed, the conversion process has to be repeated in the opposite direction to reconstitute the audio signal. So you can see speed is of the essence when dealing with digital signal processing.

So what is this mysterious digital signal processor? Quite simply it's a specialised development of the type of microprocessor that forms the heart of all home computers. As the NIR-10 uses a Texas Instruments TMS320c2x series d.s.p. device, I'll use this as an example to illustrate the operating principles. All the electronics are contained within a Very Large Scale Integration (VLSI) chip with around 160 000 transistors and some 40 000 gates. The main components being a 32-bit arithmetic logic unit, hardware 16-bit multiplier, on-chip memory, memory access control and a serial port. Perhaps the main difference between a general purpose processor and a d.s.p. unit is the accent on speed and maths capabilities.

When carrying out digital processing of audio or radio signals it's necessary to perform a series of quite complex calculations on each individual data sample. When you consider that these samples arrive at a rate of several thousand per second, you begin to appreciate why speed is so important.

In order to maximise its

speed of operation, the Texas TMS320C25 has a number of special features. Before I cover these, let's just quickly run through the way a modern processor operates. The microprocessor is essentially a simple electronic machine that carries out a sequence of instructions called a program. If you equate this to the addition of two numbers using a calculator, you can imagine the two numbers as being the data and the + key the instruction. The instruction just tells the calculator what to do with the numbers or data. The next development from here is the programmable calculator. This has many more instructions available, e.g. logs, reciprocals, etc., and can store sequences of calculations (programs) to save the operator time. The microprocessor in home computers works in basically the same way but can handle much bigger programs and has a wider range of instructions at its disposal. The d.s.p. processor takes this a step further with a more comprehensive and specialised set of instructions available. These instructions have been geared around the needs of d.s.p. and many of them carry out several complex tasks in a single instruction.

The other critical aspect of any processor is its clock speed. This determines how quickly it can carry out the instructions we've just discussed. In the case of the TMS320C25, the processor

runs at 40MHz and is capable of executing instructions in just 100ns - that's 1 ten millionth of a second! When you add this speed to the TMS320's sophisticated instruction set you can appreciate the potential speed.

So why do we need all this high speed operation to handle some straightforward audio processing? If you imagine we are trying to design a digital filter we need to have some method of analysing the stream of numbers that are arriving at high speed from the Analogue Interface Converter. The only way to do this is to continually perform some complex mathematical calculations on each data sample and compare each result with previous results and/or a set of stored parameters. This process has to be completed for a large number of samples before an output can be generated. Even when the output is ready, it still has to be converted to a serial format and rebuilt using the Analogue Interface Converter. By using the complex instructions and fast operating speed of the TMS320 the NIR10 manages to do this whilst only incurring a 130ms delay in the progress of a signal. Incidentally if you're using the NIR-10 as part of a transceiver system you can remotely disable the processor when monitoring your own signal off-air. This avoids

having to listen to your own delayed voice which can be very distracting.

Summary

The NIR-10 is a very good example of what can be achieved with d.s.p. technology. Although the non-adaptive bandpass filters were very good it's the adaptive modes that provide readability improvements that aren't readily available by other means. The facility to adjust the degree of noise reduction is a very worthwhile addition as there's nothing quite like to human ear for deciding when things are just right! It's also worth noting that the best results are generally obtained with conservative settings of the NIR control.

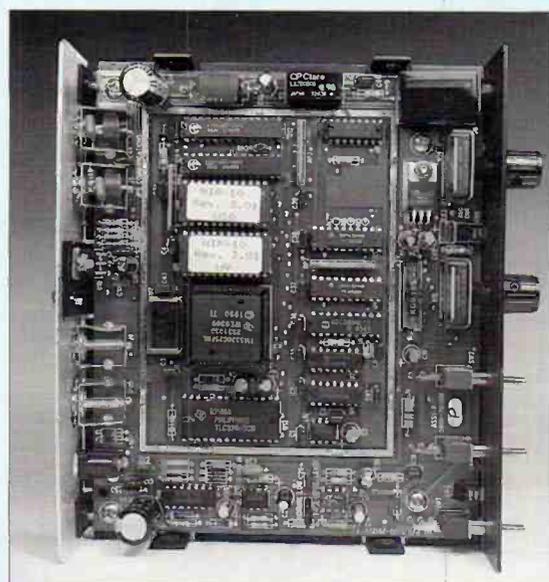
Thanks

Many thanks to **Lowe Electronics Ltd.** for loan of the review unit. They can be contacted at **Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (0629) 580800.** The NIR-10 costs £399 inc VAT. Lowe Electronics can supply their own 12V 1A regulated supply (PSU JPS), which is specially designed to run the NTR-1 and NTR-10, for £29.95 inc VAT. ■



Specifications

Audio Input	22Ω or 47kΩ phono jack
Frequency Response	300-3200Hz ±2dB
Input Level	120mV to 2.8V r.m.s.
Absolute Output Delay	130ms NIR & BP modes 0ms Bypass mode
NIR Mode White NoiseReduction:	Approx 20dB
PEAK Mode White NoiseReduction:	Typically 10 to 20dB
NIR Mode Single tone reduction:	Greater than 40dB
Time to Cancel a Tone:	approx 250ms NIR approx 3ms NF
BP Bandwidth:	NARROW: 250Hz MEDIUM: 600Hz WIDE: 1800Hz variable 300-3200Hz
BP Centre Frequency:	typically 50dB (1 to 4 tones)
BP Ultimate rejection:	
Speaker Output:	2W into 3.2Ω speaker
Power:	+11 to +16V d.c. at 1 amp peak
Size:	177(W) x 160(D) x 46(H)mm
Weight:	0.91kg



Have you noticed how mad the retail trade has gone over pricing recently? It seems only a short time ago, several dealers were listing RRP prices. Now almost every one seems to be intent on putting the other out of business. Are these desperate times, or what? Giving products away for little profit results in poor service and lack of after care. If you can't see that new product in your local store, then you maybe buying the wrong item in the first place - however "wholesale priced" it is. I'm all for a bargain, but I've been bitten by the "how does he ever make any money, he's always giving it away" store.

When you walk into a radio store here are eleven tips to help make the right decision.

Ask these eleven questions, call it the Martin Lynch Customers' Charter if you like!

There are some who really don't care about anything bar the lowest price. In eighteen years of retailing one product - Amateur Radio, the person who usually screws for the lowest price makes the biggest noise in the event of something going wrong. To those of you in this category, I'm pleased I won't have the opportunity of letting you down as a MARTIN LYNCH CUSTOMER. You probably will never be one. At MARTIN LYNCH, we like to treat customers as though you will be with us for life, not one for a "few bob" and onto the next....

In the meantime, I'll carry on giving you the BEST DEAL versus the best after sales service you will find in the world. Now that is guaranteed!

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- 8 Does he have a "family" area for those waiting, who are not so nuts about the radio you want to buy?
- 9 Does he present you with staff who aren't Licensed Radio Amateurs. Would you visit your Doctor, if he wasn't qualified?
- 10 The only method of attack he has is to keep slashing the price, not realising the care and attention you will need if it goes wrong.
- 11 Can't offer you "instant credit facilities", either by phone or in the store at very advantagous rates.

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AOR 8000UK

AOR always lead with technology in scanner design and every time details are "leaked" to the press, the phone doesn't stop ringing for months. A detailed specification sheet is now available for this truly amazing item and is available to those of you who call in or phone. Stocks will be limited but I am assured of a limited quantity from June onwards. The price? I'm told around the region of £440. A deposit of only £50 will secure your 8000UK and payments in the region of £33 a month are given as a reasonably accurate estimate. MRP £449.00



MVT 7100

The new AR800 has arrived but sales of the MVT7100 will continue as strong as ever - especially as the price is slashed to only £389! All mode, no gaps and it's available from stock.



AR 1500EX

I remember when you had to wait almost six months to get your hands on this one - no more, they're in stock and excellent value.

VT125

The no nonsense, simple to use Air Band handle. It only retails at £189.00 and it comes complete. Give yourself a birthday present. Order one today and I'll pay the delivery charge. [U.K. only mind].

VT225

The same as its little brother, but this ones matured to enable you to listen to Military AIR Traffic as well a civil. Just a touch more green backs and I'm still throwing in FREE CARRIAGE and the very latest AIR BAND FREQUENCY GUIDE. Deposit your £269.00 with me today.

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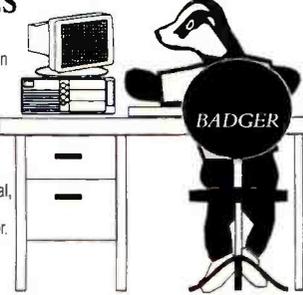
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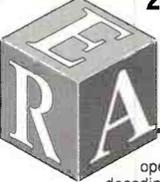
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AOR AR3030

Mike Richards takes a look at a production version of this new receiver.



Following my review of the prototype receiver back in the January issue, I have now had the opportunity for a more detailed study of a standard production unit. The review model was completely standard except for the inclusion of the optional 500Hz Collins c.w. filter and an external power lead.

Delivery of the new AR3030 is supported by a brand new production line that's been set-up at the Japanese HQ. The original review was based on an early pre-production unit that was demonstrated at the Leicester show and I was pleased to see that all the minor shortcomings of the prototype had been corrected and the AR3030 looks and feels like the top quality receiver it is.

Operation

I'll summarise some of the key operational features here but for more details, see the

full review back in the January issue. AOR have put a lot of effort into the ergonomics of the AR3030 and I found the receiver very easy to use. The front panel layout was simple and logical with good sign writing to show the various functions. Selecting frequencies within the comprehensive 30kHz to 30MHz range could be done in a variety of ways by utilising the two internal v.f.o.s. The most obvious being to use the main tuning knob on the front panel. As with all synthesised receivers the tuned frequency changed in discrete steps rather than continuously. The size of these steps could be changed from 5Hz through 100Hz, 1kHz to 1MHz by a single press of the kHz or MHz keys. This proved to be a very quick and effective system.

For larger frequency changes the numeric keypad has a clear speed advantage. Using this system, frequencies can be entered in

kHz or MHz simply by pressing the appropriate key after entering the frequency digits. The AR3030 even included a backspace key so that you can correct wrong entries as you go.

To complete the frequency selection options, the AR3030 included 100 user-programmable memories that held all the important operational parameters. Closely allied to the memories was a comprehensive set of scanning options that included all the standard options such as band scanning plus memory lock-out.

One very welcome feature of the AR3030 was the standard provision of a full set of receive modes. In addition to the usual s.s.b., c.w. and a.m., there was synchronous a.m. along with n.b.f.m. and a special FAX mode for utility enthusiasts.

Clear Manual

The new operating manual for the AR3030 was well up to the standard you would expect from AOR and was presented as a glossy, A5, 54-page booklet. In addition to giving clear and comprehensive operational details the manual included welcome chapters on antenna systems and propagation. To help you find answers quickly, the main core of the manual was arranged with a well indexed section covering every control and connector. This

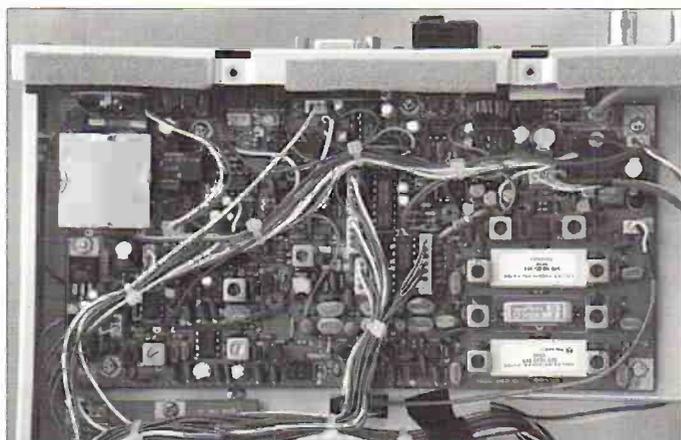
was supplemented with a methodical description of how to use all operating modes.

For those with an interest in computer control of the AR3030 there was a full description of all the commands and how to implement them. This was a pleasant change as with some systems you have to buy a special interface and software before you can operate computer control. If the idea of computer control appeals to you then you will be pleased to know that there's a new Windows-based control program for the AR3030 about to be released by AOR.

Under the Bonnet

Access to the internals was very easy having first removed the close-fitting top and bottom U covers. The standard of both mechanical and electrical construction was very high and AOR have achieved excellent access for servicing and the fitting of accessories. The internal layout was very clean with the r.f. and oscillator sections mounted in the top section, control electronics on the front panel and the main i.f. and audio units underneath.

The frequency stability was excellent and well up to the standards required for the most demanding applications such as unattended FAX reception. One of the secrets of this high stability is the standard



fitting of a Toyocom temperature controlled reference oscillator.

Although not standard practice, the review model was supplied with a complete set of test results. These showed that the AR3030 is able to compete with the best receivers currently on the market. Whilst its always difficult to accurately compare figures from different manufacturers, the AR3030's results were extremely good. The r.f. sensitivity ranged from -117 to 119dBm for 10dB SINAD and showed very good consistency across the operating spectrum. The AR3030 should also fare well in the presence of strong signals thanks to the good 3rd order intercept figure (50/25kHz) which ranged from +15dBm at 1.8MHz to +18dBm at 28MHz. This compares very favourably with the best receivers currently available.

On-Air

The AR3030 is very much a receiver crying out to be used. The layout is very well thought-out and enables the operator to use all the facilities with minimal reference to the operating manual. The receiver was also very well dimensioned and didn't take up too much valuable bench space.

During the review I used the AR3030 to receive a very wide range of signals from local broadcast stations to unattended FAX reception.

All the utility modes were received with no problems and I was pleased to see the provision of a dedicated line out jack for utility use that provided a nominal 0dBm (775mV), 600Ω output signal. Incidentally, the FAX mode was basically u.s.b. but with

some audio tailoring and the carrier injection frequency off-set to suit the AOR WX2000 weather FAX decoder.

I was particularly pleased with the excellent frequency stability that paid dividends by enabling the s.s.b. modes to be used to receive a.m. broadcast signals. The advantage of this system is a reduction in the effects of selective fading plus the opportunity to reduce adjacent channel interference. All you do is tune in the wanted signal using standard a.m. mode then switch between u.s.b. and l.s.b. to find the best result.

The use of a Collins mechanical filter for the a.m. produces excellent selectivity, but can result in some loss of treble. AOR suggest that you tackle this by off-tuning the receiver by 1kHz.

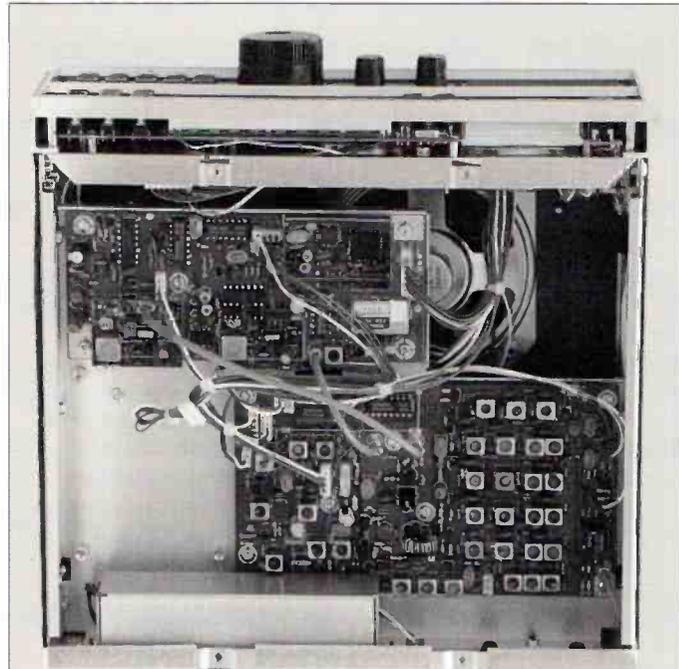
The only anomaly with the audio performance was the speaker mounting that had been changed from the original ducted front facing design of the prototype to a larger 93mm unit mounted face down on the base plate of the cabinet. Although this worked OK, there was a distinct lack of bass due to cancellation between the front and base plate ports. The resultant bright sound remained fine for communications use but I would strongly recommend the use of an external speaker or headphones for broadcast listening.

Summary

The production version of the AR-3030 has certainly been worth the wait and AOR have maintained their reputation as manufacturers of fine receivers. Its strong

points are ease of use combined with compact size. I'm sure the AR3030 will prove to be extremely popular amongst a wide range of short wave listeners. The AR3030 costs £699.00 (inc VAT)

For more information on the AR3030 and the range of accessories contact **AOR (UK) Ltd., Adam Bede Tech Centre, Derby Road, Wirksworth, Derbyshire DE4 4BG. Tel (0629) 825926.**



Specification

Frequency Range	30kHz to 30MHz
Tuning Indication	MHz, kHz, 100Hz, 10Hz (5Hz tuning steps)
Receiving Modes	a.m., s-a.m., u.s.b., l.s.b., c.w., FAX & n.f.m.
Frequency Stability	5p.p.m. -10 to +50°C
Memory Channels	100
Sensitivity	s.s.b., FAX, c.w. (10dB s+n:n) 1µV 30-50kHz 5µV 540-1800kHz 0.5µV 1.8-30MHz a.m. (10dB s+n:n) 3µV 30-50kHz 15µV 540-1800kHz 1.5µV 1.8-30MHz (narrow) f.m. (12dB SINAD) 0.5µV 1.8-30MHz
Selectivity	s.s.b./FAX 2.4kHz -6dB a.m. 6.0kHz -3dB a.m. narrow 2.4kHz -6dB c.w. 500Hz -3dB (optional filter) f.m. 15kHz -6dB
Image/spurious rejection	70dB
Dynamic range	100dB @25kHz spacing with 500Hz filter
Audio Output Power	1.8W into 8Ω at 10% t.h.d. Internal 8 x AA cells External 12V d.c. @ 0.8A
Size	250 (W) x 88 (H) x 240 (D)mm
Weight	2.2kg without batteries.



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Lake Electronics Carlton Receiver Kit



Building your own radio equipment is a rewarding experience. Dick Ganderton has been putting together one of the range of kits from Lake Electronics - the Carlton direct conversion receiver.

Lake Electronics are a long established and respected manufacturer of kits for the radio enthusiast. Their philosophy has always been to provide the constructor with as complete a kit as possible, together with a set of comprehensive instructions to enable it to be put together successfully first time.

The Carlton is a direct conversion receiver covering 3.5 - 3.8MHz, 7.0 - 7.1MHz and 14.00 - 14.35MHz. A direct conversion receiver takes the incoming radio signal, mixes it with a signal from a variable frequency oscillator so that the resultant output from the mixing circuit, or product detector, is at audio frequency. Tuning is achieved by varying the frequency of the v.f.o. The pre-selector

circuit between the antenna and product detector input also needs to be adjusted to suit the frequency of the signals being received.

A sharply tuned low pass filter immediately before the audio amplifier gives a good response for both s.s.b. and c.w. reception. The audio amplifier is the ubiquitous LM386 i.c. giving up to 500mW into an 8Ω load - a loudspeaker or low impedance headphones.

Instructions

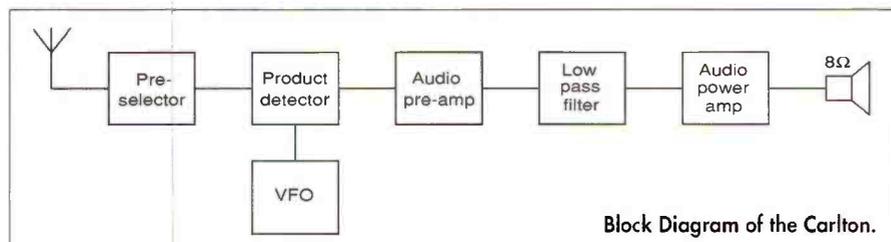
The instructions provided are both clear and comprehensive. They are divided into logical stages, starting with a general set of notes on kit construction. The next 'chapter' deals with the Carlton itself and how it works. This is followed by

detailed instructions for each section of the receiver, including a circuit diagram with test voltages shown - very useful for checking out the finished p.c.b.

Setting up and testing is also comprehensively covered, so that there should be no difficulty in getting the receiver working properly. However, if the unthinkable does happen and you cannot get it to work, Lake Electronics operate an alignment, repair or investigation service - for a minimum charge of £15.00. If the fault turns out to be not of your making you get your £15.00 refunded. If, however, you

messed it up then you get 45 minutes of bench time for your £15.00 with any extra time at £10 for every extra half hour. Lake promise to tell you how much extra time you could be in for.

Finally, there are some hints on how to operate the Carlton. Taken all round the instructions are both understandable and complete - essential for any kit.



Block Diagram of the Carlton.

Abbreviations

a.f.	audio frequency
c.w.	continuous wave (Morse)
d.c.	direct current
dB	decibels
i.c.	integrated circuit
kg	kilograms
kHz	kilohertz
l.s.b.	lower sideband
mA	milliamperes
MHz	megahertz
mm	millimetres
mW	milliwatts
p.c.b.	printed circuit board
r.f.	radio frequency
u.s.b.	upper sideband
v.f.o.	variable frequency oscillator
Ω	ohms

MultiScan comes to Britain



AMDAT are pleased to announce that we are now able to supply this superb data interface which has been taking Europe by storm. The basic unit will receive FAX, SSTV in all the latest colour modes, RTTY and TOR-FEC/NAVTEX. With the addition of the TX board full colour FAX and SSTV can be transmitted.



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 - TX/RX PCBs + kit of parts. **£149.00**
 - RX PCB only (includes software). **£49.00**

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The MultiScan interface, which is powered from 12V, is connected between the radio and the serial port of the PC. In all modes the MultiScan software gives a real time audio spectrum display which makes tuning into signals easy. In Fax mode the full screen is used to display the incoming picture. If you want a permanent record it can be saved to disk as a GIF file. In SSTV mode two windows are used on the screen which can be configured for receive or transmit. The multitasking software allows GIF pictures to be loaded into the window and overlaid with text ready from sending while a picture is being received off air.

The superb performance of this unit and the features it provides make it stand out from the existing products which are currently available.

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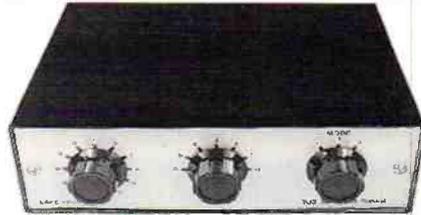


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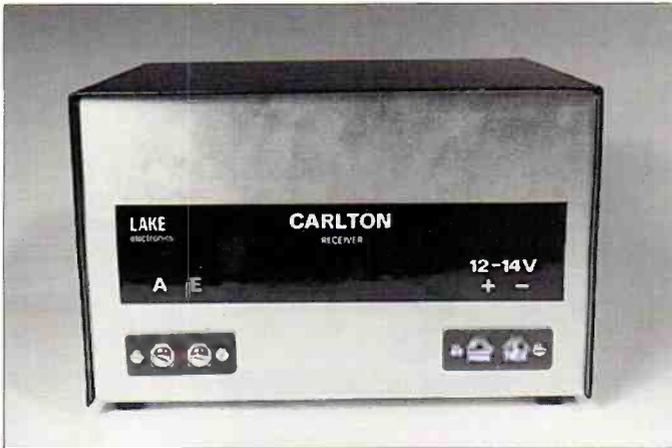
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Printed Circuit Boards

The receiver is built on three p.c.b.s. Each board contains a logical building block which, when connected to the other boards, makes up the complete receiver.

Both the v.f.o. and product detector use toroidal cores and the instructions for winding these are both clear and concise. However, care is still needed to ensure that the windings are put onto the cores in the correct sense.

The p.c.b.s are of good quality epoxy glass material and are a sensible size. This means that the components are not tightly packed or the pads so small that soldering becomes a nightmare. Sockets are provided for the two i.c.s on the audio and product detector boards. The components for each board are packaged separately to avoid confusion. The instructions contain a complete component list for each board so that each component can be ticked off as it is soldered in place.

The Case

With the printed circuit boards completed and tested the next stage is the case. The case is a two-piece aluminium affair with the main part being folded up to provide the front and rear panels. To overcome the usual difficulties of annotating the controls, a self-adhesive, plastics overlay is provided to cover the front panel with a smaller one for the rear. Full-size drawings are provided for both panels, together with detailed instructions on how to drill the necessary holes for the controls.

I must admit that, although possessing a workshop that is fully equipped for such operations, I have always found working on these large, one-piece 'chassis' has always been a bit of a bind. The soft

aluminium from which they are made does not lend itself to being drilled without snatching and the awkwardness of the shape means that it is difficult to get the panels over the drill table without a lot of juggling with blocks of wood and clamps. A lot of potential builders of this kit would not have access to metalworking equipment and for them the only way out is the trusty Black & Decker and a round file to open up the holes to size.

The self-adhesive, plastics overlays work well and will cover up a small amount of amateur 'panel bashing'. Be warned, however, that once in place they cannot be removed without destroying them - so you have to be confident that you have got it right first time and that that time is the right time in the construction sequence!

Once the front panel has been successfully drilled the p.c.b.s can be fitted using the pillars provided. This is simple as the boards themselves can be used as templates to mark out the holes in the bottom of the case.

Wiring

A clear wiring diagram of the receiver is provided so that it is easy to see where the various interconnecting wires and coaxial cables go. Miniature coaxial cable, rather than audio-style screened lead is used for carrying both r.f. and audio signals. Connections to the p.c.b.s are made to pins and by following the wiring diagram this part of the construction is simple.

A power-line filter, using a bifilar wound toroidal inductor is fitted into the d.c. power line close to the terminal block on the rear panel. This is to reduce any interference being injected into the receiver through the power supply.

Alignment

Aligning a direct conversion receiver, such as the Carlton, can be a trifle awkward. Again, the instructions are straightforward and the only test gear needed is a multimeter and a 'calibrated' receiver. Of course, a suitable 12V d.c. power supply is also needed.

With the cover removed and no antenna connected, the v.f.o. radiates enough signal to be picked up by another s.w. receiver placed alongside. The trimmer capacitors are adjusted using a non-metallic trimming tool. A suitable trimming tool can be made from an old plastics knitting needle with one end sharpened to a screwdriver blade shape. It needs to be long enough to enable the trimmers to be adjusted with your fingers outside the case.

Performance

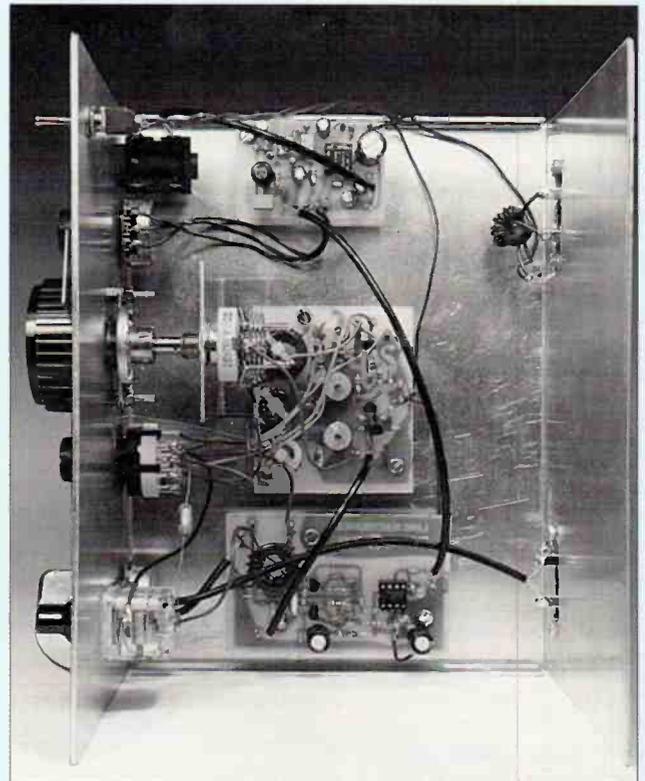
This type of receiver needs a good antenna and earth system to give results. The instructions give some hints and tips on how to use the Carlton.

Although I have aligned the set I have not had enough use with it to give a performance report - this will have to wait until a future issue.

The Carlton costs £69.50 and is available direct from **Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX.** Tel: (0602) 382509. My thanks to Lake Electronics for supplying the review kit. ■

Specification

Type:	Direct conversion
Frequency Coverage:	3.5 - 3.8MHz 7.0 - 7.1MHz 14.00 - 14.35MHz
Modes:	c.w., u.s.b., l.s.b.
Selectivity:	2kHz @ -6dB
Audio output:	500mW into 8Ω
Power supply:	12 - 15V d.c. @ 100mA
Size:	210 x 180 x 135mm
Weight:	1kg



Bandscan

Australia

I worked away from home under contract in our Federal Parliament in Canberra during June, July and August. That cut into my dial wandering but placed me near the broadcast and telecommunications decision makers. It was a fascinating time and one that I miss now it is over. Closer to home, our local bushfire brigade has been in the throes of making decisions about discharging and recharging policies for hand-held transceiver nickel cadmium batteries. As with many technical issues there seems to be as many opinions as decision makers. Anyway, time for this quarter's news.

Radio Australia

Radio Australia has commissioned two new high powered transmitters at the National Transmission Agency's (NTA) Cox Peninsula broadcasting complex outside Darwin. The two 250kW transmitters were custom-built in Europe to NTA specifications and they give the Cox Peninsula facility a total of five transmitters with three able to operate at one time.

The upgrade at Cox included a complete refit of the station control room and installation of a new main station computer control system. Capacity of the antenna matrix switch system that controls signals from the transmitters to the broadcasting antennas was increased by 60%. The transmitters and other equipment cost a total of \$A9.5 million (approximately £4.5 million) and expenditure at the Cox Peninsula and in the Darwin area has totalled about \$14 million (£6.5 million) in recent times.

In an associated project the NTA has provided five new broadcasting antenna arrays for Radio Australia at the Shepparton station in Victoria.

Mobile Towers

Mobile telephone transmissions lie a little outside the range of transmissions most *SWM* readers will be able to hear; they are probably outside the range that most will want to hear. However, the mobile telephone carriers and their subscribers are using the radio frequency spectrum and that makes their news of interest.

The mobile telephone war has hotted up here with the three carriers energetically vying for subscribers with the new UK entrant Vodaphone pushing the future with an all digital network.

The carriers have operated on a draft telecommunications code since late 1991. Under this code, numerous residents of urban areas and many local councils were dismayed to see a

proliferation of mobile telephone towers placed on high points throughout city suburbs. Residents and councils were largely powerless to affect siting or to have environmental concerns heard.

A new Telecommunications National Code has now come into effect. It requires that carriers consult more on the location of these towers with local councils, planning and land use departments and the Australian Heritage Commission. According to the Minister for Communications and the Arts, Michael Lee, the carriers will now be subject to more stringent environmental requirements. He says that, "towers and antennas must now be co-located where this action is technically feasible, compatible with network configuration and capable of minimising adverse effects on the environment". Although that sounds like a lot of escape clauses for the three carriers, the code does also allow the federal Department of Environment, Sport and Territories to assess relative merits of a siting proposal.

Budget News

In the federal budget this year the government has provided \$A515.1 million (£240 million) for the Australian Broadcasting Corporation (ABC) and \$A75.7 (£35 million) for the ethnic language broadcaster Special Broadcasting Service (SBS) in the financial year 1994-95. Minister Lee has promised more than \$A1,500 million (£690 million) to the ABC over the next three years and \$A220 million (£100 million) to SBS. Lee says that this demonstrates the government's commitment to the future of national broadcasting.

No doubt friends of SBS and the ABC here are pleased with this commitment especially in light of possible parallels with recent BBC privatisation rumours here.

NTA funding will be \$A154 million (£70 million) this year bringing total government funding to national broadcasting to \$A745 million (£350 million).

Pay Television Update

In round one of a series of sales, 190 Multipoint Distribution System (MDS) microwave broadcast licences in thirteen areas are being auctioned here for use by pay television operators. The big and unfortunately named PMT - Packer, Murdoch, Telecom - consortium here with its own plans for pay television via optical fibre cable eschewed the opportunity to acquire any of these licences in the big population centres of Sydney or

RFDS Frequencies

Although propagation conditions may preclude reception of lower powered signals from this part of the world I thought a few frequencies from the Royal Flying Doctor Service (RFDS) might interest readers.

Location	State	Call	Frequency (MHz)
Alice Springs	Northern Territory	VJD	2.020, 5.410 & 6.950
Broken Hill	New South Wales	VJC	2.020, 4.055 & 6.920
Cairns	Queensland	VJN	2.020, 2.260, 5.145 & 7.465
Carnarvon	Western Australia	VJT	2.280 & 4.045
Charleville	Queensland	VJJ	2.020, 4.980 & 6.845
Darwin	Northern Territory	VJY	2.360, 4.010, 6.840 & 7.975
Derby	Western Australia	VJB	2.792, 5.300 & 6.925
Kalgoorlie	Western Australia	VJO	2.656, 5.360 & 6.825
Meekathara	Western Australia	VKJ	2.280, 4.010 & 6.880
Mount Isa	Queensland	VJI	2.020, 5.110 & 6.965
Port Hedland	Western Australia	VKL	4.030 & 6.960
Port Augusta	South Australia	VNZ	2.020, 4.010, 6.890 & 8.165

Note that 2.020MHz is the night frequency used by all east coast RFDS stations.

Melbourne, merely sending observers to the auctions. The licences up for grabs in these cities went to Australis and an Australis related company; Australis already owned thirty microwave licences in Sydney and Melbourne.

Commentators are saying that Australis now has a stranglehold over Australia's pay television market at least in the short term; in the long term they see a British-style pay television battle of different and incompatible technologies. Lining up in Sydney for example will be Australis with 18 MDS channels, PMT with 64 cable channels and Optus with 30 cable channels. I think I will just wait and see how it all shakes out before reaching for the cheque book to sign up for any of the competing systems.

Microwave licences in 119 regional centres will be auctioned after the first round is complete.

Siphoning

A major concern of Australia's television viewers has been the problem of programmes that are currently shown on free to air television being 'siphoned' off to pay television when that is in place. In an attempt to allay some of that concern the federal government has announced a list of programmes that will be preserved on free to air television. The list proves perhaps Australia's enthusiasm for sports; all programmes on the list are major sporting events and they remain on the anti-siphoning list until the year 2004.

This is fine for sports lovers of course but I await pay television with a mixture of interest and dread. Sports may remain on free to air television but what of the many excellent British television dramas now broadcast at no charge?

Maybe I'll be forced to reach for the cheque book after all.

BBC World Service

The BBC World Service is now being beamed into the Pacific and Asia courtesy of the Radio Australia transmitters at Shepparton in Victoria. Frequency is 11.695MHz; times are 2200 - 2300UTC and transmitter power

is 100kW. The transmission uses an antenna array with a bearing of 355° and a beam width of 36°; it is designed to overshoot the Australian mainland and to fill a need in the region to this country's north. Local reception of the same program is available through medium wave and f.m. stations including Radio for the Print Handicapped stations.

I have yet to confirm that the BBC is providing transmitter time to the ABC in exchange for use of the Shepparton facilities.

Other News

From Australia's *Amateur Radio Action* (ARA) magazine comes the news that pirate New Zealand radio station Radio Kiwi can be heard on 7.445 or 7.455MHz u.s.b. between 0600 and 1100UTC. Best of luck with that one!

Also from ARA the New Guinea news that the NBC in Port Moresby is alternating between 9.675 and 4.890MHz for the relay of its Karai service in English. Times are 1900 - 2200 and 0700 - 1400UTC for 4.890MHz; other times are on 9.675MHz. The transmitter puts out 100kW.

With the inauguration of two new transmitters in Darwin the SBS now reaches all capital cities in Australia. SBS would have been broadcast earlier in Darwin, but the original transmitter was wrecked in a storm at sea while being shipped from Japan.

The ABC has begun to use what was downtime on its Parliamentary Broadcasting Network for a 24 hour parliamentary and news service now known somewhat unimaginatively as the Parliamentary and News Network. It is heard in the capitals Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart and Canberra and in the New South Wales city of Newcastle. There are no plans to extend the service.

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by *SWM* readers so I can chase up more details and interesting snippets from this end. My address is PO Box 208, Braidwood, N.S.W. 2622, Australia. For personal replies please send 2 IRCs.

Amateur Bands Round-up

Listening to the Amateurs

The quite spectacular collapse in the solar flux in the past several months seems, as I write, to at last be steadying up. However, we have some way yet to reach the bottom - maybe, 1996? Meanwhile, we must make the best of things.

Letters

Quite a pile to greet my return.

Tony Capon lives in Lindfield and says he found Top Band a silent area this time, with just G1OKOW, G13OQR and G3NKC entered in the book. On 3.5MHz, the c.w. of W1AW (ARRLs official station) was copied, and on sideband GB50OBX, OT4IPA, SP2PIT, K2OU, DLs, OZ8AB, LU5OJ, GD2HCX, VE3YJ, GB2RAF, GB4HP and GX2IC/P. At 7MHz we see ZB2SO, GM2CWL, AA1AS (c.w.), PY7MTV, JWOC for Bear Island, VK7AZ, ZL2JR, LU4FM, RU9XWH, ZP6CC, UX0RR, ZL4KF, W4BK and W5RB, both on the key, AZ6AN and TI4CF. On 14MHz Tony seemed to find the Europeans, but in addition 5Z4PL, 4X4KU, TA8C, 4X1MO, W2ONV, PT7WX, S92YL, 9K2HN, PT2PF plus KB5WGZ heard at 20 000 feet over the Adriatic talking to an Italian in Sarajevo, this one was an Aeronautical mobile not signing properly, for sure. 21MHz yielded CG8AI, PI7BI, 3V8RT and 5N9ZRC.

A thoughtful letter from **Frank Lennon** in Hyde, Cheshire, discusses among other things his audio filtering. The **ideal** filter would, in fact, be fitted in the antenna lead, so that the only wanted signal could reach the receiver front-end. This is just 'not on' for a tuneable receiver. However, the technology does exist to make a sideband or c.w. bandwidth filters at a fixed frequency and these are fitted in receiver i.f.s as the next best thing, maybe associated with an attenuator at the front. The audio filter is technically the last choice, but has the great advantage that it can be an add-on, transferable from one rig to another. The big problem with the a.f. filter is that receiver overload will almost certainly occur first in the mixers or detector stages of the receiver, creating noise lying within the audio filter passband. **MORAL:** If noise occurs with **any** receiver, always try the effect of turning down the r.f./i.f. gain and upping the a.f. to compensate.

Frank reports a 29MHz f.m. station in DL7UZ in Germany, while

on 7MHz CE4MAD, ZP5MGR, PS8JA and VP2EY were noted. 14MHz provided the best entertainment with such as GM4ITK up in Shetland, 3W1AE, VE7IW (Vancouver Island), IY5IM, 3YQAI on Peter 1 Is, BV2VA, 5T5SV, V51X (Namibia), YB5VQG, HS0/G4UAV, VU2HSN, DU1SAW, JA3GFA, VP2MES, XX9AS, KG5CP, FS5PL, EP2MHB, G3UXO/MM aboard QE2, AP2AGI, CO1RG, FY5FJ and V44KBC.

Next, **J. Salisbury** from Huddersfield writes in to say he is using the packet decoding system on the Hamcomm disk available from Mike Richards of 'Decode' fame. He finds the tuning very critical indeed, and notes that much of what he receives is not text but graphic symbols. Not being much into packet I don't know, but an educated guess says that most likely a corrupt packet is lousing the works up, or that a packet is failing to get through to its destination and is being repeatedly sent. I would have thought that listening-in to packet stations would be more effective on v.h.f. stations - that's why I'm not on packet myself, being in the bottom of a valley!

Next we have **Ted Allen G3DRN** from Wimbledon commenting on the use of shortened calls. Like me, Ted sees them as quite illegal and poor operating. As he says 'I'll continue to use my full callsign and if they don't like it, hard luck!'. I rather like his rider, cynical though it is: 'The Clots won't read anything they are advised to, and probably wouldn't heed the advice anyway!' As usual, Ted puts an unerring finger right on the sore spot!

Now we turn to **Harry Richards** of Barton-on-Humber, who runs a Grundig Satellit 700, fed from a Datong AD270 active antenna. Harry quotes the *WRTH* as saying that 'receiver manufacturers tend to make portable radios that are so sensitive that once you attach an external antenna they can't handle the incoming energy and overload'. Whoever wrote that down either didn't know how to express himself, or worse, didn't know what he was talking about! Any receiver is made sensitive. Susceptibility to overload is quite a different parameter. To make the mixer a bipolar transistor is poor practice, to use an f.e.t. better, and to go to a double-balanced diode mixer probably best. The designer chooses what he sees as the best he can technically, while still within his

budgetary constraints. After all, if he designs a radio too expensive for the market, no-one will buy and he will be made redundant! Any company, considering a new item, will first do market research, then define a selling price, to give a works price. The designer and the production engineers will then get a proposed specification and the works cost limit right at the start. Make Mini with a Rolls price-tag, or make a square golf ball, neither will sell in quantity!

Les Young is in Torquay nowadays, but used to be in Kent, where he was stirred by my recent reference to the late G6QB and the BBC cinema organ. Seemingly, Les got his start through living next door to G2GZ, the infection wrecked his scholastic career, through reading 'W.L.S.' in *Popular Wireless* instead of doing homework. One of his classmates told him that his piano tutor was the same W.L.S. otherwise Howard Thomas G6QB. This led to meeting G6NF and G6HP, not to forget Douglas Walters G5CV, who was the airborne part of the activity. Those were the days when amateurs were always in the lead! Though Les was never licensed, he was BRS 1357.

Next we come to **Geoff Crowley**, up in Aberdeen. Geoff is now GM7SUC as well as TF3XXT and on the low bands listens with a Yaesu FRG-100 and a half-sized G5RV. Geoff has also now joined the local club. The log includes: on Top Band, G6PZ, GW3UEP, G4RIV and GM0HIG. and for 3.5MHz we see Europeans plus 4U1ITU, 9H1EL, D44BS, EA9PB, ZP6RO, VK7AZ and ZP6VT. 7MHz managed 9G1MR under a 'large economy-size' pile-up, plus Europeans, while on 14MHz I note UT7FP, 9K2NU, CP6PL, PT2AZ, S5PKR/M, 4X1MO, T99A, 9K2YAZ, Z37DRS, W4QSH/M, C53HG, ZB2JO, PY2LG, LZ2LK running all home-brew, PY2LG using 1200W from 18m above the 30th floor, WA2OQM, PY1LI and 9Y4NZ. The yield from 18MHz was RK6AXS, A22CT, JWOC, 4S7EA, 4S7AVR, 9G1MR, PY5CC, 9G1UW and JL1WBQ. Turning to 21MHz I find 4X2LK and on 24MHz Geoff caught most of the Europeans openings, as indeed he did on 28MHz. Unless a miracle occurs we won't see any more Australasian contacts on Ten for some years now.

Now we come to a log *sans* covering letter, under the name **Iain Macallister** - seven pages at 35 - beautifully clear - entries to

the page. Normally, I could prune out the European entries, but Iain's log only contains the odd one or two Euro-stations who are from rare spots anyway! One thing is evident; Iain likes Islands, with Shetland, St. Helena, Norderney, Taiwan, Greenland, Guam, Aruba, Fernando do Noronha, Tristan da Cunha, Gibraltar, Moors Is Nova Scotia, Desroches, Trinidad, Santa Catarina Is in the form of PP5AM, DU6BG on Panay Is, 9V1QX, 9Y4SF, IF9/IT9PPG for Favignana Is, V44KBC on St Kitts, KA2PHQ/VE1 on IOTA NA-081, IA5/IK3MAW on Giglio Is, VP2VF, FS5PL on St Martin, J37WA, IM0USB on San Pietro, HP1/DL8RBR for Contadora Is, OJ0/OH2BBF at Market Reef, FG5FC, VK7AZ, NP2CV for St Croix, 5B4AFB, C6AGR, DL3YEL/P, ZF2WQ, JWOC, JR5JQAQ on Shikoku (IOTA AS-076), WX5L/C (Chandeleure Is, Louisiana, IOTA NA-089, ZF2SQ/ZF Bon Little Cayman, RX1AD for Kotlin Is, VE7IM Vancouver Island, CE7OXA Chiloe Is, VP5/W4BAI, HS8E Phuket, 4F2BP Luzon, KA2SJJ/VE8 Baffin Island, ZD7CTO, GM0OWE/M (Great Cumbrae Island), GU0HRY, SV5DDDS (Rhodes) and 8Q7AD. Unless my geography is badly off, every blooming one of 'em an island. And, amusingly, at the right time I was passing Great Cumbrae, but on the wrong band!

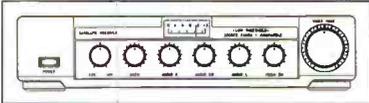
Bringing up the rear, **Leighton Smart** has been operating on his Marconi antenna again, it is now 61m long and so it is hooked on Top Band c.w. TK/DL8NBH for a new country, ON5SH and F5TGR/P, plus sideband with DL6UDX, EI7A, G0DRA and G4JIA. Turning to Eighty, c.w. was entered from DL7VUO, G0UPS, LY2BO, 4R0S, plus GM3TTW on sideband. Finally, up on 10MHz the c.w. mode found 8P8GU for another new one, plus S59AA. What's so special? All low-power addicts.

Finale

That's it for now. The deadline is to arrive at the beginning of the month, as usual, and I would appreciate it if you would mark your letter with the letters 'SWM' and the date you wrote. Address, as always, to me at PO Box 4, Newtown SY16 1ZZ. That way there's no risk of me accidentally using your letter for the previous month, or in the wrong column!

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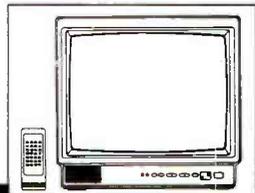
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Reflections

Welcome to my new column, Reflections, where I hope to have something each month that will interest and please as many of you, our readers, as possible.

Radio Signals

The abnormal propagation of radio signals is a subject close to the hearts of the vast majority of short wave enthusiasts. It doesn't matter whether your interest is in the reception of sound or vision, on the h.f., v.h.f. or u.h.f. bands, there are times when a natural disturbance, somewhere in the earth's atmosphere, will cause a signal from afar (DX) to arrive at your antenna. That's where the fun of radio communications begins when you are hearing, seeing or contacting a station that's way outside of its normal range.

Astronomy and Radio

With the rapid advance of technology in recent decades, the sciences of astronomy and radio communications have moved closer together. Let's try and make this easier to understand.

The visual astronomer, equipped with good binoculars or a telescope, studies the movement, structures and beauty of the planets in our solar system and/or the stars and galaxies in outer space. These heavenly bodies are seen by the astronomer, on a clear dark night, because of the light they emit themselves, in the case of the stars, or by the amount of sunlight their bodies reflect in the case of the planets. Sounds straight forward, but the stars, like our sun, are very complex nuclear furnaces and many of them also emit waves that can be detected, here on earth, within the radio frequency spectrum. And that's the specialised field of the radio astronomer that we will talk more about as this series continues.

Last, but by no means least, comes the DXer who listens for signals that have been deflected or

reflected by an auroral display, various regions of the ionosphere, decaying meteor trails and a disturbed troposphere.

Solar

Each month I hope to have reports about the activity of our own special star, the sun, from a variety of dedicated observers. Looking back to the solar eclipse on May 10, **John Locker** (Newton), whose main interest is based around multi-satellite TV, told me, "I saw the whole thing from three different view points, via satellite TV! Firstly, a Reuters feed via Intelsat 1C at 21° West, this was a re-feed from NASA. Then I got a glimpse of the start, here in Wirral and finally a one hour feed from a German TV crew who left the camera running for the whole event!, **Fig. 1**". Thanks for that John, it certainly shows how valuable the satellite TV service is to the whole world. I don't think any of us who heard the 'bleeps' of Sputnik 1, around 20MHz, back in October 1957, fully realised how space communications would develop and become a service to all mankind.

At his observatory in Bristol, **Ted Waring**, using a projection system, counted 12 sunspots on June 10 and 8 on the 15th. He also saw two active areas crossing the central meridian on the 13th. Although **Patrick Moore** (Selsey) found his solar projection screen blank on June 18, 19, 22, 24, 25, 27 & 28, he saw an interesting group of sunspots at 1310 on the 30th which developed further by 0630 on July 1, **Fig. 2**.

In June, **Ron Livesey** (Edinburgh), using a 2.5in refractor telescope and a 4.0in projection screen, located one active area on the sun's disc on days 7, 8, 28, 29 & 30 and two, from the 9th to 13th inclusive.

Auroral and Magnetic

The magnetometers used by **John Fletcher** (Tuffley), **Tony Hopwood** (Upton-On-Severn), **Karl Lewis** (Saltash), **Ron Livesey**, **David Pettitt** (Carlisle) and **Tom Rackham** (Goostrey) between them recorded some disturbance to the earth's magnetic field on June 1-7, 10, 12, 13, 19, 20, 22, 23, 25, 26 & 28-30. In addition to gathering magnetic data

from the people listed above, **Ron Livesey** is also the auroral co-ordinator for the British Astronomical Association. One of Ron's observers **Jay Brausch** (Glen Ullin, North Dakota) reported seeing auroral 'glow' during the overnight period on June 4/5, 6/7, 25/26 and 29/30, 'quiet arc' on 11/12, 'rays' on 5/6, 17/18, 26/27 and 28/29 and 'pulsating activity' on 3/4 and 10/11.

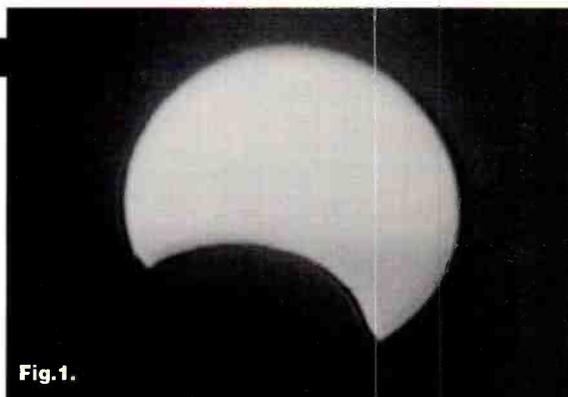


Fig. 1.

Fig. 2.



Sporadic-E

Sporadic disturbances in the E region of the earth's ionosphere were frequent in June. In Basingstoke, **John Woodcock** noted openings in Band I (48-68MHz), for varying periods on days 12, 14, 15, 17, 20, 22, 25 & 26. At times he watched programmes from Italy (RAI), Russia, Spain (TVE) and Yugoslavia (JRT). Signals were so strong around 1800 on the 22nd that he could get a DX picture with just a metre of coaxial feeder in the antenna socket. John also noted that when the Barcelona beacon (EA3JA) on 28.250MHz could be heard TV pictures from that area were received in Band I.

During an opening on the 20th, **Arthur Grainger** (Carstairs Junction) identified the following stations, in Band II, by their RDS and radiotext, from France, Info (104.7MHz), Culture (98.8MHz), Musique (89.2MHz) and RFM (104.1MHz) and from Italy, RAI MF2 (93.7MHz), RAS OE2 (103.3MHz), Radio Radicale (88.6MHz), Radio Dimensione Suono (103 and 105MHz) and RRI on 103.4MHz.

On June 25 and 26, **Richard Bell** (Melton Mowbray) received programmes, including a church service, fashion show, news (Telediaro) and weather, from Spain's TVE1. During the afternoon of the 26th he added Italy (RAI UNO) and, in the evening, he saw, what looked like a documentary, with a large '1', in a square, **Fig. 3**, in the bottom right hand corner of the picture. Richard saw World Cup football from an unidentified source, with the letters 'PTJ' in the top left hand corner on June 25 and on July 2, he received a film with possibly 'TBK' in the bottom right plus a film from another station with the figure '1' in the top right hand corner.

North of the border, **David Glenday**, using a loft dipole, received pictures in Band I on May 31, June 1, 2, 15, 30 & July 2. Spread through those days he logged programmes andidents from Czechoslovakia (NOVA), France, Germany (ARD1), Italy (RAI UNO), Poland (TVP1), Portugal (RTP1 with 'C1' on screen), Russia (1st Network, football and a big '1' on screen), Spain (TVE1), Switzerland (DRS) and some unidentified programmes from Scandinavia. He also saw the caption 'WERBUNG' that he thinks came from Austria (ORF1) on Ch. E2A (49.75MHz).

Also on the 25th, **John Scott** (Glasgow) noted that the 28 and 50MHz amateur bands were open during the late afternoon.

Weather

"The best of the weather up here was enjoyed in the first part of the month," wrote Arthur Grainger at the end of June. "The barometer went up and down like a see-saw," he added and kindly sent a graph of his atmospheric pressure readings for the period May 27 to June 25. If you now compare Arthur's chart, **Fig. 4**, with the one recorded on my barograph, **Fig. 5**, beginning one day earlier, we can see the difference in pressure, at a given time, between Scotland and the South of England.

In June, I recorded 1.18in of rain compared with 2.59in for the same period in 1993. The heaviest falls of 0.45in and 0.40in came on the 4th and 25th respectively. The latter was due to a thunderstorm accompanied by some spectacular fork lightning.

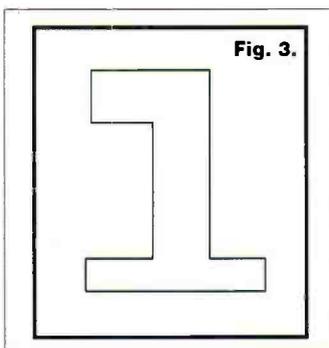


Fig. 3.

Fig. 4.

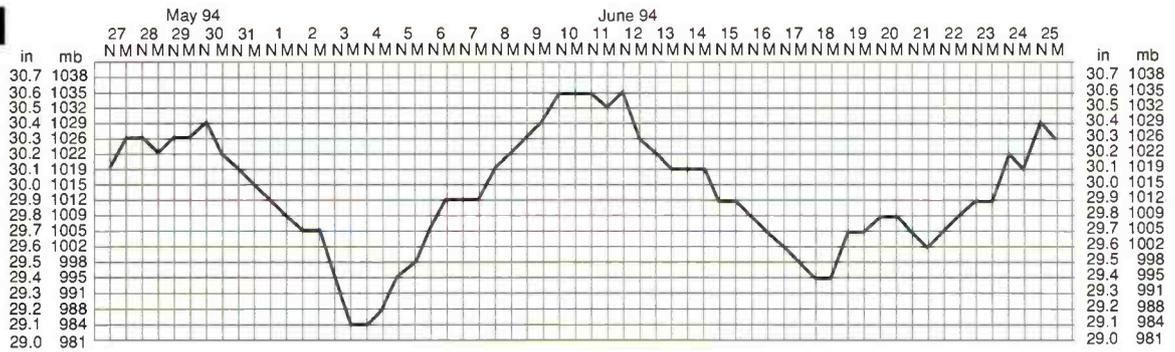
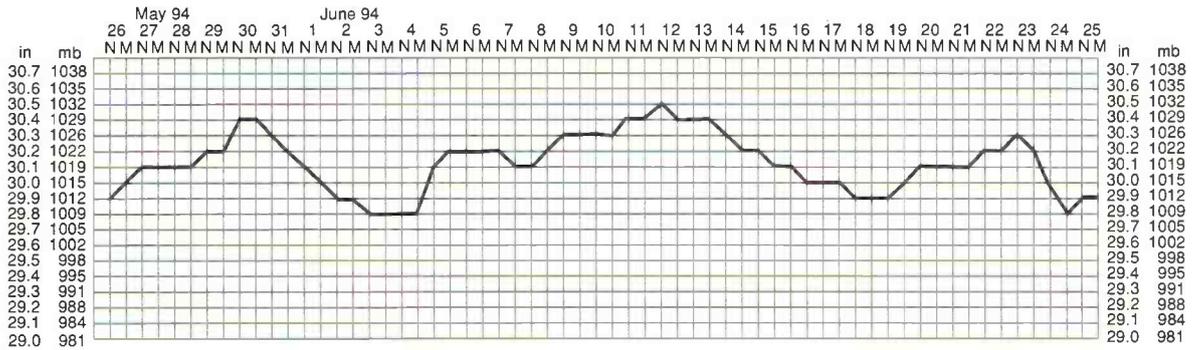


Fig. 5.



The weather had been hot still and 'muggy' all day until the late afternoon when black clouds approached us from the west. As the storm began there was a sudden

gust of strong wind and then the temperature started to decline. An early warning of this came at midday on the 23rd when a bright solar halo was visible in our atmosphere.



Fig. 6.



Fig. 7.



Fig. 8.

Tropospheric Openings

Pictures on Ch. E6, in Band III and strong co-channel interference on stations in the u.h.f. band were observed as the high atmospheric pressure was falling during the evening of June 27 and the early hours of the 29th.

Tim Bucknall (Congleton) had a good cross country haul on the u.h.f. bands in June. He logged Anglia and Central South TV, via the Sandy Heath and Ridge Hill transmitters respectively on the 7th, BBC1 from Belmont on the 10th, RTE2 on the 11th and Border TV on the 12th. He added signals from Sandy Heath on the 15th, Pontop Pike (16th), Divis (17th), Crystal Palace (18th), Emley Moor, Oxford and The Wrekin (19th), Hannington (20th), Mendip and Waltham (21st) and Belmont, Macclesfield and Caldbeck on the 27th.

On the 12th, David Glenday received good pictures in Band III from 'RTE'.

Band II and high quality sound is Arthur Grainger's specific interests. He replaced his existing gear with a Pioneer F-502RDS tuner that can receive radiotext in lines of up to 64 characters. This provides programme details including the names of the presenters. In addition to good sensitivity the new set-up has narrow band selection which means that Arthur can now hear Hallam FM, TFM and Wear FM permanently instead of on an occasional basis. While the high pressure system was over Ireland, Arthur logged FM104 from Dublin for the first time and RTE2FM on May 30 and, on June 11 and 12, he again heard FM104, plus Downtown Radio, Q102, Radio Ulster and RTEFM3. Also on the 11th he logged Radio Nan Gadheal (104.9MHz), a Gaelic station from Skye, in stereo, and Horizon Radio (103.3MHz) from Milton Keynes.

During the month **George Garden** (Edinburgh), noting a high pressure of 30.5in and the warm weather decided to check Band II for

DX. He connected a pre-amplifier between his rooftop antenna and his Sony ICF-2001D, turned the antenna south-west and identified the signal of Radio Cymru, around 104.3MHz, coming from their transmitter in Llangollen in north-east Wales. At this point George drove his car to higher ground, near Tranent and with his Panasonic car radio heard a fading signal on 103.6MHz which turned out to be Radio 4 from the Llanddona transmitter in Anglesey.

SSTV

In June, John Scott found the 14MHz band 'poor to great' with signals, at times, "fading and rising". Despite this, he copied slow-scan television pictures from stations in Hungary, **Fig. 6** and Italy and the International Telegraphic Union's station 4U1TU exchanging video with an amateur in Holland, **Fig. 7**. I think that the point John made about band conditions is borne out by the amount of 'horizontal line' interference on both **Figs. 6** and **7**. Somewhat different to the strong clear v.h.f. picture that he received on 144.5MHz, from GM8HGT, **Fig. 8**. John tells me that German stations taking part in a SSTV net were active during the early evenings, around 3.730MHz, on most days in the month and that the 144MHz band has been 'buzzing' with slow-scan activity.

During the month prior to July 6, **Robert Powell** (Mablethorpe) received SSTV pictures, in colour, from stations in France, Germany, Hungary, Italy, Spain, Sweden, Switzerland, USA and Wales. Robert detects the slow-scan pulses on a Realistic DX300 receiver, fed by a two-element beam for the h.f. amateur bands, followed by a MFJ 1278B multi-mode converter. He also uses an IBM 386SX-16 computer, with Multicom V3.1 and JVFAX V6.0 software. He kindly sent me samples of the pictures he logged on a 3.5in floppy disc in .GIF format. These I resolved on my computer using the Pressworks DTP package.



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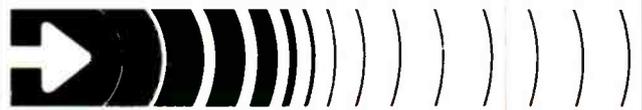
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Satellite TV News

The Latest from the Clarke Belt

For those satellite zappers that are also into football then you'll have had a ball these past few weeks with the World Cup games across the USA being back-linked into Europe. Apart from football feeds on Intelsats' 601 at 27°W uplinked from the 'States in C Band (4GHz) and cross strapped into a Ku band downlink for Europe, there have been the pan-European distribution feeds via the EBU leased circuits on Eutelsat II F4 7°E and yet more football relays on the dedicated DTH/cable programme downlinks from the broadcasters.

With football feeds uplinking from all over the 'States so there have been numerous localised teleports with their own unique identifications which have added spice to an otherwise boring period of football - that is if you dislike football! 'Dallas Fort Worth Teleport' has quite a dramatic ring, certainly more than the London Teleport on the Isle of Dogs.

An alternative to the noble art is golf and Intelsat K at 21°W seems to have remained aloof from footie and concentrated on various golf tournaments. Late June into July saw the Ford Senior Players Championships from Deerbourne, Michigan and the PGA Tour Motorola Western Open tournaments - the Eastbound circuit using NTSC 525 lines system M standards with both programme circuits.

Politics during this balmy Summer continued as ever with the Italian G7 Summit in Naples and the controversial European Commission talks in Corfu.

'Cable Plus', the Czech cable feed has experienced an active life this past few weeks. Normally resident on the 11°W Gorizont at 11.525GHz the programming ceased only to reappear amongst the EBU leases on Eut. II F4 at 7°E, largely in the clear. At the same time the Reuters Moscow Bureau circuit normally on the 14°W Gorizont (though in recent times lacking) transferred to the now vacated 11°W bird. Obviously negotiations for a cheaper downlink succeeded and Cable Plus departed 7°E and popped up on the 40°E Gorizont. This *status quo* didn't last too long! A new Gorizont craft (it's suspected) became operational at 14°W, the predecessor at 14°W thought to have succumbed to the dreaded inclined orbit syndrome. Reuters moved back home to 14°W and Cable Plus deserted 40°E for life back on the range at 11°W.

The new Intelsat 702 which launched earlier mid June and destined to replace 512 at 1°W has been seen testing at 37°W with carriers and telemetry though as of

mid July no pictures. The new 702 bird carries 26 C Band and 10 Ku band transponders.

Aidan Murphy (Co. Meath, Eire) logged an Intelsat K (21°W) news feed of a simulated aircraft hi-jacking with the Soviet Special Forces carrying out the rescue - 'these boys know their stuff and I take pity on any terrorist organisation who feel like hijacking a Russian plane' comments Aidan! Aidan has been watching the nighttime BR BSF-3 space footage on Astra, these are NASA and Russian videos showing space launches, shuttles etc. and run from approx. midnight through to the early hours on Astra.

La Chaine Info, the rolling news service of the TF1, France is now on-air, check out Telecom 2B at 5°W - 12.585GHz horizontal and audio 6.6MHz - not as I earlier suggested a shopping channel! The channel hit air June 24 last in clear SECAM.

One of my contacts in Bahrain advises that Saudi Arabia has now banned the use of home dish systems enforced with the threat of a heavy fine and/or imprisonment for non compliance. Since the satellite company Orbit (that now transmits across the Middle East) is partly backed with Saudi cash, the ban is an odd decision. Decoders for the digitally compressed service are rumoured to be costing \$10 000 each + subscriptions after the first year, take up for Orbit in Saudi at least could be very limited. I have also heard the rumour that Iran has banned home satellite dishes though it's yet to be confirmed.

And from **Bandula Gunasekera** (Colombo) is the report of great success with a simple u.h.f. TV satellite circuit that is being made by fellow enthusiasts in both South India and Sri Lanka. There are currently two satellite TV services receivable from Ekran/Gorizont satellites at 99°E in Group B on relatively simple equipment, I hope next month to feature the circuit to inspire other Middle and Far Eastern readers to 'have a go'.

July 1 saw Yasser Arafat the Palestinian leader return to Gaza City after 27 years of exile. Scenes of rejoicing as Yasser entered the town, the events being covered by the TV media circus. Eutelsats II F1 and 3 were widely used for SNG circuits in both PAL and NTSC. Unfortunately the rejoicing of early July changed to violence and riots mid month - once again the SNG trucks fired up from Gaza.

Baby Abbie hit the headlines following her kidnapping and return 10 days later, numerous feeds both 1

and 2 ways were carried from Nottingham, outside the hospital and various news conferences. Many of the UK national events are satellite linked via Eutelsat I F4 at 25°E, a slot masked completely to me by trees. I'm grateful to **John Locker** (Wirral) for keeping me advised of what I'm not seeing!

One mystery signal logged here July 15 on Intelsat 601 at 27°W was the caption 'Reserved for United Artists Programming' at 11.055GHz horizontal late evening. There have been no media reports to date as to what United Artists may be offering.

It's been a busy month with many news circuits and unusual signals. It demonstrates what a varied selection of signals there are from space, there is life after Astra!

Satellite News

Recent negotiations by Star TV in Hong Kong have secured the TV transmission rights over 10 years to show selected matches from the Chinese National Football League. Up to a dozen matches will be shown during 1994 with over 20 next season, kick-offs being tabled for 1815 Hong Kong time to meet peak viewing times on the Prime Sports satellite network. It's likely that the Chinese football matches will appear on Sky Sports due to the majority interest that Rupert Murdoch owns in Star TV.

The Russian Federation has now been accepted as a full member of the Eutelsat organisation making the roll call to 41 countries. Russia intends to increase use of the Eutelsat fleet with radio/TV distribution and for programme/news exchanges.

With Poland being one of the most avid satellite viewing countries of the former Eastern Europe, Filmnet is introducing a dedicated Polish movie channel over Astra from October 1 using Videocrypt II as part of the MultiChoice programme package. If successful, then other former Eastern European countries may come aboard the package with dubbed audio subcarriers. With the present Astra fleet all but fully booked, Filmnet-Polish transponder capacity is likely via the late August launching Astra 1D. It is known that Canal Plus are also seeking an involvement with a Polish TV service and intend to offer a general entertainment service from early December on both satellite and cable.

The satellite trade is throbbing with the news of a News Datacom/Sky sting in which hackers were sold seemingly active series 09



Homestead Teleport control, via PanAmSat - PAS-1 45°W during the Dallas football extravaganza. John Locker, Wirral



Tape roll instructions via Intelsat 601 27.5°W. John Locker, Wirral



Eutelsat I F4 25.5°E now carries the BBC Arabic World Service into Rome for Orbit Middle East. John Locker, Wirral



Another news feed via 16°E carrying newsreel of rioting in the Gaza Strip. Roger Bunney

master cards (from which the pirate trade would mass produce copies) at exchange sums thought approaching £2 million total - one pirate is thought to have paid over £100 000! Once the pirates had produced several hundred thousand cards Sky enacted ECM (electronic counter measures) that knocked out all the pirate cards instantly.

The Flat Antenna Company Ltd. of Stanstead, Essex, have produced a 3m square flat C Band antenna that it is claimed has a gain similar to a standard dish of same dimension, the advantage of the flat position is reduction of potential terrestrial interference. The flat plate can lay flat on the ground or tilt up to maximum 20°. The low profile makes it of interest to the Middle East states that have banned conventional dish antennas.

NTL are to uplink a 2-channel C Band service for the UK's MBC Arabic service at the MBC studio facility in London. On-air date is thought mid-November.

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Many Radio Amateurs and SWLs are puzzled. Just what are all those strange signals you can hear but not identify on the Short Wave Bands? A few of them such as CW, RTTY, Packet and Amtor you'll know – but what about the many other signals?

HOKA ELECTRONICS HAVE THE ANSWER! There are some well-known CW/RTTY decoders with limited facilities and high prices, complete with expensive PROMS for upgrading etc., but then there is CODE3 from Hoka Electronics! It's up to you to make the choice – but it will be easy once you know more about Code3. Code3 works on any IBM-compatible computer with MS-DOS 2.0 or later and having at least 640K of RAM. The Code3 hardware includes a digital FSK Converter unit with built-in 230V AC power supply and RS232 cable, ready to use. You'll also get the best software ever made to decode all kinds of data transmissions. Code3 is the most sophisticated decoder available and the best news of all is that it only costs £329!

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- Sitor – CCIR 625/476-4, ARQ, SBRS/CBRS FEC, NAVTEX etc
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- Autospec – Mks I and II with all known interleaves
- DUP-ARQ Artrac – 125 Baud Simplex ARQ
- Twinplex – 100 Baud F7BC Simplex ARQ
- ASCII – CCITT 5, variable character lengths/parity

- ARQ6-90/98 – 200 Baud Simplex ARQ
- SI-ARQ/ARQ-S – ARQ1000 simplex
- SWED-ARQ/ARQ-SWE – CCIR 518 variant
- ARQ-E/ARQ1000 Duplex
- ARQ-N – ARQ1000 Duplex variant
- ARQ-E3 – CCIR 519 variant
- PDL-ARQ – 100 baud Duplex ARQ
- TDM242/ARQ-M2/4-242 CCIR 242 with 1/2/4 channels
- TDM342/ARQ-M2/4 CCIR 342-2 with 1/2/4 channels

- FEC-A – FEC100A/FEC101
- FEC-S – FEC1000 Simplex
- Sports Info. 300 Baud ASCII F7BC
- Hellscreiber – Synch./Asynch.
- Sitor RAW – (Normal Sitor but without synchronisation)
- ARQ6-70
- Baudot F7BBN
- Piccolo Mk6 12 tone/ASCII mode – coming soon!
- GMDSS 100 Baud system – coming soon!

All the above modes are pre-set with the most commonly seen baudrate setting and number of channels which can be easily changed at will whilst decoding. Multi-channel systems display ALL channels on screen *at the same time*. Split screen with one window continually displaying channel control signal status e.g. idle Alphas/Beta/RQs etc, along with all system parameter settings e.g. unshift on space, *Shift on Space*, multiple carriage returns inhibit, auto receiver drift compensation, printer on, system sub-mode. Any transmitted error correction information is used to minimise received errors. Baudot and Sitor both react correctly to third shift signals (e.g. Cyrillic) to generate ungarbled text unlike some other decoders which get 'stuck' in figures mode!

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Maritime Beacons

The long hours of daylight during April, May and June discouraged many listeners from waiting for the sky waves from distant beacons to arrive after dark. However, those who did manage to stay awake and search the band were rewarded.

Eight beacons, which were inaudible during daylight, were logged by **Steve Cann** (Southampton) during the only night he stayed up to search the band. They included Punta D.Penna, Italy (TL) 314.5; Cala Figuera, Majorca (FI) on 286.5; also the Faroes beacons at Akraberg (AB) 381.0 and Noslo (NL) 404.0.

The Akraberg beacon (AB) was also received after dark by **Robert Connolly** in Kilkeel. He picked up the sky waves from several beacons around the coast of Iceland at night, but his reception of the beacon at Prins Christians Sund, Greenland (OZN) on 372.0 was quite remarkable.

All of the entries in the log from **Peter Rycraft** (Wickham Market) were received after dark. He was a little disappointed that only one Icelandic beacon could be heard (Grimsey Lt (GR) on 308.0) and there was no trace of the Greenland beacon (OZN). While staying in Appleby, **Clare Pinder** picked up the sky waves from the Cabo Villano beacon in N. Spain (VI) on 290.5 at 2330UTC. She says, "This is an excellent way to check my progress in learning Morse!".

The move from Iceland to Aberdeen by **Geoff Crowley** has brought many beacons within range! His initial exploration of the band was after dark, when he logged quite a few of the Scandinavian beacons and some along the coastline of France and Spain.

By listening during the early morning, in the evening and at night, **Jim Edwards** (Bryn) was able to compile an extensive log! He heard for the first time the Latvian beacons on 312.5 at 0245. Another new one for him was Cabo San Sebastian, S. Spain (SN) on 291.0, which he logged at 0445. The beacon at Baltijsk, Latvia (BK) on 312.5 was also noted in an interesting log from **John Eaton** in Working.

In an attempt to improve his results **Tom Smyth** (Co.Fermanagh) walked up a local mountain! He says, "Although I enjoyed the scenery I did not pick up any more beacons". Several of the beacons in his list were logged during daylight, but his reception at night of the beacon at Ile de Giraglia Lt, Corsica (GL) on 305.0 suggests that further checks after dark may be worthwhile.

The beacon at the Butt of Lewis (BL) on 289.0 was mentioned in the report from **Kenneth Buck**. He says, "This was a good signal here until six months ago but I have not heard it since December". There was no mention of it in the latest reports, so perhaps it has been closed down. Any information about it would be very welcome here.

Freq kHz	Call-sign	Station Name	Location	DXer	Freq kHz	Call-sign	Station Name	Location	DXer
284.5	LA	Lizard Lt	S. Cornwall	A,B,C,D,F,G,H,J,K,L,N,P*.W,X,Z,1	302.0	RB	Cherbourg Ft W Lt	France	C,D,PZ,1
284.5	MA	Cabo Machichaco	N. Spain	D*.E*.WZ	303.0	D	Rota	SW. Spain	D*.G
285.0	ND	Cabo de la Nao Lt	S. Spain	H*	303.0	FB	Flamborough Hd Lt	Yorkshire	B,C,D,E*.G,H,I,J,L,O,PR*.S.T*.W,X,YZ,1
285.0	NP	Nieuport W. Pier	Belgium	D*.FHZ					B.D*.H
286.0	TR	Tuskar Rock Lt	S. Ireland	A,B,C,D,H*.I,J,K,L,M,N,O.T*.W,X,YZ	303.0	FV	Falsterboev Lt	Sweden	C.D*.E*.H,K,W,YZ
286.5	AL	Almagrundet Lt	Sweden	D*.G*.S.T*	303.5	BJ	Ile d'You Main Lt	France	B.D*.H*.T*
286.5	BY	Baily Lt	S. Ireland	D.L.V.W	303.5	FN	Bjornund Lt	Norway	B
286.5	FE	Cap Frehel Lt	France	H*.W	303.5	IA	Feistein Lt	Norway	D*.HZ
286.5	FI	Cala Figuera	Majorca	C*.D*	303.5	VL	Vieland Lt	Holland	C.D*.H,S,X,YZ,1
286.5	FT	Cap Ferret Lt	W. France	C,D,E*.H.T*.Z	304.0	PS	Pt Lynas Lt	Anglesey	A,B,C,D,H,J,L,M,N,P*.S*.W,X,YZ
286.5	FK	Inchkeith Lt	F of Forth	D*	304.0	SB	Sumburgh Hd Lt	Shetland Is	G*
287.3	HA	Haifa Lt	Israel	D*	304.5	GY	Castle Breakwater	Guernsey	U
287.3	IB	I. Berlenga	Portugal	D*	304.5	MY	Cabo Mayer Lt	N. Spain	D*.Z
287.3	JA	Jaroslaviec	Poland	D*	305.0	FP	Fife Ness Lt	SE. Scotland	B,D,E*.H,I,J.T*.WZ
287.5	DO	Rosedo Lt	France	D*.T*	305.0	GL	Ile de Giraglia Lt	Corsica	D*.V*
287.5	FR	Faerder Lt	Norway	B,D*.H*	305.5	AL	Pt d'Alilly Lt	France	A,C,D,G*.H,I,J,K,PR*.S.T*.U.X,YZ,1
287.5	MD	Cabo Mondego	Portugal	D*					D*.H
287.5	SE	Sete Mt St Clair	S. France	D*	305.7	DA	Dalatangi Lt	Iceland	K.Z
288.0	SH	Hoek van Holland	Holland	D.T*	306.0	EC	Elizabeth Castle	Jersey	B,C,D,I,J,L,M,W,Z
288.0	KL	Skinna Lt	Norway	D*	306.0	FN	Walney Is Lt	Off Lancs	B.E.D.
288.0	DM	Did Hd of Kinsale	S. Ireland	C,J,M,N,O,W	306.0	TN	Thyboron	Denmark	B,C,D
288.5	YI	Cabo Finisterre Lt	NW. Spain	D*.H.W	306.5	GJ	Le Grand Jardin Lt	France	H
288.5	FM	Ulmuiden Front Lt	Holland	B,D,E*.H*.S.T*.X,YZ	306.5	KL	Kolkasrags	Estonia	D*
289.0	BY	Baily Lt	S. Ireland	B,C,D,H,J,K,L,M,N,O,V,Z	306.5	KR	Kubassaar	Estonia	D*
289.5	KY	Oksoy Lt	Norway	D*	306.5	MV	Morzhovskiy	Arctic	H*.Z
289.5	LO	Landsort S Lt	Sweden	D*.H.S*	306.5	DR	O. Dussusaar	Estonia	D*
289.5	MN	Hammerodde	Denmark	D*.H*.O	306.5	RS	Ristna	Estonia	D*
289.5	SN	Ile de Sein NW Lt	France	C,D*.E*.H*.V*.X.Z	306.5	SY	Sorve	Estonia	D*
290.0	BS	Port en Bessin Lt	France	Z	306.5	UT	Utsira	Norway	B,C,D*.E*.G*.H*.I.J.T*.Z
290.0	FD	Fidra Lt	F of Forth	B,D*.E*.G.W.Z	307.0	GL	Eagle Is Lt	Ireland	B,C,H,M,N,W
290.5	DY	Duncansby Hd Lt	NE. Scotland	D.T*	308.0	GR	Grimsey	Iceland	T*
290.5	SB	S. Bishop Lt	Pembroke	A,B,C,D,F,G,H,J,K,L,M,N,O,P.T*.W,X,YZ,1	308.0	RC	Cabo Roca	Portugal	C.H.T*.W
290.5	VI	Cabo Villano Lt	N. Spain	C,D,E*.G*.H*.P*.Q*.T*.V.W,X,Z	308.0	RD	Roches Douvres Lt	France	A,C,D,G,H,J,K,PX,Z,1
291.0	SN	Cabo San Sebastian	S. Spain	D*.E*	308.5	NZ	St Nazaire	France	C.D.H*.Z
291.5	OR	Orsakar Lt	Sweden	D*.E*	308.5	BA	Punta Estiaca Bares	N. Spain	C.D*.G*.H,K,S*.T*.V*.W.Z
291.5	SJ	South Rock LV	Co. Down	A,B,C,D,F,G,H,J,L,M,N,O.T*.V,W,X,Z	309.5	MA	Marstein Lt	Norway	B.D*.E*.H.I.T*
291.9	AV	Aveiro	Portugal	D*.T*	309.5	WE	Wangerooge Lt	N. Germany	D*
291.9	LT	La Isleta	Canaries	D*.H*	310.0	ER	Pt de Ver Lt	N. France	C.D*.G,H,K,PX,YZ,1
291.9	MR	Montedor Lt	Portugal	D*	310.3	GV	Goltur	Iceland	H
291.9	NH	Punta Lantallia	Canaries	D*.H*	310.5	BD	Bokfjord Lt	Norway	D*
292.0	MA	Mahon, Minorca	Balearic Is	D*	310.5	BR	El Burullus	Egypt	D*
292.0	SJ	Souter Lt	Sunderland	B,C,D,E*.H,I,J,L,O,W,YZ	310.5	SG	Sjallands N Lt	Denmark	B.D*
292.0	TD	Torungen Lt	Norway	B	311.0	GD	Girdle Ness Lt	NE. Scotland	B.D*.E*.L.W
292.5	SM	Pt St. Mathieu Lt	France	C,D,G*.H,J,K,O,R*.T*.X,YZ,1	311.0	NF	N. Foreland Lt	Kent	C.G*.H,K,PR*.S.T*.X,YZ,1
293.0	CP	St. Catherine's Lt	I.O.W.	A,C,F,G,H,K,O,PR*.S*.T*.X,YZ,1	311.5	LP	Loop Hd Lt	S. Ireland	A,D,H,M,N,W
293.0	RN	Rhinns of Islay Lt	Is of Islay	B,D,E*.L.V.W	312.0	HD	Tennholmen Lt	Norway	D*
293.0	SY	Svinoy Lt	Norway	D*	312.0	OE	Oostende	Belgium	C.D*.G*.H,K.S.T*.X,YZ
293.5	RO	Cabo Silleiro Lt	N. Spain	D*	312.0	UH	Eckmuhl Lt	France	D*
294.0	KU	Kullen High Lt	Sweden	B,D*.G.H*	312.5	AK	Akmenrags	Latvia	D*.H*
294.0	PH	Cap d'Alprech	France	C.D*.G,H,O.T*.X,YZ,1	312.5	BK	Baltijsk	Latvia	D*.G*.H*
294.5	BA	#Black Hd Lt	N. Ireland	D*	312.5	BT	Mys Taran Lt	Latvia	D*.H*
294.5	BM	Brighton Marina	E. Sussex	D*	312.5	CS	Calais Main Lt	France	D*.T*.X.Z
294.5	KA	Kaybolovo Lt	Estonia	D*	312.5	FV	Ostrov Belyy	SSR Arctic	H
294.5	KC	#Old Hd of Kinsale	S. Ireland	J	312.5	KA	Klaipeda Rear Lt	Lithuania	D*.H*
294.5	MH	Mohri Lt	Estonia	D*	312.5	LB	Liepaja	Latvia	D*.H*
294.5	NG	Pikasaare Ots	Estonia	D*	312.5	VS	Cabo Estay Lt	N. Spain	S.T*
294.5	PA	Pakrimeem Lt	Estonia	D*	312.5	VVV	Ventspils	Latvia	O*.H*
294.5	PS	#Pt Lynas Lt	Anglesey	D.G*.H.L	312.6	SR	Skardshfjara Lt	Iceland	D*.H*
294.5	PT	#Souter Lt	Durham	B,I,O	313.0	HA	Halten Lt	Norway	D*.T*
294.5	SN	Sletnes Lt	Norway	D*	313.0	PA	Cabo de Palos Lt	S. Spain	O*
294.5	UK	Sunk Lt V	Off Essex	C*.G.S.T*.YZ,1	313.0	PB	Portland Bill Lt	Dorset	A,C,D*.F,H,J,K,PR*.X,YZ,1
295.5	CB	La Corbiere Lt	Jersey, CI	A,C,D,H,J,YZ	313.0	TY	Tory Is Lt	N. Ireland	B,C,L,M,N,V,W
295.5	RE	La Rochelle	France	D	313.5	CM	Cromer Lt	Norfolk	B,C,G*.H,I,J,R*.S.T*.X,YZ,1
296.0	BH	Blavandshuk Lt	Denmark	B,C,D*.E*.G*.H,I,J,O,S*.T*.X,YZ	313.5	OG	Olands Sodra Grund	Sweden	D*
296.0	GR	Georee Lt	Holland	H,S,Z	313.5	PQ	Porquerolles	France	C*.D*.H*.U*
296.0	KN	Skrova Lt	Norway	D*	313.5	WB	Weser Pilot V.	Germany	D*
297.0	FG	Pt de Barfleur Lt	France	A,C,D*.F,G,H,I,J,K,O,PT*.X,YZ,1	314.0	HK	Helkingen Lt	Norway	D*.G
297.5	MA	Mantyluoto	Finland	D*	314.0	VG	Ile Viegre Lt	France	A,C,D,F,G,H,J,K*.LPT*.W,X,YZ,1
297.5	PS	Cabo Penas Lt	N. Spain	D.G.H*	314.5	SK	Strandhofn	Iceland	D*
298.0	GX	Ile de Groix	France	C,D*.H,S,X,YZ	314.5	TL	Punta D.Penna	Italy	C*.D*.E*.S*
298.0	TA	Cabo Gata	S. Spain	D*.1	315.0	SL	Sletterhage	Denmark	C*.D*.G*.H*.S*.T*.U,W,X,1
298.5	RR	Round Is Lt	Is Scilly	A,B,C,D,F,G*.H,J,K,L,M,PT*.W,X,YZ,1	316.0	IN	Ingolfshofndi Lt	Iceland	D*.G*
298.5	SV	Skagen	Denmark	B.D*.O	319.0	LEC	Stavanger	Norway	A,B,C,D,E*.G*.I,J,K,L,PR*.S.T*.V,W,X,YZ
298.8	DW	Djupvogur	Iceland	D*.H*	372.0	OZN	Prins Chris's Sund	Greenland	D*
298.8	HD	Hornbjarg	Iceland	D*	381.0	AB	Akraberg	Faroes	C*.D*.U*
299.0	AD	Ameland Lt	Holland	B,C,D,H,I,O,S*.X,YZ,1	404.0	NL	Noslo	Faroes	C*
299.0	BN	Les Baleines	W. France	D*.H					
299.0	O	Tarifa	S. Spain	D*					
299.0	UN	Understen Lt	Sweden	D*.H*					
299.5	NP	Nash Pt Lt	S. Wales	A,C,D,G*.H,J,K,M,N,T*.X,YZ,1					
299.5	SK	Skomvaer Lt. Rost	Norway	D*					
299.5	VZ	Utvaer Lt	Norway	B,D*.E*.H*.O.T*.Z					
300.0	MR	Mizen Head	S. Ireland	A,C,D,J,M,N,W,Z					
300.0	TU	Cap d'Amfiter Lt	N. France	C,G,H,K,PT*.X,YZ,1					
300.5	DI	Dungeness Lt	Kent	A,B,C,D*.G*.H,I,K,O,PR*.S.T*.X,YZ,1					
300.5	LA	Lista	Norway	D*					
301.0	CA	Pt de Creach	France	C,D,H,D,Z					
301.0	ER	Eierland Lt	Holland	B,D*.H,I,O,S					
301.1	HA	Pt del Hank	Morocco	D*					
301.1	RG	Raufarhoefn	Iceland	D*					
301.5	LD	Kinnards Hd Lt	NE. Scotland	B,C*.D*.E*.H,I,D,Z					
301.5	K	Torre de Hercules	N. Spain	D*.H.W					
301.5	OB	Hoburg	Sweden	D*.H*.T*					

Note: Entries marked # are calibration stations. Entries marked * were logged during darkness. All other entries were logged during daylight.

DXers:
 A: Darren Beasley, Bridgewater.
 B: Kenneth Buck, Edinburgh.
 C: Steve Cann, Southampton.
 D: Robert Connolly, Kilkeel.
 E: Geoff Crowley, Aberdeen.
 F: Bernard Curtis, Stalbridge.
 G: John Eaton, Woking.
 H: Jim Edwards, Bryn.
 I: David Edwardson, Wallsend.
 J: Jerry Haynes, Talgarth, Powys.
 K: George Millmore, Wootton, IOW.
 L: Albert Moore, Douglas, IoM.
 M: Sid Morris, Cwm Nantcol, Gwynedd.

N: Sid Morris, Weston Super Mare.
 O: John O'Halloran, Harrogate.
 P: Fred Pallant, Storrington.
 Q: Clare Pinder, Appleby.
 R: Peter Pollard, Rugby.
 S: Peter Pollard, Horing.
 T: Peter Rycraft, Wickham Market.
 U: John Sadler, Bishops Stortford.
 V: Tom Smyth, Co.Fermanagh.
 W: John Stevens, Largs.
 X: Malin Thorpe, Tonbridge.
 Y: Philip Townsend, E. London.
 Z: John Wells, E. Ginstead.
 1: Peter Westwood, Farnham.

SSB Utility Listening

HF Sideband

I recently received a letter asking me to provide a listing of NDBs (Non-Directional Beacons) that can be heard between the top of the l.w. and bottom of the m.w. portions of the h.f. spectrum. These NDBs transmit their identification in Morse code every few seconds, and are mainly used by aircraft for navigation, but they do make excellent propagation indicators. I thought long and hard about mentioning these, as they are not really s.s.b. signals, but they certainly can be considered 'utility signals'. Once I started to compile the listing, I soon realised that those in Europe are enough to fill this page, so instead I am going to recommend some books which list them.

The first of these is the *RAF En-Route Supplements* covering the UK and Europe. Actually, there are three books in the series that cover the whole of Europe -

British Isles, Northern Europe and Southern Europe. Towards the back of each book is a long list of navigational aids, listed in alphabetical order - the NDBs are listed within this section. A typical entry for an NDB reads **OE London/Heathrow NDB 389.5 N51 27.92 W000 20.43**, which indicates that beacon **OE** refers to **London/Heathrow Airport**, it is an **NDB** beacon operating on a frequency of **389.5kHz**. The final set of figures are a set of accurate latitude/longitude positions for the beacon. In fact, this particular beacon is quite special, as there is an almost identical beacon **OW** operating on exactly the same frequency just a few miles further west - this pair of beacons are markers for the runways at Heathrow, one to the east (**OE**) and one to the west (**OW**). This book (or 'books' if you get all three) is available from: 1 AIDU,

The first visit of a C-17A Globemaster to Europe, at RAF Mildenhall during late May 1994. The aircraft is medium grey with a yellow band across the fin. (Graham Tanner)



RAF Northolt, West End Road, Ruislip, Middlesex HA4 6NG. I do not know the current price for these books, but a few years ago they cost about £10 each. Fortunately, NDBs do not change too often, so you won't need to buy a new copy too often.

The second book that I can recommend is the *Europe & Middle East Supplement* available from British Airways AERAD. In this book, there is a section that lists all the navigational and communication aids at every airfield and airport in the area covered by the book. These are listed in alphabetical order, so you will have to search through the whole section extracting the NDB information as you go.

One benefit of this particular book is that it contains an excellent list of h.f. VOLMET stations and frequencies, as well as listings for Speedbird London, Stockholm Radio and Portishead Radio. This book is available from: AERAD Customer Services (S464), British Airways PLC, PO Box 10, AERAD House, Heathrow Airport, Hounslow, Middlesex TW6 2JA. Each copy costs £10, plus £1.15 for post and packing.

The latest edition of this latter book also contains a diagram of the North Atlantic Track (NAT) system, along with all the frequencies assigned to each NAT system. The NAT system now contains six areas, labelled 'A' to 'F', with 'F' having recently come into operation. As I have not mentioned these before, and they are always worth a regular mention, here are the six areas with their assigned frequencies (in MHz):

(current from 26.4.94)
 NAT-A: 3.016, 5.598, 8.825, 8.906, 13.306 & 17.946
 NAT-B: 2.899, 5.616, 8.864, 11.279, 13.291 & 17.946
 NAT-C: 2.872, 5.649, 8.879, 11.336, 13.306 & 17.946

NAT-D: 2.971, 4.675, 8.891, 11.279, 13.291 & 17.946
 NAT-E: 2.962, 6.628, 8.825, 11.309, 13.354 & 17.946
 NAT-F: 3.476, 6.622, 8.831 & 13.291

As we are currently at the bottom of the sunspot cycle the lower frequencies in each set are being used. As we start the long climb back to the top of the cycle, the higher frequencies will be used once again.

Globemaster

This month's photograph shows an example of the new C-17A Globemaster operated by the USAF. They are designed to replace the C-141 Starlifter and (partially) the C-130 Hercules. This particular aircraft was 'snapped' at the RAF Mildenhall airshow during late May, on its first visit to Europe. It arrived on 25.5 using the callsign 'Reach 23291' (did anyone hear it on h.f.?).

Another two C-17A Globemasters visited the UK during early June, 'Reach 807GU' on 2.6 and 'Reach 807NG' on 3.6. If anyone can send in a months worth of h.f. logs including the above flights, I will send them a print of the above photograph.

Hurricane

I recently came across a huge list of h.f. loggings that are likely to be used during the Hurricane Season in the USA. Since we are now in the middle of that season, the chances of these frequencies being used are very high. The list originates from the USA, but many readers send in logs that include hurricane related traffic, so the signals can certainly be heard on this side of the Atlantic. The list is too large to include in this page, but if you send me a stamped s.a.e. I will forward you a copy of the list.

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

- 4.742 'Riendeer 2' working Architect, reporting that they were approaching RAF Odiham, and were 'closing down on h.f..
- 5.616 USAF B-52 'Jambo 11' working Shanwick, reporting descending to 5000ft heading west-bound for their 'exercise area'. Shanwick asked 'Jambo 11' to contact Croughton on 11.176MHz and 'Cajun Ops' on 11.150MHz. This was one of the B-52s temporarily based at RAF Fairford for exercise 'Resolute Response' during the first weeks of May.
- 5.685 RAFAIR 12M7 working MKL.
- 6.550 2 operators speaking English, but with foreign accents. One station used the callsign 'Coastguard 05'. On another occasion, station 'Coastguard 03' reported their position as 53 26N 002 57E.
- 6.647 Watchdog 94 working MAFF Base, passing the lat/long positions of 8 illegal fishing vessels. The same information was also passed to RN ship 'GUYW' (Fisheries Protection ship *HMS Guernsey*).
- 6.697 MKL advising an Italian unit, C6E, to close down on this frequency.
- 6.778 DHJ59 (German Navy, Wilhelmshaven) working ship DRHP and station 7TY.
- 8.903 CTM 9105 working Brazzaville reporting their departure from Entebbe (Uganda) and their ETA for Paris. This was a Russian Antonov AN-124 chartered by the French Air Force to transport troops to Rwanda as part of the French 'Operation Turquoise'.
- 9.017 SAM 27000 working STATE OPS on a Mystic Star frequency, discussing the French forces intervention in Rwanda.
- 11.176 'Quid 50' (a KC-135 tanker aircraft) working Croughton, with a phone-patch to 'Banter Control' at RAF Mildenhall. 'Quid 50' reported a hydraulic leak during air-refuelling, and was unable to retract their refuelling boom!. 'Quid 50' eventually made a safe landing at Mildenhall.
- 13.333 Speedbird London working several British Airways and British Caledonian flight giving regular reports of the score in the World Cup Final.
- 18.018 'Cyprus Flight Watch' transmitting weather details for various RAF airfields. This broadcast occurs at H+15 from 0500Z until 1600Z.

Airband

One of the features of aeronautical engineering is not to assume that a piece of equipment can't go wrong. Instead, alternative or back-up facilities exist to deal with the failure of critical services. What if my transmitter works (sends out pulses of carrier wave when I press the transmit button) but my microphone is broken? Can I, as a pilot, still communicate with air traffic control? The first thing to do is to set the secondary surveillance radar transponder to the 'Radio failure' squawk code of 7600. This device is independent of the communications transmitter.

All is not lost, even without a transponder, though. As described in *AIC 5/1994* (from the CAA) there is a speechless code that is like a simple alternative to Morse. As **Neil Fry** (Tenbury Wells) is wondering how this works, I'll explain. A short burst of carrier means 'Yes/Acknowledged' but two short bursts is the opposite. Three short pulses mean 'Say again'. A long burst means 'Manoeuvre complete'. Four short pulses, H in Morse code, mean Homing (to an airfield) requested; in case things go really wrong, Morse letter X (dah-dit-dit-dah) signifies that another emergency has just occurred.

The controller might find a 'speechless' aircraft on frequency with no clear means of identifying it - in which case the call sign 'Speechless' would be spoken by the controller. Unfortunately, many pilots adopt the poor procedure of acknowledging some controllers' transmissions with two pulses even under normal conditions. This conflicts with the speechless code but seems to be generally understood; however, it takes no longer to utter a quick 'Roger'.

Information Sources

High in the Sky is such a useful book that I'm always recommending it because it enables an aircraft to be identified once its Selcal is known. Unfortunately, The Aviation Hobby Shop are out of print! **Malin Thorpe** (Tunbridge) was most disappointed when he was unable to buy one. I've had a word with the publisher and they hope to have a new issue available very soon. The moment I get any details, I'll tell the rest of you.

Readers often request sources of specialised information, mainly military. There's no room for long call sign, serial or tail-number lists in my column so instead I refer you to sources that cater for particular interests. *Signet* says it is the 'Military

Monitors Newsletter' and is suggested by **Bill Reeve** (Norwich). Each issue, available from 19 Crescent Road, Hunstanton, Norfolk PE36 5BU, will cost you 50p (payable to The Black Cat Aviation Group) plus an A4 reply envelope with postage for 30g contents (that's 19 or 25p in the UK). The bias is clearly to USAF information, with call signs and specialised frequencies being listed.

Another military aircraft communications newsletter is *Intercept*, which is available from David Gregg, 11 Newton Close, South West Denton, Newcastle Upon Tyne NE15 7QP. Please note that the address has changed since I last gave it in the July issue.

Many readers are familiar with the *From the Flightdeck* series published by Ian Allan. Recommended by **Chris Brenton** (Plymouth) is *No. 7: Cessna 172 Around Britain*. Isn't the subject aircraft (G-WACL) operated out of Wycombe? Good book shops (such as W.H. Smith and Dillons) are becoming equipped with computer databases to find books more easily these days, or there's always the public library.

Let's Fly

A new service is provided by Euro Direct Airlines. Their network takes in Amsterdam, Berne, Bournemouth, Brussels, Dublin, Gatwick, Manchester and Paris (which includes routes relinquished by Dan-Air). Interestingly the ATP operates the Berne run with its load reduced from 68 to 50 seats. Landing distance available on runway 32 at Berne is a mere 1200m (which you can compare with 26 at Luton, 2075m). Compounding the problem is Berne's relatively high elevation: 1673ft.

Receiver Hardware

Antennas always make a popular topic! Neil Fry would like a directional antenna that can be pointed at a visible aircraft. If the signal strength peaks, then that is the aircraft that is being received!

Sorry to disappoint you, it isn't that simple. You are asking rather a lot of the antenna: really sharp directivity in two planes yet enough signal coming in 'off the side' to keep the transmission audible whilst taking aim. The radiation pattern must not change, even when the elevation is adjusted in order to point at the target aircraft. A tiny error in angular placement would mean the inability to distinguish between two closely-



Victor at Duxford. Taken at Duxford D-Day Airshow, May 1994.

Christine Mlynek.

spaced aircraft. You could never be certain that you were receiving from a visible aircraft, rather than another one hidden in cloud but along the same line of sight.

Finally, aircraft transmissions are short and so the entire direction-finding operation must be possible in a couple of seconds. Now you know why the best position fixer of all - radar - sends its own transmission rather than waiting for the aircraft to make a spontaneous one. And just look at the size of antenna you need, despite the exceedingly short wavelengths involved!

Aerodromes do have a v.h.f. direction-finding system (v.d.f.), though. This equipment is nonetheless complicated (i.e. expensive). Several vertical antenna elements are grouped at the top of a mast as if stuck onto the curved surface of a vertical cylinder. Electronic equipment gives a bearing read-out by sensing the relative phases of the signal arriving at each element. Accuracy (typically $\pm 5^\circ$) isn't adequate to detect which visible aircraft is being received, however; so this doesn't solve Neil's problem. It is only intended to guide an aircraft to the general vicinity of the aerodrome. A full position fix requires antennas in at least two (preferably three) widely separated locations.

From Bracknell, **Graham Long** writes with a whole list of questions aimed at improving reception in general. In summary, different advice is needed for 'short waves' (correctly known as h.f. or strictly 3-30MHz) and v.h.f. (30-300MHz). For h.f. as great a length of wire as possible (sometimes called a 'random' or 'long' wire) is a good start. Bring this into the receiver through an antenna tuning unit. A magnetic balun (advertised in this magazine) sometimes reduces interfering man-made noise.

Now, v.h.f. requires a different approach. Airborne signals come from all directions, so there is no point in having a directional antenna. It will miss most of the signals! Fortunately, high-flying aircraft are able to cast their transmissions downwards with little obstruction - i.e. the signals are strong. So go for a simple, omni-directional antenna such as a quarter-

wave vertical. More expensive (but better as it covers a wider frequency range) is a discone. You don't need a rotator for an omni-directional antenna. As the signals are strong, get rid of that pre-amplifier! They tend to pick up a wide range of interference, especially the broadband ones intended for TV and f.m. broadcasts.

No matter what the frequency, it's far better to place an antenna outside (usually as high as possible). Make sure the antenna is constructed in a suitably weather-proof manner, though!

Can s.s.b. transmissions be resolved on a receiver intended for a.m. reception? It will please **John Morrison** (Edinburgh) to know that they can, provided that a suitable oscillator (called a b.f.o.) is available. You need to look in your receiver's manual to find the intermediate frequency (i.f.). This should be listed in the specifications. The oscillator needs to be set to this frequency and held physically close to the receiver. If the oscillator is powerful enough, no electrical connection is necessary. It might help to bring a length of wire from the oscillator's output terminal and wrap it once round the receiver.

The oscillator needs to be slightly variable in frequency and adjustment for best results will be fiddly; it comes with practice. If you've an r.f. signal generator to hand, your problem is solved. If you're not that lucky then I suggest you contact H. Corrigan, 7 York Street, Ayr KA8 8AR, to see if one of their b.f.o. kits would be suitable.

Frequency and Operational News

In June, CAA's *GASIL* announced some d.m.e. changes. I think that there might have been some confusion when (last month) I passed on changes at Lydd. Certainly, the 22 i.l.s. has been withdrawn (according to *AIC 74/1994*) but the v.o.r. is presumably unaffected. The d.m.e. on 1105MHz (reply) previously identified as ILYX but is now LDY. Benbecula and Wick each get a new d.m.e. and both are on 979MHz (reply).



Plane Sailing's Consolidated Catalina is based at Duxford. Taken at Duxford D-Day Airshow, May 1994.

Christine Mlynek.

On a flight a few days ago I found myself confused about Gatwick's new TIMBA reporting point. It was once called Eastwood, but that doesn't conform with the new 5-letter 'computer friendly' codes. So it's TIMBA from now on (wood and timber, get it?).

Graham Tanner's (Harlington) list of LATCC frequency changes continues with those scheduled for September. Original 134.25 now becomes 118.375; 128.4 becomes 120.525; 121.025 becomes 127.1; 135.425 becomes 127.875; and 133.7 becomes 131.125MHz. Next batch will be in November. Further noted by Chris Brenton is a new Cardiff sector frequency of 132.95 whilst Seaford area changes from 134.45 to 135.05MHz. I believe Shannon area control has been on 132.15MHz for some time, Chris.

To cope with the high volume of aircraft visiting the Silverstone Grand Prix, temporary air traffic control was set up on 121.075MHz. Can anyone tell **Keith Goodchild** (Tring) if the old Upper Heyford frequency (128.55MHz) played any part in this operation?

Cranfield no longer has radar on 122.85MHz but, as I found out at the PFA Rally, the frequency itself is still available. So's 123.2MHz, as noted by **Ian McDowell** (Peterborough).

Red Arrows

In September, the Reds are scheduled to perform (excluding foreign locations) at Cleethorpes (September 2), Benson (September 3), Southport (September 4), Newquay (September 6),

Abbreviations

AIC	Aeronautical Information Circular
a.m.	amplitude modulation
ATP	Advanced Turbo-Prop
b.f.o.	beat frequency oscillator
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
f.m.	frequency modulation
ft	feet
g	grams
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
i.l.s.	instrument landing system
LATCC	London Area & Terminal Control Centre
m	metres
MHz	megahertz
PFA	Popular Flying Association
r.f.	radio frequency
Selcall	Selective Calling
s.s.b.	single sideband
USAF	United States Air Force
v.h.f.	very high frequency
v.o.r.	very high frequency omni-directional radio range

Farnborough (September 10), Duxford & Farnborough (September 11), Guernsey & Jersey (September 15), Finningley & Leuchars (September 17) and Cranfield (September 18). Watch out for last-minute changes.

And finally, television news last night reported a proposal to close the air-sea rescue service at Manston. I leave you with this thought. Public spending cut-backs sound attractive -

as long as it isn't **YOU** who needs rescuing.

The next three deadlines (for topical information) are September 16, October 14 and November 4. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 081-958 5113 (before 2130 local please).

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Scanning

Now that my house is being worked on under the guise of some Euro Grant Aided Project, and scaffolded all round, it seems like a good time in which to draw down my antennas and give them some very serious attention in terms of maintenance. Many scanner and radio owners neglect their antennas. This is quite a bad move as the adage 'your radio is only as good as your antenna' is something you **must** give due attention to! Neglecting the often forgotten antenna on your roof can have serious results. Also, whilst up there, it is equally a good idea to check the security of mountings and to allow some time for preventative maintenance to them, too.

Every antenna will benefit from an overhaul. A rub down with a fine piece of emery cloth or sandpaper followed by a light coat of 3 in 1, or sewing machine oil is beneficial. For antennas exposed, as mine are, to salt in the air due to my living on the coast, the liberal application of waterproof tape on joints, Vaseline on any screw threads and mastic-jointed sections is also something that I believe in. Further, use of a popular brand of waterproofing spray like WD40 or its variants has benefits that are invisible - but can ease a whole lot of headaches from corrosion and the inevitable ingress of moisture. Water and electrics do **NOT** mix very well!

Light white deposits on exposed aluminium elements can be cleaned off with emery cloth or sandpaper, with the elements lightly given a once over with Vaseline. This is true for upright sections as well. Any screw threads, on joints or places like ground planes, should be wire-brushed and, again, coated in Vaseline. Joints should be carefully checked and, if need be, re-masticed with waterproof compound. The addition of tape afterwards is a good idea, both to retard the ingress of moisture as well as to offer some protection from rust and dirt particles.

Glass-fibre or GRP can be checked for small, vertical splits in the fabric. I use candle wax to fill in these, they are never very deep but look pretty awesome, and waxing them gives them a good element of protection from the trying properties of rain. Plug connections should be cleaned off, sprayed with WD40 and allowed to dry, then

given a very light smear with Vaseline before being mated again. I also believe in smothering plugs with Vaseline which keeps moisture at bay. Don't presume that because you have a plug connection shielded by a downpipe section you have a good level of protection, you don't! Application of Vaseline here is of inestimable benefit for longevity of plug life, by plugs I mean PL259 or 'N' connectors at the antenna site.

Attention to weatherproofing has, obviously, benefits in keeping water from the coil, or, in the case of AD370s and other active types, from the delicate electronics in the antenna head. To ensure maximum protection here I always spray WD40 inside the case before re-sealing it with its rubber jointing, a smear of Vaseline and I also secure the joint externally with good quality waterproof tape. My AD370 is now many years old, exposed to everything thrown at it and is still as good as new.

A little bit of common sense, some attention to ensuring the antenna is in a workable condition, and plenty of preventative maintenance will ensure you get many years use out of the most important piece of your station. What's more, saves money in the long run, and I daresay that can't be a bad thing!

Safety

One last thing, be aware, at all times, of safety! Exposed areas like the roof are deadly in rain and even light winds. Make sure you practice good safe methods of erection - no pun intended! and always, **ALWAYS** let someone know you are up there. Better to be safe than sorry.

Advice Sought

Now we move onto radio proper. During his time here, Alan Gardner mentioned stations like ASDA FM (Astra transponder 16 - 7.92MHz) - news from **J. G. Salisbury** states that information on stations like this and indeed all other UK Commercial Stations can be had in the *Radio Authority Pocket Book*. It is obtained free, though I would send return postage as a matter of course, from: Radio Authority Press Officer, RA, Holbrook House, 14 Great Queen Street, London WC2B 5DG.

Advice is sought by **Steven Rogers** of Saxmundham, who has a HP-200E and wishes to know the following: Can channels be 'wiped' quicker than the one at a time method? In other words, can the memory be wiped out on this model? Also, has anyone any idea how to disarm the 'beep' from the front panel? Steven says the set is very like the AOR AR 2000.

Interesting letter from **Leslie Griffiths** of Sheffield that I believe may well give those of us who monitor milnets on v.h.f. a bit of a poser! Leslie has picked up signals on 74.0750MHz on his set at 5/9. Callsign used was 'WATCHDOG'. This particular 'Watchdog' reported on an accident to a truck towing a Howitzer and a Landrover: Range Clearance Reports: Contacts with camps in UK and BFPO G (Germany) - Query: Who is WATCHDOG?

Well, 'Watchdog' is a callsign used by MAFF, Ministry of Agriculture Fisheries and Food, and one quite well heard on both Civ/Air and Marine v.h.f., as well as on h.f. now and again.

Good lift conditions on Band II v.h.f. allowed me to hear Spanish and French f.m. stations clear as bells, easily 5/9, during the last week of June and beginning of July. Anyone else get them? Most were heard above 100MHz, the clearest French station being France 1 possibly out of Boloune on 103.3MHz. Any ideas?

Real air scanners can also listen to 245.100, but don't expect much. This is used for PLB, Personal Locator Beacon, training! Just noise, really! While on the subject of SAR working, the Air Force Mountain Rescue Teams - Callsigns 'Alpine' can be heard on 158.650 (Ch. 53 FMN). Lower down in the v.h.f. portion, channels 1, 3 and 2 are 86.3125/86.3500/86.4125. A breakdown on callsigns and other MRT workings was given in last month's SSB Utility Listening column. The Channel 53 v.h.f. frequency I mentioned comes from a listener who very kindly wrote to me - and shares my own interests in SAR working!

Back to the Readers!

A question from **Paul Wade** of Corringham, in Essex, prompts me to ask whether any readers know of frequency allocations used by the

motorsport crowd? Paul asks if anyone knows where he can find frequencies for cameras, 'planes and helicopters used in following the sport. This interesting aspect of scanning should attract a few listeners and if you are one of them, why not share? I know that allocations are given in books like *The UK Scanning Directory* and, to a certain extent, in *The VHF/UHF Scanning Frequency Guide* but nothing definite, ie. team or company frequencies. I did hear at one stage that CB radio was used - f.m., or course, but can't confirm that. If you are a motorsport or rally enthusiast as well as a scanning enthusiast and you know where to find these, drop me a line and I'll feature it within the column.

Again, any form of sport using radio can be featured, so get writing!

Coastguards

Marine monitors may be interested in a 'new' frequency that I have heard recently, used by Auxiliary Companies of HM Coastguard. The designator was 'Channel 99' and the frequency 160.600 mode being FMN. In this case, the Auxiliary Team were taking part in a location exercise and reporting back between their base and the various mobiles being used. The callsigns used were '.....Coastguard', geographical area preceding designator, but they did **not** use this frequency to work the Maritime HQ at Holyhead. This makes me think that mobiles are used, co-ordinating any event on their own channels in order to keep the traditional Channel Zero of 156.0 clear. Obviously this makes a great deal of sense as things can get congested on Zero when there are coastguards, maybe a lifeboat or two and a helicopter all involved in a scenario. The scenario could then be relayed back to the main coastguard station on landline. Channel Zero is used by many SAR units, from Nimrods to mobile vehicles, and congestion causes confusion. Obviously, this may be a local exercise and may not be in use nationwide: Write me if you know any different!

Also, can someone confirm with me that 456.825 is in use with any coastguard mobiles? Many books report this variously as coastguard mobiles and inshore lifeboats. I know, from my RNLI

experience, that it is **not** an RNLI frequency. It may be a private rescue company or even HM Coastguard, but certainly not RNLI!

Having said that, I recently bought *The VHF/UHF Scanning Frequency Guide* - through the *Short Wave Magazine* Book Service of course, and found it very easy to use as well as informative. Given the limitations of the hobby in terms of accuracy, as I've said above, this is an excellent book, full of good information and clearly managed into readable and well defined sections. I may now change allegiance to this from another well-known publication if only because it is easier to read! Books are really personal choice but if you're into the market for a book, give this one real consideration. Price wise, it is affordable, something a few other publishers should note.

If any reader has information on other frequency sources I would be interested in knowing about them. Maybe we can go for a column on publications allied to the hobby at a later date? That's UK as well as everywhere else by the way! Some readers like to track about here and there and take a radio with them! Obviously, I mean more than abroad. I once took my PRO-80 in my backpack with me

for a hike up Snowdon! A case of 'have radio, will travel'.

A letter from **David Wilkinson** in Ventor IoW, who is also the Honorary Correspondence Secretary for The Lifeboat Enthusiasts' Society asks if anyone can suggest why London ATCC on 124.750 and 134.450 are 'deaf' for him at Wroxall. Apparently David used to get good traffic on both these on his Realistic PRO-34 but, within the past month, things have become very quiet indeed. This is a clear case of columns overlapping as Godfrey Mannings 'Airband' is the best, so far, in any magazine for up-to-date news on frequencies and any changes. My own 'gen' on airband comes from books that are available on the market and, living almost on top of both RAF Valley and RAF Mona plus the 'civvy' field at Caernarfon, I tend to favour what is on my doorstep, although I can hear overflights heading to places like Dublin, Manchester and so on with ease. May I suggest that up-to-date info would appear, without doubt, in Godfrey's column before my own - plug!

Likewise, with my background 'at sea' I keep an eagle-like eye on marine and SAR frequencies. Each to his own. Having said that, recently invalidated out of the MN as I have diabetes - Cat 1 IDD -

and having to stand down from the boat crew at Trearddur Bay RNLI, I should have more time to collate the masses of information you require! I will maintain my lifeboat and SAR links through the Shore Crew on stations, but meanwhile, I'm looking for anything of interest involving scanning, including 'picking the brains' of the scanner owners among the crew!

Informative

In my first column I requested information on a set I had here, a Sony ICF-5500M or 'Captain 55'. To prove that requests do work, I had a very informative letter from someone who not only bought theirs new, but still has it, and is as pleased with its performance as I am! It was, in fact, this set that I used to get the Band II v.h.f. signals in and on its own telescopic whip. Not bad for a portable sitting against the window, albeit with no absorbing or electrically blocking objects in its path!

It seems that the ICF-5500M was popular with the boating fraternity, which would explain its Marine Band h.f. switch and dial. Obviously, emissions on h.f. are now H/A/J/R3E mode - H3E full carrier, single channel on 2182kHz,

A3E is double sideband, J3E suppressed carrier, single channel s.s.b. and R3E single channel, rescued, but back when it was on sale, s.s.b. wasn't an issue! It would appear to be circa mid to late 70s and constructed ruggedly, which explains its still very good audio and external experience. Like my informant, **Don Lewis** of Crawley, I too find the tuning to be a bit on the spongy side. However, that is a very small price to pay for what is a damned good radio.

As I write this last piece for this month, the '55' is on and I'm listening to Key 103 out of Manchester at 5/9 and that is something! A short 'skip' through the band has shown up Irish f.m., Spanish f.m. and a few of the f.m. stations 'across the border' like BRMB! They do not come up on my PRO-80 or the AR 2000.....

Bit of a hotch-potch for this month, but I hope that the bit on looking after your antenna serves. It makes sense! Remember to write if you have any queries or any gen you wish to pass on, frequencies, problems requiring answers and so on. I'm here to assist and if I can't then there is always someone out there who can.

Until next month, good listening.

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Info In Orbit

During the days around July 20, comet Shoemaker-Levy 9 has been impacting Jupiter. Not a predictable start for a column on WXSATS, but the point is that the instant availability of images of our weather systems is once more proving invaluable. I had local TV crews filming my set-up, and more radio interviews than are decent for most people. One phone-in was 'swamped' with callers asking about Jupiter's atmosphere! Animating earth's atmospheric imagery is very useful for amateur astronomy.

A number of readers have written asking about the possibility of reviews of WXSAT receivers. Curiously - this is a delicate matter! I believe such reviews would be of considerable interest and help to many newcomers to this hobby. A letter from **Nigel Tucker** from Zimbabwe made such a request. Behind the scenes, during the last two years I have written to UK suppliers whom I hoped would provide suitable hardware for me to test comprehensively, for this magazine. In one instance the unit was never sent, and in another instance the unit, regrettably, had to be returned.

Following several weeks of marking examination papers, I am now trying to belatedly catch up on correspondence for the column. Some very interesting letters have been received from places as far away as Australia and Cape Town.

At last we have the definitive situation on METEOSAT encryption. For most people monitoring WXSAT transmissions there are no changes - at least for some years.

Current WXSATS

I have logged only five polar orbiting WXSATS during early summer weeks. NOAAs 9 through 12 have continued

routine operations with the expected short breaks from NOAA 10 while it overtook NOAA 12. For new readers to 'Info' it is worth mentioning that each NOAA WXSAT has a slightly different orbital period, so at regular (predictable) intervals, their passes over Britain (and elsewhere) overlap. During these times, transmissions from NOAA 9 or NOAA 10 will be terminated for the period of overlap. Check out your Kepler elements for each NOAA pair (NOAAs 9 and 11, then NOAAs 10 and 12) and you will notice their Mean Motions (number of orbits per 24 hours) are similar. For the first pair, the difference is only 0.006 orbits per day. The second pair differ by 0.088 orbits per day. Consequently, overlap periods for NOAAs 10 and 12 are more frequent but last for a shorter time.

Only METEOR 3-5 transmitting on 137.85MHz (at least during June and July) has represented the Commonwealth of Independent States (formerly Russia).

Summer so far has seen the largest areas of clear skies that I can remember since I saw my first WXSAT image many years ago. On several different occasions I recorded Europe with a clarity that I had not previously seen. Not a cloud over the Mediterranean sea. Such was my enthusiasm that I saved and printed the images.

METEOSAT Encryption

Details for the future encryption of METEOSAT transmissions were published in mid-July. They include both favourable and less favourable news, depending on your exact image requirements.

As most readers will know, METEOSAT-5 (the geostationary WXSAT positioned near longitude zero) transmits several types of

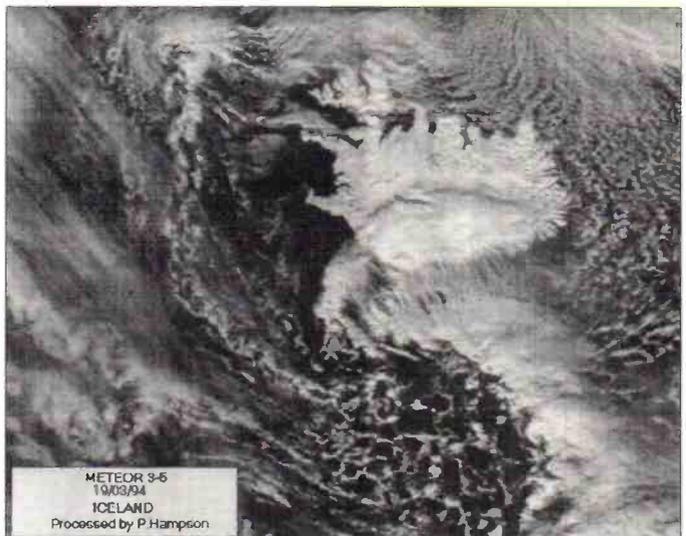


Fig. 1: Iceland METEOR 3-5 from Peter Hampson.

telemetry. The two of special interest to 'Info' readers include WEFAX (officially known as Secondary Data User Station) imagery, and Primary Data (known as PDUS). Transmission of Primary Data test images in encrypted format began some months ago. Encryption will be increased in April, June and September next year. From 1 September 1995 all high resolution images (HRI) will be encrypted - with the exception of images at six-hourly intervals.

The Good News

Images at 0000, 0600, 1200 and 1800UTC will not be encrypted. This means that no changes will be necessary to PDUS hardware and software for those for whom six-hourly images are acceptable.

The Other News!

For anyone wanting more than the previous few un-encrypted images, a licence agreement will be required. EUMETSAT have issued a registration form to all known users of both WEFAX and PDUS. It is well worth completing and no liability or commitment attaches to its content. It allows the user to record their details with EUMETSAT for which they will receive updated information as it becomes available. WEFAX users who do not anticipate upgrading in the future need not apply for or return the form.

If you wish to decode encrypted telemetry you will need to purchase a METEOSAT Key Unit (MKU) from the equipment supplier at a cost of 700 ECU. An additional annual payment may also be required, depending on your official status. EUMETSAT will grant free access to certain scientific research and educational programmes if the data is not used commercially or operationally. Each case will be examined individually.

If you have not had this questionnaire you can write to: EUMETSAT, Meteosat Operational Programme Manager, Am Elfengrund 45, D-64242 Darmstadt-Eberstadt, Germany.

Pictures

Perry Hampson of North Walsham built his first receiving station using a Maplin kit for the receiver and decoder. Those kits were designed to interface with either Amstrad or BBC computers, so Perry used his CPC6128 for producing images. The memory limitations of those earlier machines reduced the resolution available for displaying images. Recently he upgraded to a 486SX computer with large hard disk and plenty of RAM. Using hardware for receiving METEOSAT and the polar orbiters, Perry produced **Fig. 1**, which is a large format METEOR 3-5 image of Iceland obtained on March 19. He comments on the different types of cloud formation seen in this picture and wonders when he will find the time to examine all of the detail now obtainable.

Roger Ray of Telford sent **Fig. 2** which, if you look carefully, is the composite view that we don't normally see from METEOSAT WEFAX pictures. He has combined the C2D and C3D formats, obtained on March 24, using the Joinpix software mentioned some time ago in this column. His original is a well coloured, seam-free image showing the Mediterranean almost clear of cloud. Roger recently upgraded his computer, increasing the RAM to 8Mb run long colour animations using a program from Timestep.

Another regular correspondent **Brian Dudman** of Harrow, has a Primary Data station and sent in a whole-disc image (see **Fig. 3**) showing a visible-light picture of the Americas, as seen by METEOSAT-3. This image format is relayed daily by METEOSAT-5 as a fairly high resolution (Primary Data) image, included in channel 2 transmissions. This image was collected last September so both poles are illuminated by the sun, and some tropical storm activity can be seen to the east of the Florida peninsula.

Those who are new to receiving METEOSAT data will almost certainly

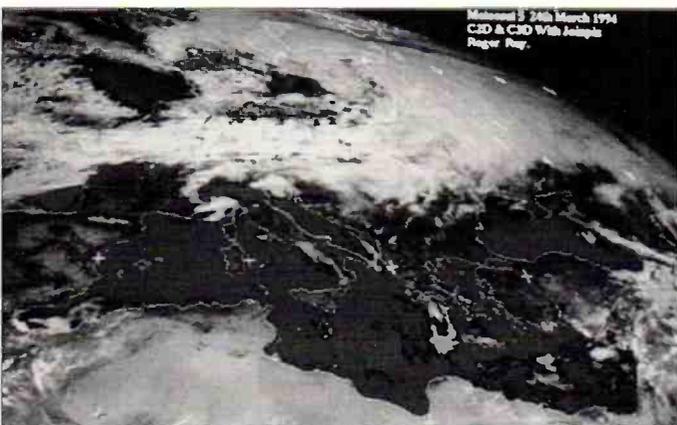


Fig. 2: METEOSAT C2D with C3D from Roger Ray.

be monitoring WEFAX transmissions that are mostly disseminated on channel 1 (1691MHz). The schedule of transmissions shows that some additional WEFAX formats are transmitted on channel 2 (1694.5MHz). These extra formats include whole disc images of the earth in three wavebands (visible, infra-red and water vapour) from METEOSAT-5, plus relays collected from two other geostationary WXSATS. Japanese GMS images are also available, giving us very large coverage of global weather systems. I am sure readers will wish Brian a speedy recovery following his recent spell in hospital.

METEOSAT Interference

A reader living in London sent me several pictures taken with his METEOSAT equipment. The images recorded on channel 1 were noisy and un-synchronised, yet those on channel 2 were perfect. He had contacted the hardware supplier but had not received any help so wrote to me some weeks ago in a state of agitation.

What actually happened was METEOSAT-6 was undergoing tests at the time. Currently METEOSAT-5 (the operational WXSAT) is positioned at about 2° east, and METEOSAT-6 (the backup) is located at 9.5° west - though these positions may not remain constant. Simultaneous transmissions from both WXSATS invariably cause some interference because tests are carried out on channel 1 - 1691.0MHz. The result can be heard as a characteristic buzz on the signal, and computer software may fail to synchronise properly.

EUMETSAT point out in their technical specification for METEOSAT equipment that in order to avoid all interference between the two satellites at your receiving station, a minimum dish size of about 1.8m is theoretically required for WEFAX telemetry. In practice, we rarely use dishes larger than about 1m diameter because, for most of the time, only one signal is transmitted on this frequency and good signal strength is achievable. Smaller dishes have wider signal capture characteristics - hence this occasional interference.

Queries and Reminiscences

A correspondent (**S. Bright**) from Portsmouth kindly sent me some GOES (FAX) images and asked whether we can receive direct transmissions from the GOES WXSATS here in the UK. The answer is no. There are several GOES WXSATS and I occasionally give their locations in geostationary orbit along the Clarke belt. They are all below our horizon. For those suitably equipped, some images from these satellites can be obtained via h.f. transmissions from some utility stations. As detailed previously, METEOSAT-3 is currently in the GOES east position at 75° west



Fig. 3: METEOSAT-3 relay from Brian Dudman.

longitude, so may be heard by those suitably located.

Abroad again, this time to Capetown, South Africa where **Robert Hall** set up two different WXSAT receiving systems at relatively low cost. He tells me that METEOSAT channel 1 data is transmitted continuously from a local relay on 145.45MHz. This would certainly be a cheap way into METEOSAT images! Robert uses a Yagi for this frequency, feeding a Kenwood RZ-1 receiver. He uses JVFAX 6 and PROsatII and comments that the schedule timetable changes last March required editing into the software. He also points out the importance of checking the computer's internal clock before leaving it under automatic software control.

From Wellington, New Zealand came a letter from **Len Maxim** who worked at the local Meteorological Office for 33 years. He became very familiar with the characteristics of METEOR WXSATS dating back to 1977. He tells me that he saw imagery from METEOR 2-2 before the use of binary edge code was implemented. This code - the changing bars along the side of METEOR images - represents sensor aperture settings. Len saw a.p.t. transmissions from METEORS 1-25 and 1-30, giving excellent imagery.

I still have some original METEOR 1-30 recordings saved on cassette audio tape. Those images were of high quality and good resolution. When I first heard METEOR 1-30 in the mid-eighties, I had not known of its existence, but recognised the sound as a.p.t. coming in on 137.06MHz. After connecting the lead from the receiver to my framestore it produced a picture of Italy - of a quality never seen before. My enquiries at the time were inconclusive - suggestions were that I had measured the frequency wrongly. Later it was acknowledged that my Dartcom receiver had given the correct frequency - METEOR 1-30 was drifting! Since retiring two years ago, Len no longer sees METEOR images, but still operates a v.h.f. receiver to monitor WXSATS.

Apple Mac

Graham Cockshutt of Sheffield uses a Dartcom receiver with his Apple Macintosh IIsi computer. He writes that the software was developed by Newcastle Computers and provides many facilities. This is one of only a few letters that I have

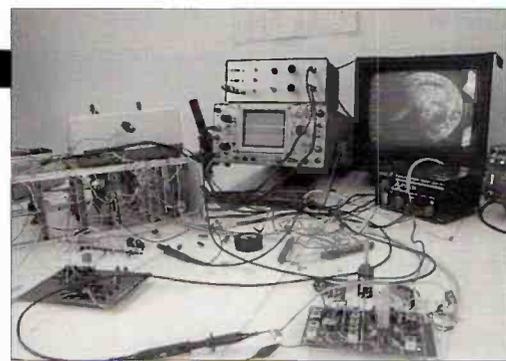


Fig. 4: Peter Hayes home-built PDUS system.

received from people using the Mac, though some correspondents have previously asked about the availability of such software. Graham is proposing to send some photographs from his set-up, about which he writes very favourably.

DIY PDUS and HRPT

When I built my first a.p.t. receiver (for the polar orbiters), based on the Cirkit design, I quickly realised what a major project d.i.y. WXSAT image-decoding hardware construction was. My framestore took several weeks to build, including buying professional help, before everything was working. Consequently, realising just how much test equipment was needed, building my own high resolution decoding hardware for either PDUS (METEOSAT) or h.r.p.t. (NOAAs) was a non-starter.

About two years ago I had a letter from **Peter Hayes** of Ayr in Scotland who wrote telling me about his mostly home-built equipment, so I invited him to bring me up-to-date.

A general view of his PDUS gear, taken in June 1991 can be seen in **Fig. 4**. The PDUS decoder and framestore is in what Peter describes as 'the rat's nest on the left'. The receiver is unboxed in the foreground right, and is in use, still in this form. Peter even built his own spectrum analyser (!) from a 'Badger Boards' kit. His PDUS set-up has its own computer - a Z80 chip with operating system on EPROM. This computer was used to de-multiplex the METEOSAT data stream. For those unfamiliar with the complex nature of METEOSAT Primary Data telemetry, data from the various channels are combined (multiplexed) before transmission to users, instead of transmitting each image separately. A computer, or suitable hardware, is required to separate channel components for picture reconstruction.

Fell off a Roof!

Peter's PDUS dish is 1.8m diameter. It was originally used at a school for receiving educational programmes from satellites. The tripod feet had only been cemented into the flat roof of the college, so the first gale sent it hurtling off! He was able to retrieve the dish for the cost of collection. Peter uses a RIG (Remote Imaging Group)-type pre-amp fitted to the feed-horn.

For receiving NOAA h.r.p.t. (high resolution picture telemetry) in the

1700MHz band, Peter now uses a 0.9m dish with a Timestep dual-feed horn. This set-up is currently fitted to a Yaesu 5600 rotator that sits on a Versatower at about 10m height. Because of his location overlooking the Firth of Clyde to the north, he has a good horizon and can track satellites and receive h.r.p.t. well into polar regions. More pictures and further details of Peter's advanced set-up will appear in future editions.

Recommendations

When I receive details of new products, I am happy to provide brief summaries on the basis of information sheets. This allows readers to become aware of such products so they can make further enquiries. I can't make personal recommendations on equipment or software, because this column needs to remain independent of any manufacturer or supplier.

Kepler Elements

I will send a print-out of the latest WXSAT elements upon receiving a stamped, addressed envelope with separate, extra stamp. All WXSATS plus MIR are included, together with transmission frequencies if operating. This data originates from NASA.

Some readers like to receive monthly Kepler print-outs. To join the list please send a 'subscription' of £1 (plus four self-addressed, stamped envelopes) to cover four editions.

I also provide files containing recent elements for the WXSATS, and a massive 0.5Mb ASCII file holding elements for literally thousands of satellites. This option includes a print-out identifying NASA satellite catalogue numbers for the WXSATS, amateur radio satellites, and others of general interest. This is ideal for computer data retrieval. The option is constantly being improved and notes are provided. Please enclose cash, a cheque, or PO for £2 (yes - down from £3 because there are more requests than expected). Enclose your PC-formatted disk and s.a.e.

Frequencies

NOAAs 9, 11 a.p.t. on 137.62MHz; NOAAs 10, 12 on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METEORS use 137.30, 137.40 and 137.85MHz.

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SHORT WAVE MAGAZINE

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Orders and remittances should be sent to; **Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 021-384 2473**, marking your envelope **SWM PCB Service**. Cheques should be crossed and made payable to **Badger Boards**. When ordering please state the Article Title as well as the Board Number. Please print your name and address clearly in block capitals and do not enclose any other correspondence with your order.

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Decode

All the Data Modes

I've just been sent an interesting new decoding package called WeatherSpot by the author **John Standen**. John has a keen interest in meteorology and has produced this program to process the full range of weather data that's available on h.f. As a result, this program is very much aimed at those with a more serious interest in weather data.

The package is supplied complete with a manual and two high density 3.5in disks. Installation was easy using the supplied installation routine that created the appropriate sub directories on your hard disk and transferred all the files. It's worth noting that the program and its support files occupy around 7Mb of hard disk space so it's not possible to run the program from a floppy disk. The system requirements were not too well defined other than the need for an AT compatible machine or better. If you want to be able to use the sophisticated Workstation option you will need a VESA, Super VGA graphics system capable of operating at 600 x 800 resolution.

Unlike many decoding systems WeatherSpot is not able to decode data direct from your receiver as it relies on a log file having been created by a conventional RTTY system. Virtually all these programs have the option to log received data to disk and its this information that's used by WeatherSpot.

In operation, you first tune into an appropriate met. station such as Bracknell on 41489MHz and set your RTTY decoder to save all the received text to a log file. When you have received a good quantity of data you need to view the information with a text editor and clean out any obvious errors. The sort of thing you're looking for are the loss of a shift character where the information appears as letters instead of neat 5-digit groups. Once you've completed the basic tidy-up you can run WeatherSpot and complete the data processing. To help with this, the main menu contains a filter option that automatically scans the data file, groups and extracts the relevant sections.

The main menu of WeatherSpot contains 13 options for further processing and displaying the various sources of information. The most basic is the Land station reports that give a map of the selected area showing the reporting stations and the measured level. This is supplemented with the full and detailed report for the last displayed station to the left of the main map. The quality of this map display was very good indeed.

Moving onto the more unusual areas the next option extracted and

displayed data from Radiosonde stations. The data could be displayed in tabular form or, more usefully, as a plot of temperature against altitude. Those with an interest in v.h.f. propagation will find this information very useful for spotting the temperature inversions that often lead to enhanced propagation conditions.

One particularly unusual, but interesting, sequence of reports was the European lightning strikes. The reports are apparently transmitted from Bracknell and in this program are displayed graphically on a map.

For those interested in longer term weather trends WeatherSpot could interpret and display the monthly climatology reports. These showed a variety of weather data including the hours of sunshine/rain per month for a variety of locations.

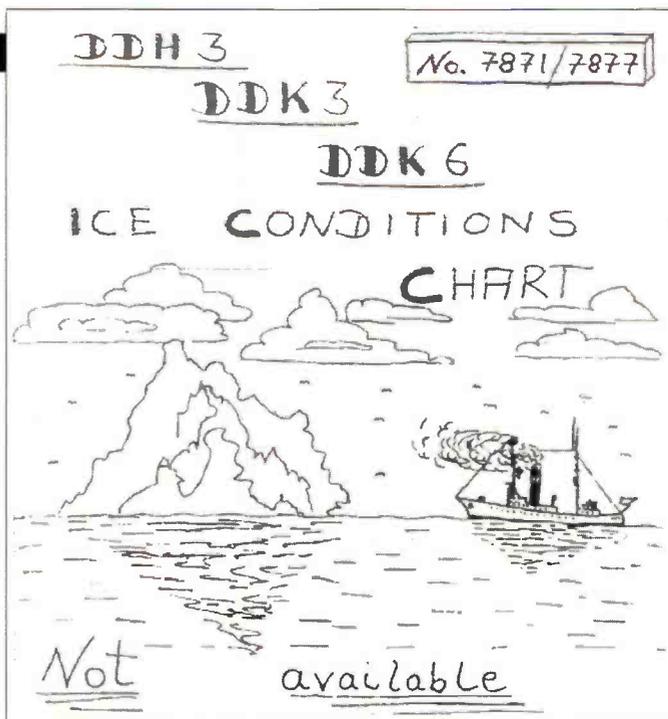
My favourite system was the aircraft reports. The display showed a pseudo 3-D map of the Atlantic Ocean with all the aircraft positions and callsign shown. The positioning of the aircraft was proportional to their real location, so this could well appeal the aeronautical enthusiasts.

The serious weather watcher will find the VESA workstation particularly impressive. This took full advantage of the increased display resolution to enable different reporting systems to be directly compared. To do this the screen was divided up into four windows, each of which could be used to display different elements of the weather pattern. In a typical example a satellite image could be compared with a surface chart and a number of individual station reports displayed in the remaining windows. By presenting all the information on one screen you could build up a much more complete weather picture.

The only problem with this mode was its dependency on the VESA graphics card. Although the system worked fine with the SPEA V7 Mirage on my home system, it failed to work when loaded on a Cirrus GD54xx based 486SX machine. John reports that WeatherSpot has been tested with Trident, Oak, Orchid and Paradise systems, so I would check for compatibility with your system before you commit yourself.

Overall the system provided a very useful insight into areas of weather reports that are not normally easy to decode. Providing you have a fully compatible VESA card WeatherSpot looks to be a well thought out package. For more details contact **Comar Electronics Unit 3, Medina Court, Artic Road, Cowes, Isle of Wight PO31 7XD**. The current price is £93.00 plus £3.50 post and packing.

Right: German Met men do have a sense of humour.



Stafford Hamfest Clinic

The Decode clinic at Stafford proved to be very worthwhile with lots of readers taking the time to stop for a chat and to exchange views on our hobby. There was also a very strong interest in Hamcomm and JVFAX from people who had not seen them before. Although I took up a good selection of my lists, these were quickly snapped up with the Interference FactPack proving particularly popular. Much interest was attracted by my simple demonstration station that comprised a Lowe HF-150, Datong FL3 with a laptop PC running Hamcomm, JVFAX and the Lowe Modemaster. The Hamcomm spectrum analyser display seems to be a real attention grabber and I even had one person who wanted a copy of the program just for that feature. Apparently he had been trying to develop a fast, computer based, spectrum analyser for some time with very little success. I'm sure the magazine will be running more of these Clinics, so watch this space for more information.

Interference Problems

My new interference FactPack is proving to be very popular with new requests arriving daily. I have also received feedback from a number of readers reporting great success with the packs methodical approach to the problems.

By using this system **T. Trentfield** of Tamworth discovered that his main source of interference was the domestic video recorder! Looking through an RS catalogue recently I found a couple of items that may prove very useful for filtering mains interference. If you are electrically competent and can manage some simple soldering, it may be worth considering replacing the mains socket of your computer (or any other noisy devices) with a filtered socket. The RS FN329 range of replacement sockets feature excellent filtering properties including an earth line choke. The RS stock numbers are 238-788 for the 3 amp version and 238-794

for the 6 amp model.

If you don't have the skills to change the internal socket you could try using the RS in-line filtered lead. This is a short lead with an IEC plug at one end and a filtered socket at the other, that's ready for use without any soldering. The stock number for this 6A filtered lead is 238-558 and you can expect to pay around £11.00 plus VAT.

Another useful tip comes from **Les Crossan** of Wallsend. He has fitted a 1:1 isolating transformer in the lead from the receiver to the decoder. This effectively stops r.f. interference signals whilst letting the audio signal pass unimpeded. If you want to try this, the RS CWC9000 transformer, stock number 208-822 (around £3.00) should prove suitable.

If you've succeeded in reducing or eliminating interference using the FactPack please write and let me know. I'd also like to know of those cases where the process doesn't work so I can expand it to cover as many problems as possible.

Decoding Accessories

My latest FactPack attempts to throw some light on the wide range of accessories that are available. Rather than deal with individual products, I have looked at different types of accessory and made my comments on their value and what you should look for when choosing an accessory.

Perhaps one of the most common areas that cause uncertainty is the choice between a t.u., preselector or nothing at all. Let's just quickly run through this to get you started. The basic problem arises from the use of a random length wire antenna and its coupling to the receiver. Whilst you can bring the wire straight indoors and connect it to the wire antenna socket of your receiver, you need to be able to keep the wire well away from the building and any sources of interference.

For many, this is not really practical and some form of feeder is required. In order to keep interference levels to an absolute minimum, I prefer to use a

coaxial feeder to bring the antenna into the shack. This presents a problem in itself as coaxial feeders are low impedance devices of usually 50 or 75Ω, whereas a random wire antenna offers a varying impedance which is often high. One of the more practical solutions to this dilemma is to use a magnetic long wire balun to couple your antenna to the coaxial feeder.

If you are using a more sophisticated tuned antenna system you will find that you can generally directly couple the antenna to its feeder without any special precautions or matching devices.

Once we have the antenna in the shack we have the option whether or not to use an a.t.u. When used in this way, the main benefit of the a.t.u. is not to provide matching, but to reject out-of-band signals. This is only really of value when using the cheaper receivers as these often have poor overload characteristics and are prone to strong signals. Because the a.t.u. contains at least one tuned circuit, it tends to reject out-of-band signals so helping the receiver cope. The best option is to use a preselector as this is designed specifically to remove out-of-band signals so is generally more effective than an a.t.u. Unfortunately, they also tend to be rather more expensive!

For more information on accessories including filters, speakers, headphones, power units, etc., see the special offers section in this column.

Hamcomm 3 Now Available

Yes, I've just received a brand new version of Hamcomm from the author Wilhelm Schroeder, in Germany. This latest version is a real winner as it now includes the transmission and reception of AMTOR/SITOR modes.

Wilhelm has also made a few changes to the distribution conditions and asks for a \$30 or DM40 payment for use after the 30 day evaluation period. In view of the costs of commercial decoding packages this is more than reasonable. Once you've formally registered you will receive an updated version of the program with the registration prompt removed. You will also receive the latest updates as they are developed.

One of the great points about Hamcomm is that it is still capable of running on the older and slower 8088 based PCs. This means that virtually everyone with a PC or compatible will be able to run the program. The only areas that may suffer on slower machines are those that demand a lot of processor time like the spectrum and oscilloscope displays.

To install the new program you just create a destination floppy disk or hard disk sub-directory and copy the file HAMCOM30.EXE from the new distribution disk. From the new disk or directory just type hamcom30 and the program will automatically unpack itself and create the operational files plus documentation. Once this process is complete, you can delete HAMCOM30.EXE to save some precious disk space. The final

installation occupies a very conservative 995K of your hard or floppy disk.

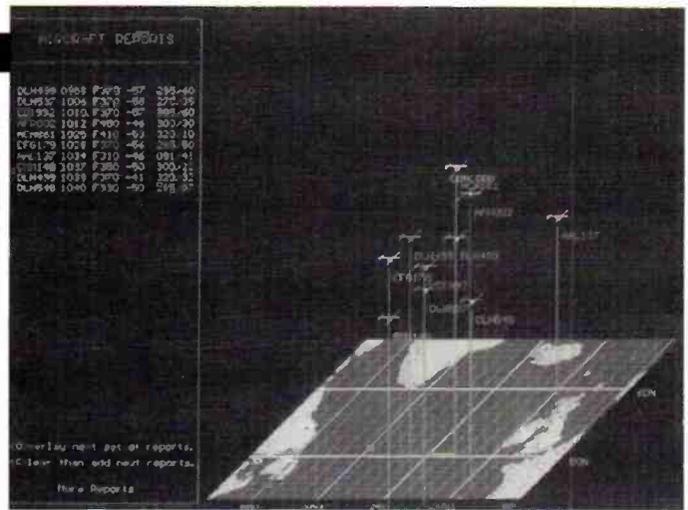
Along with the new version comes a fully updated on-disk 38-page operating manual. This contains full details of the hardware interface as well as the operating controls. You will all no doubt be pleased to hear that the interface requirements remain unchanged so you will be able to receive SITOR straight away. The only extra you may have to sort out is the clock correction so let me explain the reasoning.

SITOR is what's known as a synchronous transmission system, which means that the receiving station follows the speed of the sending rather than setting its own speed. Because of this, before displaying a signal on the screen the computer spends a short time analysing the incoming signal to find the right point to start decoding and also to lock onto the right speed. Once this phasing sequence is complete the computer continually tracks the signal to maintain lock. However, if the signal is suffering very bad interference or becomes lost in the noise, the computer keeps trying to resynchronise but uses its own internal clock as a reference. It's because of this that the computers clock has to be as close as possible to the right speed or you will always have to completely resynchronise after any form of signal loss.

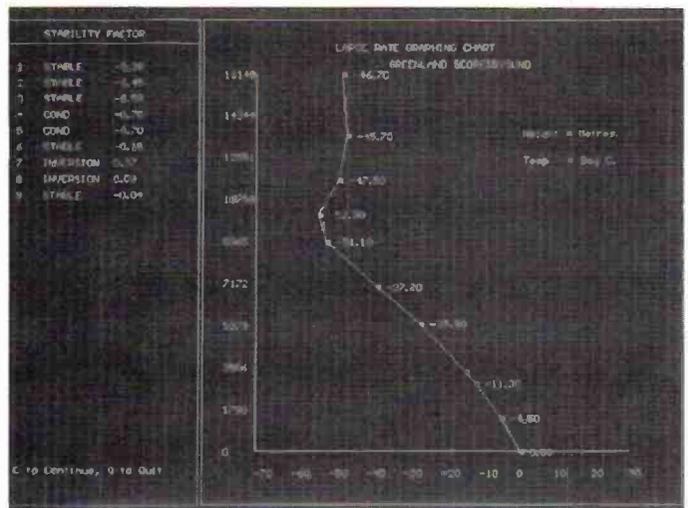
Although all PCs are controlled by stable crystal oscillators, the absolute frequency is rarely accurate. To compensate for this Hamcomm now has a built-in clock correction system that can be set for your PC. To do this you first have to find a good commercial SITOR signal to synchronise with. The best place to start is around 4.2 or 6.32MHz, so start Hamcomm and press F4 for AMTOR listen mode. You will now see the correction counter in the lower left hand corner of the screen. Once you have locked onto a good signal, press Escape to zero the counter and time how long the counter takes to + or - 10. A tip here is to use the PC's clock displayed at the top right of the screen. If it takes any longer than two minutes to reach 10, your PC clock is already accurate enough for this mode. If it's less than this the clock correction factor becomes 100 x S, where S is the number of seconds taken to reach + or - 10. This value is then added to the configuration file HC.CFG as set clockcorr n where n is the correction factor. Don't forget to add the minus sign if your correction counter moved to -10. Adding this value to the config file is best done with a simple text editor such as the DOS 6 editor.

One of the other plus points for short wave listeners is the facility to disable the transmit type ahead buffer. This takes out the transmit section at the top of the screen and makes the whole screen available for received text. You can do this either by typing Control R or by setting txwindow off in the config file.

If you would like a copy of Hamcomm 3, see the offers at the end of the column.



Above: PC Weatherspot aircraft reports
Below: PC Weatherspot radiosonde graph



Special Offers

The following special offers are available to Decode readers. Although I try to turn the orders around within a day or two you should allow up to two weeks for delivery.

JVFAX: Provides FAX and SSTV reception, transmission and image viewing facilities for PC users.

New HAMCOMM 3: Provides RTTY and c.w. transceive facilities for PC users. This program is supplied with PKTMON12 that enables reception of h.f. and v.h.f. packet signals.

Day Watson Beginners List: This comprises a chronological listing of reliable utility signals designed to ensure that the new listener can easily find some signals to decode. These are also some good listening tips and explanations.

Decode List: This is a straightforward frequency list of around 3 to 4 pages of reports sent in over recent months by Decode listeners.

FactPack 1 - Interference

Problems: This provides practical help in solving those difficult to cure interference problems with a special accent on computer noise.

FactPack 2 - Decoding

Accessories: Provides help in choosing and using accessories such as a.t.u.s, preselectors, filters, speakers, power units, etc.

Ordering Details:

JVFAX or HAMCOMM: For each program send a blank formatted 3.5in disk (720K or 1.44M) plus 50p and a self-addressed sticky label.

FactPack 1 or Beginners or Decode List: 50p each and a self-addressed sticky label

Two lists or FactPacks plus JVFX or HAMCOMM: blank formatted 3.5in disk (720K or 1.44M) plus £1.50 and a self-addressed sticky label.

Five items from the list, please send £2.00 plus a self-addressed label and disks. All six items, please send £2.50 plus disks and a self-addressed label.

Freq (MHz)	Mode	Speed	Shift	Call	Time	Notes
8.638MHz	CW	-	-	DAM	1746	Norddetch Radio
8.702MHz	RTTY	50	400	UHK	1158	Batumi Radio
19.747MHz	RTTY	50	400	6VU79	1141	Dakar Met
18.319MHz	RTTY	100	400	OMZ	0949	MFA Prague
10.973MHz	ARQ	100	170	HBD20	-	MFA Berne
13.953MHz	ARQ	100	170	HBD59	-	Swiss Embassy
4.993MHz	ARQ	100	170	-	-	Irish Navy
0.1342MHz	FAX	120	576	DCF54	0459	Offenbach
4.489MHz	RTTY	50	400	-	0744	Bracknell Met
14.452MHz	RTTY	50	400	HMP	1438	Pyongyang press

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LMS

Long Medium & Short Wave Bands

Searching the bands for the broadcasts mentioned in LM&S can be a rewarding experience, but other people in the house may find the sounds objectionable. If the windows are open the noise could easily annoy the neighbours. One should also bear in mind that sound travels long distances in the dead of night.

The solution, which may also clarify reception, is to wear headphones. There is a wide choice available at reasonable prices, but do make sure the impedance is correct - refer to the receiver handbook.

Long Wave Reports

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

The broadcasts from Radio Monte Carlo via Roumoules on 216kHz (1400kW) reached Eastern Canada on June 21. While searching the band in Quebec, **Alan Roberts** picked up their 5am news bulletin quite clearly. He used a new Lowe 'Europa' receiver with a 26MHz vertical dipole mounted on the chimney, which has proved to be his best antenna for long and medium wave reception.

Unusual reception conditions were observed by some listeners in the UK in June. Several of the stations heard regularly during daylight by **Fred Pallant** in Storrington were inaudible. In the late evening **Sheila Hughes** (Morden) had difficulty in receiving the broadcasts from Denmark via Kalundborg on 243 and there was no trace of Topolna on 270.

Medium Wave Reports

There were two reports of m.w. transatlantic reception this time. The first came from **Paul Logan** in Lisnaskea. On May 30 he awoke around 0330, checked the band and heard for the first time R.Nacional in La Paz, Bolivia on 1390! Subsequent checks during June proved disappointing, but he logged CJYQ in St. John's on 930 at 0245 and VOCM in St. John's on 590 at 0400. Weak signals were received around 0300 from WBBR in New York on 1130; WTOP Washington on 1500; WSSH Boston on 1510. Good signals from RFO in St. Pierre & Miquelon on 1375 were often received around dawn.

The second report was on reception in the reverse direction! At 0255 on June 18 Alan Roberts

(Quebec) picked up a broadcast on 1611. A man was speaking, but the signal was too poor to identify the language, rating just SIO132.

However, the interval signal which followed was that of Vatican Radio.

The sky waves from stations in the M.East were absent when **George Millmore** (Wootton, IoW) checked the band after dark, but he found reception from N.Africa better than usual, most signals rated SIO444. Many low power outlets in Spain were heard, including a few not logged before. In contrast, reception from E.Europe was very poor. The ground waves from some German stations reached him in daylight.

The test transmissions from London Country Radio via Crystal Palace on 1035 have been attracting attention. Quite good reception of them was reported by **Laurence Mason** in Hassocks. He tells me that the station will be called 'Country 1035' and that scheduled programming will commence at 1035BST on September 1. They claim it will be the first full-time Country Music station in Europe.

The most distant report on their tests came from **Gerry Haynes**, who picked up their signals at 1006 while staying in Talgarth, Powys. He also received the tests from 'Fortune 1458', which will serve the Manchester area via Ashton Moss (5kW) on 1458, they rated 42422 at 1828. Up in Warrington, **Scott Caldwell** logged them as 55555 at 1300.

Short Wave Reports

The higher frequency bands tended to remain open until later in the evening during June and an improvement in reception from some areas was noted.

Conditions in the **25MHz (11m)** band are now so unreliable that international broadcasters cannot provide a worthwhile service.

In contrast, many broadcasters use the **21MHz (13m)** band to reach selected target areas. Quite often R.Australia's broadcasts to Asia have reached our shores. Their Darwin transmission on 21.595 (Eng to S.Asia 0100?-0900) was 44333 at 0803 in Talgarth. Sometimes better reception was noted on 21.725 from Darwin (Eng to Asia 0900-1100). In Woking **John Eaton** logged it as 45444 at 1045.

Other broadcasters using this band in the morning include R.Pakistan, Islamabad 21.520 (Eng to Eu 0800-0845) 45243 at 0800 by **Eddie McKeown** in Newry;

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	K*
153	Donebach	Germany	500	A,B,C,D,E*,F,G,H*,J,K,L
162	Allouis	France	2000	A,B,C,E,F,G,H*,J,K,L
171	Nador Medi-1	Morocco	2000	D*,G*,H*
171	Kaliningrad	Russia	1000	B,C,E*,F,G,H*,L
177	Oranienburg	Germany	750	B,C,D*,E,G*,H*,K,L
183	SaarLouis	Germany	2000	B,C,E,F,G*,H*,J,K,L
198	Droitwich BBC	UK	500	A,B,E,F,H*,J,K,L
207	Munich	Germany	500	B,C,D*,E*,F,G*,H*,L
216	Roumoules RMC	S.France	1400	B,C,E,F,G,H*,I,J,K,L
216	Oslo	Norway	200	E*,G*
225	Raszyn Resv	Poland	1	B,D*,E*,G*,H*,K*,L
234	Berdweiler	Luxembourg	2000	A,B,C,E*,F,G,H*,J,K,L
234	St.Petersburg	Russia	1000	H*
243	Kalundborg	Denmark	300	A,B,C,E,F,G,H*,K,L
252	Tipaza	Algeria	1500	E*,F*,H*,K*
252	Atlantic 252	S.Ireland	500	A,B,C,E,F,G,H*,J,K,L
261	Burg	Germany	200	C,F,G,H,K,L
261	Taldom Moscow	Russia	2000	B,H
270	Topolna	Slovak Rep	1500	F,G*,K,L
279	Minsk	Belarus	500	H*,K,L

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

Listeners:

A: Scott Caldwell, Warrington.
B: Geoff Crowley, Aberdeen.
C: John Eaton, Woking.
D: Simon Hockenhill, E.Bristol.
E: Sheila Hughes, Morden.
F: George Millmore, Wootton, IoW.

G: Fred Pallant, Storrington.
H: Harry Richards, Barton-on-Humber.
I: Alan Roberts, Quebec, Canada.
J: Tom Smyth, Co.Fermanagh.
K: Andrew Stokes, Leicester.
L: Phil Townsend, E.London.

R.Japan via Moyabi 21.640 (Jap to Eu, M.East 0800-0900) 45444 at 0847 by **Geoff Crowley** in Aberdeen; RFI via Issoudun 21.620 (Fr to E.Africa 0700?-1700?) 44444 at 1045 by **Robert Connolly** in Kilkeel; UAER, Dubai 21.605 (Eng to Eu 1030-1055) 44434 at 1050 by **Vera Brindley** in Woodhall Spa; R.Pakistan, Islamabad 21.520 (Eng to Eu 1100-1120) 53333 at 1105 by **Chris Shorten** in Norwich.

Those noted in the afternoon were the BBC via Ascension Is 21.660 (Eng to Africa 0730-1745) SIO211 at 1300 by **Tom Smyth** in Co.Fermanagh; UAER, Dubai 21.605 (Eng to Eu 1330-1355) SIO344 at 1330 by **Kenneth Buck** in Edinburgh; UAER, Abu Dhabi 21.735 (Ar to Eu 0900-1358) SIO344 at 1330 by **Phil Townsend** in E.London; R.Portugal Int via Sines 21.515 (Eng to M.East, India? 1430-1500) 25423 at 1442 in Storrington; WYFR, Okeechobee 21.615 (Eng to Eu, Africa 1600-1700) 42332 at 1620 by **Darren Beasley** in Bridgwater.

Later, R.Nederlands via Bonaire 21.590 (Eng to Africa 1730-1925) was logged as 43333 at 1815 by **Rhoderick Illman** in Oxted; HCJB, Ecuador 21.455 (Eng, u.s.b. + p.c.) 35554 at 1900 by **Ross Lockley** in Stirling; WYFR via Okeechobee 21.500 (Ger to Eu, Africa 1900-2000) 35343 at 1930 by **Eric Shaw** in Chester; VOFC Taiwan via Okeechobee 21.720 (Eng to Eu, Africa 2200-2300) SIO222 at 2200 by **Julian Wood** in Elgin.

R.Australia's broadcasts reached the UK on three frequencies in the **17MHz (16m)** band: 17.880 to S.Asia via Darwin (Eng 0600?-0900) was 24542 at 0601 by **David Edwardson** in Wallsend; 17.715 to N.Asia via Carnarvon (Eng 0500?-0900) 23322 at 0845 by **Leo Barr** in Sunderland; 17.795 to Pacific areas via Shepparton (Eng 2130-0600) was 22332 at 2350 in Kilkeel.

In the morning the BBC via Kranji 17.830 (Eng to S.Asia, Aust, NZ 0500-1030) was 34422 at 0810 in

Talgarth; R.Pakistan, Islamabad 17.900 (Eng to Eu 0800-0845) 32233 at 0820 by **Bernard Curtis** in Stalbridge & (Eng to Eu 1100-1120) 53554 at 1105 in Bridgwater; Voice of Greece, Athens 17.525 (Gr, Eng to Aust 0850-0950) 34434 at 0912 by **Charles Bealand** in Gibraltar; Channel Africa, Johannesburg 17.810 (Eng to Africa 1000-?) 32333 at 1000 in Storrington; Africa No.1, Gabon 17.630 (Fr, Eng to W.Africa 0700-1600) 44434 at 1051 in Woking; HCJB Quito 17.890 Eng to N/S.Am 1130-1600) SIO222 at 1200 by **Tony King** in Swindon.

After mid-day the Voice of Greece, Athens 17.520 (Gr, Eng to N.Am 1300-1350) was SIO334 at 1335 in E.London; WEWN, Birmingham 17.510 (Ar to M.East 1400-1455) 45444 at 1409 by **Harry Richards** in Barton-on-Humber and (Eng to Eu 1500-1600) SIO333 at 1540 by **Philip Rambaut** in Macclesfield; BBC via Ascension Is 17.880 (Eng to C.Africa 1400-2030) 34322 at 1553 in Oxted.

In the evening R.Nederlands via Bonaire 17.655 (Eng to S/W.Africa 1730-2025) SIO444 at 1800 in Co.Fermanagh & 17.605 (Eng to W.Africa 1930-2025) 45544 at 1951 by **Ron Damp** in E.Worthing; DW via Wertachtal? 17.765 (Ha? to W.Africa 1800-1850) 25332 at 1830 in Chester; Voice of Greece, Athens 17.525 (Gr, Eng to S.Africa 1800-1850) 53333 at 1847 in Norwich; HCJB Quito 17.790 (Eng to Europe 1900-2000) 44333 at 1926 in Woodhall Spa, (Port to Eu 2000-2030) 33323 at 2000 by **Peter Pollard** in Rugby & 17.490 (Port 2000-2030 u.s.b. + p.c.) 25321 at 2000 in Chester; R.Havana Cuba 17.760 (Eng to Eu 2100-2200) 34233 at 2102 in Newry; RCI via Sackville 17.875 (Eng to Eu 2030-2130) 55545 at 2110 by **Michael Griffin** in Ross-on-Wye; VOFC Taiwan via Okeechobee 17.750 (Eng to Eu, Africa 2200-2300) 44444 at 2200 by **Clare Pinder** in Appleby.

Good reception from some areas

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof-Saale (BR)	Germany	0.2	A*,D*
531	Ain Beida	Algeria	600	I*,K*,Q*
531	Torshavn	Faroe Is.	100	D
531	Leipzig	Germany	100	C,M*,Q*
531	Beromunster	Switzerland	500	D*,M*
540	Wavre	Belgium	150/50	C,D*,J*,K,M*,Q,R
540	Sidi Bennour	Morocco	600	K*
540	Victoria (EI)	Spain	10	G*
549	Les Trembles	Algeria	600	A*,I*,J*,K*,M*
549	Thurau (DLF)	Germany	200	B*,C,D*,K,M*,Q,R
549	St Petersburg	Russia	1000	D*,M*
558	Espoo	Finland	100	A*,K*,M*
558	Rostock (NDR)	Germany	20	Q*
558	RNE5 via ?	Spain	?	J*
567	Berlin	Germany	100	A*,K*
567	Tullamore (RTE1)	Ireland (S)	500	A,B,C,D*,I,J,K,M*,P,Q
567	RNE5 via ?	Spain	?	J*,K*
576	Muhlacker (SDR)	Germany	500	A*,C*,K,M*,Q*,R
576	Barcelona (RNE5)	Spain	50	D*,J*,K*
585	Orl Wien	Austria	600	C*
585	Paris (FIP)	France	8	A,F,K,R
585	Madrid (RNE1)	Spain	200	A*,D*,J*,K*,M*,P,Q
585	Dumfries (BBCS)	UK	2	D
594	Frankfurt (HR)	Germany	1000/400	A*,C*,D*,K,M*,Q*,R
594	Oujda-1	Morocco	100	A*
594	Muge	Portugal	100	A*,K*
603	Sevilla (RNE5)	Spain	50	M*,N*
603	Newcastle (BBC)	UK	2	C,D*,N
612	Athlone (RTE2)	Ireland (S)	100	B*,C*,D,J,J,M*,P,Q,R
612	Sebaa Aioun	Morocco	300	A*
612	RNE1 via ?	Spain	10	A*,K*
621	Wavre	Belgium	80	C,D*,J*,K,Q
621	Barcelona (OCR)	Spain	50	K*,M*
630	Dannenberg (NDR)	Germany	100	C*
630	Vigra	Norway	100	A*,D,M*,P,Q
630	Tunis-Djedeida	Tunisia	600	K*
639	Praha (Liblice)	Czech	1500	A*,C*
639	RNE1 via ?	Spain	10	J*,K*,M*,Q*
648	RNE1 via ?	Spain	10	J*,K*,M*,P*,R
648	Orfordness (BBC)	UK	500	C,D,J*,K*,Q*,R
657	Napoli	Italy	120	A*
657	Madrid (RNE5)	Spain	20	J*,K*
657	Wrexham (BBC)	UK	2	A,J,M*,Q
666	Bodenseesdr (SWF)	Germany	300/180	A*,M*
666	R.Vilnius	Lithuania	500	A*,K*
666	Lisboa	Portugal	135	A*,K*
675	Marseille	France	600	M*
675	Lopic (R10 Gold)	Holland	120	B*,C,D,J,K,M*,N,Q,R
684	Sevilla (RNE1)	Spain	500	A*,C*,J*,K*,M*,Q*,R
684	Beograd	Yugoslavia	2000	A*,D*,M*
693	Burghhead (BBC5)	UK	50	D*,M*
693	Droitwich (BBC5)	UK	150	B*,J*,K*,Q,R
693	Enniskillen (BBC5)	UK	1	P
693	Postwick (BBC5)	UK	10	C
702	Flensburg (NDR)	Germany	5	A*
702	Zamora (RNE1)	Spain	100	A*,D*,K*,M*,Q
711	Rennes 1	France	300	C,I,J,K,M*,Q*,R
711	Laayoune	Morocco	600	K*
711	Murcia (COPE)	Spain	5	D*
720	Langenberg	Germany	200	A*,C*
720	Lisnagarvey (BBC4)	Ireland (N)	10	A*,D*,K*,M*,P
720	Norte	Portugal	100	M*
720	Lots Rd Ldn (BBC4)	UK	0.5	A,C,J,K,Q*
729	Cork (RTE1)	Ireland (S)	10	D,M*,P
729	RNE1 via ?	Spain	?	J*,K*,M*
738	Paris	France	4	K
738	Poznan	Poland	300	K*
738	Barcelona (RNE1)	Spain	500	B*,D*,J*,K*,M*,Q*
747	Flevo (Hilv2)	Holland	400	C,D*,J,K,M*,Q*,R
747	Badiz (RNE5)	Spain	10	K*,M*
756	Braunschweig (DLF)	Germany	800/200	B*,C*,K*,M*,Q*
756	Lugoj	Romania	400	D*
756	Bilbao (EI)	Spain	5	K*
756	Redruth (BBC)	UK	2	K*
756	Sottens	Switzerland	500	D*,J*,K*,M*,Q*
774	RNE1 via ?	Spain	?	J*,K*,M*,Q*
774	Plymouth (BBC)	UK	1	D
783	Burg	Germany	1000	K*,M*,Q*
783	Miramar (R,Porto)	Portugal	100	K*,M*
783	Tartus	Syria	600	D*
792	Limoges	France	300	K*,M*
792	Lingen (NDR)	Germany	5	K*
792	Sevilla (SER)	Spain	20	K*
792	Londonderry (BBC)	UK	1	P,Q*
801	Munchen-Ismaning	Germany	300	M*,Q*
801	RNE1 via ?	Spain	?	K*
810	Madrid (SER)	Spain	20	K*,M*
810	Burghhead (BBCS)	UK	100	A*,D
810	Westergien (BBCS)	UK	100	A*,B,C*,I*,J*,K*,M*,P*,Q*
819	Batna	Egypt	450	A*,G*
819	Toulouse	France	50	K*,Q*
819	Rabat	Morocco	25	M*
819	Warsaw	Poland	300	A*
819	S. Sebastian (EI)	Spain	5	G*
828	Hannover (NDR)	Germany	100/5	J*,M*
828	Barcelona (SER)	Spain	50	D
837	Nancy	France	200	M*,P*
837	COPE via ?	Spain	?	J*,K*,M*
846	Rome	Italy	540	A*,C*,D*,J*,K*,M*,Q*
855	R.Bucharest	Roumania	750	P*
855	RNE1 via ?	Spain	?	J*,K,M*,Q*
864	Santah	Egypt	500	D*,M*
864	Paris	France	300	J,K,R
873	Frankfurt (AFN)	Germany	150	A*,B*,C*
873	Zaragoza (SER)	Spain	20	K*,M*
882	COPE via ?	Spain	?	A*,K*,M*
882	Washford (BBC)	UK	100	A*,C*,D,J,K,M*,P,Q*,R
891	Algiers	Algeria	600/300	A*,D*,F*,K*,M*,Q*
891	Huisberg	Netherlands	20	C*,K*,Q*
900	Milan	Italy	600	A*,C*,D*,K*,M*
900	COPE via ?	Spain	?	M*

Freq (kHz)	Station	Country	Power (kW)	Listener
909	Lisnagarvey (BBC5)	N.Ireland	10	P
909	Bournemouth (BBC5)	UK	0.025	K
909	Bmans Pk (BBC5)	UK	140	C*,J*,Q*
909	M'side Edge (BBC5)	UK	200	C*,M*
909	Westergien (BBC5)	UK	50	D
918	R Ljubljana	Slovenia	600/100	C*,D*,E,K*,M*,Q*
918	Madrid (R.Int)	Spain	20	A*,M*
927	Wolvertem	Belgium	300	C,D,E,K,M*,R
936	Bremen	Germany	100	C,D,E,K*,M*,Q*
936	Venezia	Italy	20	A*,K*,M*
936	RNE5 via ?	Spain	?	E
936	L'vov	Ukraine	500	G
945	Toulouse	France	300	D,E*,J*,K*
954	Madrid (CI)	Spain	20	B*,E,K*,M*
963	Pori	Finland	600	C*,M*,Q*
963	Tir Chonaill	Ireland (S)	10	P
972	Hamburg (NDR)	Germany	300	C,E,K*,M*,Q*
972	Nikolayev	Ukraine	500	G
981	Barcelona	Algeria	600/300	A*,B*,E,J*,K*,M*,Q*
981	Megara	Greece	200	G
990	Berlin	Germany	300	Q*
990	R.Bilbao (SER)	Spain	10	E,K*,M*
990	Redmoss (BBC)	UK	1	C,P
999	Schwerin (RIAS)	Germany	20	A*,M*
999	Torino	Italy	200	G
999	Madrid (COPE)	Spain	50	A*,E,M*
1008	Las Palmas (SER)	Gran Canaria	?	A*,M*
1008	Flevo (Hilv-5)	Holland	400	C,D,E,K,M*,R
1008	Aleksinsac/B grad	Yugoslavia	400/200	G*
1017	Rheinsender (SWF)	Germany	600	B*,C*,D*,E,K*,Q*
1026	Graz-Doib	Austria	100	A*,K*
1026	Spain ?	Spain	?	M*
1035	Tallinn	Estonia	500	M*
1035	RAI via ?	Italy	?	E*
1035	Lisbon (Prog3)	Portugal	120	A*
1044	Dresden	Germany	250	Q*
1044	Sebaa-Aioun	Morocco	300	M*
1044	S. Sebastian (SER)	Spain	10	E*,M*
1062	Kalundborg	Denmark	250	C,D,E*,M*,Q*
1062	Norte	Portugal	100	D*,G
1071	Brest	France	20	K,Q*
1071	France-Inter	France	?	E
1071	Lille	France	40	C,D*,R
1071	Bilbao (EI)	Spain	5	M*
1080	Katowice	Poland	1500	E,K*,Q*
1080	SER via ?	Spain	?	C*,M*
1098	Nitra (Jarok)	Slovakia	1500	C*,D*,E,M*,Q*
1107	AFN via ?	Germany	10	D*,I*
1107	RNE5 via ?	Spain	?	K*,M*,P
1116	Bari	Italy	150	E,G,K*
1125	Deanevec	Croatia	100	D*,M*
1125	RNE5 via ?	Spain	?	K*,M*,Q
1125	Llandrindod Wells	UK	1	M*
1134	Zadar	Croatia	600/1200	D*,M*,P*
1134	COPE via ?	Spain	2	K*
1143	Stuttgart (AFN)	Germany	10	M*,Q*
1143	Messina	Italy	6	K*
1152	RNE5 via ?	Spain	10	M*
1161	Strasbourg (Flnt)	France	200	K*,M*
1179	SER via ?	Spain	?	C*,K*,M*,Q
1179	Solivesborg	Sweden	600	D*,I*,P*,K*,L*,M*,P*,Q*
1188	Kurune	Belgium	5	C,K,R
1188	Reichenbach (MDR)	Germany	5	M*
1188	Szolnok	Hungary	135	D*,M*
1197	Minsk	Belarus	50	D*,P*
1197	Virgin via ?	UK	?	A,C,D*,E,J,K,M*,Q,R
1205	Wroclaw	Poland	200	K*,M*
1215	Virgin via ?	UK	?	A,C,D*,J,K,M*,N,P,Q,R
1224	Vidin	Bulgaria	500	M*,Q*
1224	Virgin via ?	UK	?	A,D*,J,Q*
1233	Liege	Belgium	5	K*
1233	Virgin via ?	UK	?	A,C*,J,M*,Q
1242	Virgin via ?	UK	?	B*,C,D,J*,M*,Q
1251	Marcali	Hungary	500	D*,M*
1260	SER via ?	Spain	?	K*
1260	Guildford (V)	UK	?	A,D*,K
1260	Nukus	Uzbekistan	100	D*
1269	Neumunster (DLF)	Germany	600	B*,C,D*,K*,M*
1269	COPE via ?	Spain	?	K*
1278	Strasbourg	France	300	K*,M*
1278	Dublin/Cork (RTE2)	Ireland (S)	10	B,C,D*,J,M*,P,Q
1287	RFE via ?	Czech Rep.	400	D*,K*,Q*
1287	Lerida (SER)	Spain	10	D*,K*,M*
1296	Valencia (COPE)	Spain	10	M*
1296	Orfordness (BBC)	UK	500	C,D*,K*,Q
1305	Rzeszow	Poland	100	D*
1305	RNE5 via ?	Spain	?	M*
1314	Kritsoy	Norway	1200	C,D,J,K*,M*,Q,R
1323	Wachenbrunn (RMMS)	Germany	1000/150	D*,M*
1332	Rome	Italy	300	D*,K*
1341	Lisnagarvey (BBC)	Ireland (N)	100	C*,D*,I*,J*,K*,M*,P
1341	Tarrasa (SER)	Spain	2	K*
1350	Nancy/Nice	France	100	C*,J*,K*,M*,Q
1350	Cesvaine/Kuldiga	Latvia	50	D*
1359	Melilla	Morocco	5	K*
1359	Arganda (RNE-FS)	Spain	600	B*,D*,M*
1368	Foxdale (Manx R)	IO M	20	A*,B,D*,I*,K*,M*
1377	Lille	France	300	C,D,J*,K,M*,Q,R
1386	Bolshakov	Russia	2500	D*,I*,K*,M*,Q
1395	Lushnje (Tirana)	Albania	1000	D*,K*,M*,Q
1404	Ajaccio	France	20	J*
1404	Brest	France	20	A*,D*,K,M*,Q
1413	RNE5 via ?	Spain	?	D*,K*,M*
1422	Alger	Algeria	50/25	K*
1422	Hausweiler (SR)	Germany	1200/600	C*,D*,J*,M*
1431	Nikolayev	Ukraine	400	J*,M*
1440	Marnach (RTL)	Luxembourg	1200	C,D*,K,M*,N,Q
1440	Damman	Saudi Arabia	1600	G*,N*
1440	Jagodina	Yugoslavia	20/10	6*
1449	Berlin	Germany	5	M*
1449	Squinzano	Italy	50	G*
1449	Redmoss (BBC)	UK	2	C,D,M*,Q*
1458	Lushnje (Tirana)	Albania	500	A*,D*,Q

Freq (kHz)	Station	Country	Power (kW)	Listener
1467	Monte Carlo (TWR)	Monaco	1000/400	D*,K*
1476	Wien-Bisamberg	Austria	600	C*,K*,P*
1485	SER via ?	Spain	?	K*
1484	Glermont-Ferrand	France	20	K*
1484	St. Petersburg	Russia	1000	D*
1503	Stargard	Poland	300	A*,D*,K*
1503	RNE5 via ?	Spain	?	A*
1512	Wolvertem	Belgium	600	C,D,K,L*,P*,Q,R
1521	Kosice (Cizitate)	Slovakia	600	K*
1521	Duba	Saudi Arabia	2000	Q*
1521	R.Mansera (SER)	Spain	2	B*,K*
1530	Vatican R	Italy	150/450	K*,Q*
1539	Mainflingen (DLF)	Germany	700	C*,D*,J*,K*,P*,Q
1548	Laghouat	Algeria	20	G*
1557	Nice	France	300	P*,Q*
1566	Samen	Switzerland	300	Q*
1566	Slax	Tunisia	1200	G*
1575	Genova	Italy	50	A*,G*,K*,M*
1575	SER via ?	Spain	5	D*,K*,Q*
1584	SER via ?	Spain	2	K*,Q*
1593	Dniopropetrovsk	Ukraine	5	D*,G*
1602	SER via ?	Spain	?	K*
1602	Vitoria (EI)	Spain	10	D*,M*
1611	Vatican R	Italy	15	Q*

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

Listeners:
 A: Clive Boutell, Dovercourt.
 B: Scott Caldwell, Warrington.
 C: Sean Cooper, Wells-next-the-Sea.
 D: Geoff Crowley, Aberdeen.
 E: Wilfried Derynck, Ichtegem, Belgium.
 F: John Eaton, Woking.
 G: Gerry Haynes, Talgarth, Powys.
 H: Francis Hearne, N.Bristol.
 I: Simon Hockenhill, E.Bristol.
 J: Tony King, Swindon.
 K: George Millmore, Wootton Bassett.
 L: Clare Pinder, Appleby.
 M: Martin Price, Shrewsbury.
 N: Harry Richards, Barton-on-Humber.
 O: Alan Roberts, Quebec, Canada.
 P: Tom Smyth, Co.Fermanagh.
 Q: Andrew Stokes, Leicester.
 R: Phil Townsend, E.London.

was noted in the **15MHz (19m)** band. In the daytime RTL via Junglinster 15.350 (Ger to USA 24hrs) was 44444 at 0820 in Stalbridge; Voice of Greece, Athens 15.650 (Gr, Eng to Eu, Asia, Far East 1000-1050) 44444 at 1040 in Warrington & 15.630 (Gr, Eng to N.America 1300-1350) 54454 at 1336 in Newry; R.Finland via Pori 15.400 (Eng to N.Am 1130-1200) 53343 at 1137 in Norwich; BBC via Limassol 15.575 (Eng to M.East 0400-1500) 34333 at 1143 in Barton-on-Humber & via Antigua, W.Indies 15.220 (Eng to C/S, Am 1200-1400) 54433 at 1346 in Talgarth; R.Australia via ? 15.565 (Eng to Asia 1100-1300) SIO333 at 1152 in Macclesfield; SRI via Schwarzenburg? 15.505 (Eng, Fr, It, Ger to SE.Asia 1300-1500) SIO343 at 1300 in Co.Fermanagh; UAER, Dubai 15.395 (Eng to Eu 1330-1400) SIO444 at 1330 in Edinburgh; World Voice of Adventism via WCSN 15.665 (Eng to Europe 1500-1700) 44333 at 1600 in Morden.

In the evening RNB Brazil 15.265 (Eng, Ger to Eu 1800-2020) was 32222 at 1845 in Rugby and 33223 at 1929 in Gibraltar; WEWN, Birmingham 15.695 (Eng, Fr, It, Ger, Serb to Eu 1800-2200) 45554 at 1900 in Woking; VOA via Morocco 15.205 (Eng to Eu, M.East, N.Africa 1500-2200) SIO444 at 1930 by **Francis Hearne** in N.Bristol & 15.445 (Eng to Africa 1900-2200) SIO222 at 2134 in Elgin

Tropical Bands

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2050	D,H
2.325	ABC Tennant Creek	Australia	2101	H,P
2.485	ABC Katherine	Australia	2013	H
3.200	TWR Ndebele	Swaziland	0326	H,N
3.210	Em-Nacional, Maputo	Mozambique	2025	G,H,N
3.220	R.HC.IB Quito	Ecuador	0005	D,O
3.220	R.Togo, Lome	Togo	2100	D,H,N
3.230	SABC Oranje Meyerton	S Africa	2357	D,N
3.232	RRI Bukittinggi	Indonesia	2355	D
3.240	TWR Shona	Swaziland	1924	H,N
3.245	R.Clube Varginha	Brazil	0330	N
3.255	BBC via Maseru	Lesotho	2135	D,G,H,I
3.267	RRI Gorontalo	Indonesia	2120	D
3.270	SWABC 1, Namibia	SW Africa	1931	H,N
3.279	La Voz del Napo	Ecuador	0015	D
3.280	R.Beira	Mozambique	1954	H
3.290	SWABC 2, Namibia	SW Africa	2110	D,H,N
3.300	R.Cultural	Guatemala	0125	D,N,O
3.310	Channel Africa	S Africa	1856	H
3.315	AIR Bhagal	India	0025	D,H,N
3.315	R.Manus, Lorengau	New Guinea	2120	D
3.315	SLBS Goderich	Sierra Leone	2227	D,F,G,I,N
3.325	FRCN Lagos	Nigeria	2229	E,G,N
3.335	CBS Taipei	Taiwan	2028	H,N,P
3.338	R.Maputo	Mozambique	1943	H,N
3.355	R.Nac.Luanda	Angola	2257	D,N
3.356	R.Botswana	Gaborone	2030	E,G,H,N,O,P
3.359	RTV Malagasy	Madagascar	1841	H
3.365	R.Cult. Araraquara	Brazil	0212	N
3.365	R.Rebeld. La Julia	Cuba	0150	D,F
3.365	GBC R-2	Ghana	2030	A,D,E,F,G,I,K,N,O,PR
3.365	AIR Delhi	India	1833	H
3.370	R.Beira	Mozambique	1953	H
3.375	R.Nacional S.Gabriel	Brazil	0030	D
3.380	R.Malawi	Malawi	2012	D,E,H,M,N,P
3.385	RFO Cayenne	Guiana	0309	O
3.915	BBC Kranji	Singapore	2135	A,D,E,H,J,L,N,O
3.945	Vatican Radio	Italy	2004	L,O
3.955	BBC Skelton	England	2020	D,E,U
3.955	R.Budapest	Hungary	2100	E,K,L,O,S
3.955	Novo-Birsk rly A.Ata	Kazakhstan	?	R
3.965	RRI Paris	France	2125	D,E,J,K,L,O,R,U
3.980	VOA Munich	Germany	2125	D,E,J,K,O,T,U
3.985	China R via SRI	Switzerland	2125	C,D,E,O,Q,S
3.985	SRI Beromunster	Switzerland	2030	E,K,O,U
3.995	DW via Juich	Germany	0200	B,D,E,I,L,O,R
4.035	Xizang PBS, Lhasa	Tibet	2246	F
4.409	R.Eco, Reyes	Bolivia	2354	N
4.450	R.Frontera, Cobija	Bolivia	0245	N
4.470	R.Movima	Bolivia	0030	D,N
4.600	R.Pera del Acre	Bolivia	0035	D,N
4.650	R.Santa Ana	Bolivia	0035	D,N
4.755	R.Educ CP Grande	Brazil	0314	O,R
4.760	Yunnan PBS, Kunming	China	2210	F,K
4.760	AIR Port Blair	India	1716	H
4.760	ELVA Monrovia	Liberia	2014	N,P
4.765	R.Integracao	Brazil	0040	D
4.765	R.Rural, Santarem	Brazil	0145	N
4.765	Brazzaville	PR.Congo	2019	A,D,E,H,I,N,O,P
4.765	RRI Medan	Indonesia	2200	N
4.770	Centinela del Sur	Ecuador	0055	D
4.770	FRCN Kaduna	Nigeria	2019	D,E,F,G,N,O,PR
4.770	R.Mundial, Bolivar	Venezuela	0205	O
4.777	R.Gabon, Libreville	Gabon	2010	E,N
4.783	RTM Bamako	Mali	2018	D,N,Q,PR
4.785	R.Tanzania	Tanzania	1913	E
4.786	R.Federacion	Ecuador	0208	O
4.790	Azad Kashmir R.	Pakistan	1720	H
4.790	R.Atlantida	Peru	0045	D,N
4.790	TWR Manzini	Swaziland	1751	H
4.800	R.Nac Amazonas	Brazil	?	R
4.800	AIR Hyderabad	India	1713	H
4.800	LNBS Lesotho	Maseru	2010	E,H,N,O,P
4.805	R.Nac Amazonas	Brazil	0050	D,F,N
4.805	R.Villa Rica	Peru	0128	N
4.810	R.San Martin Tara	Peru	0210	O
4.810	SABC Meyerton	S Africa	2040	E,H,N
4.815	R.Difusora, Londrina	Brazil	0045	D
4.815	R.diff TV Burkina	Ouagadougou	2010	D,E,N,PR
4.820	R.Paz Y Bien	Ecuador	0137	O
4.820	La Voz Evangelica	Honduras	0107	D,N,O,R
4.825	R.Cancao Nova	Brazil	0211	N,O
4.825	V of Selva	Peru	0234	N

Freq (MHz)	Station	Country	UTC	DXer
4.830	R.Botswana, Gaborone	Botswana	2021	D,E,F,H,M,N,O,P
4.830	R.Tachira	Venezuela	0045	D,N,O
4.835	R.Teziutlan, Coban	Guatemala	0110	D,F,N,O
4.835	RTM Bamako	Mali	2012	B,D,E,F,K,N,O,PR
4.840	AIR Bombay	India	1651	H
4.840	R.Valera, Trujillo	Venezuela	0055	D
4.845	R.Fides, La Paz	Bolivia	0115	D
4.845	R.Cabocia, Manaus	Brazil	0230	N
4.845	ORTM Nouakchott	Mauritania	2010	B,D,N,PR
4.850	R.Yaounde	Cameroon	2325	D,E,N
4.855	R.Centenario	Bolivia	0100	D,N
4.860	AIR Kingsway(Feeder)	India	1911	H,N,P
4.865	PBS Lanzhou	China	2150	E,F,N
4.865	L.V. del Cinaruco	Colombia	0110	D,N
4.870	R.Cotonou	Benin	2018	D,E,G,K,L,N,P
4.875	R.Roraima, Boa Vista	Mozambique	0215	N
4.880	R.Nac. Espejo, Quito	Ecuador	2350	D,N
4.885	R.Clube do Para	Brazil	0112	D,N,O,R
4.885	R.Difusora Acreana	Brazil	0100	D
4.885	KBC Nairobi	Kenya	2032	E,H,O,P
4.890	RFI Paris	via Gabon	0359	N,O
4.895	R.IPB AM C'po Grande	Brazil	0225	N
4.895	Pakistan BC	Pakistan	1837	H,P
4.900	SLBC Colombo	Sri Lanka	0007	H,N
4.905	R.Nat.N'djamena	Chad	?	R
4.910	AIR Jaipur	India	1731	H
4.910	R.Zambia, Lusaka	Zambia	2044	E,H,N,P
4.915	R.Anhangera	Brazil	0430	N
4.915	PBS Guangxi, Nanning	China	2150	D
4.915	GBC-1, Accra	Ghana	2010	B,D,E,G,I,J,N,PR
4.915	Voice of Kenya	Kenya	1945	P
4.915	R.Cora, Lima	Peru	0216	N,O
4.920	R.Quito	Ecuador	0330	G
4.920	AIR Madras	India	1716	H
4.925	R.Difusora, Taubate	Brazil	0115	D
4.925	R.Nacional, Bata	Eq.Guinea	2110	E
4.927	RRI Jambi	Indonesia	2210	N
4.935	Voice of Kenya	Kenya	2007	H,N,P
4.935	R.Tropical, Tarapoto	Peru	0110	D
4.940	AIR Guwahati	India	?	R
4.945	Channel Africa	S Africa	1748	H
4.950	R.Nac.Luanda	Angola	2142	E
4.950	R.Madre de Dios	Peru	0100	D,I,N
4.955	R.Mariajoara, Belem	Brazil	0220	D,E,N,O
4.960	R.Federacion, Sucua	Ecuador	0015	N
4.975	R.Uganda, Kampala	Uganda	2008	E,N,P
4.980	Ecos del Torbes	Venezuela	0115	B,O,E,G,K,N,O,R
4.985	R.Brazil Central	Bolivia	0026	G,N,R
4.990	R.Animas, Chocaya	Bolivia	0215	N
4.990	AIR Ext. Service	India	0100	N,O
4.990	FRCN Lagos	Nigeria	2016	D,E,G,N,O,P
4.990	R.Ancash, Huaraz	Peru	0105	D
4.995	R.Andina, Huancayo	Peru	0155	N
5.005	R.Libertad, La Paz	Bolivia	0110	D
5.005	R.Nacional, Bata	Eq.Guinea	2029	D,E,G,H,N,P
5.005	R.Nepal, Kathmandu	Nepal	1706	H
5.010	R.Garoua	Cameroon	2009	D,P
5.010	Es.Radiofonicos Pop	Ecuador	0243	N
5.010	AIR Thiru'puram	India	0120	O
5.020	La Voz du Sahel	Niger	2014	D,N,P
5.020	ORTN Niamey	Niger	2226	E,H
5.025	R.Parakou	Benin	2123	D,F,N
5.025	R.Rebeld. Habana	Cuba	0120	D,N,O
5.025	R.Quillabamba	Peru	0115	D
5.025	R.Uganda, Kampala	Uganda	2132	E,O
5.035	R.Aparecida	Brazil	0115	D,N
5.035	R.Bangui	C Africa	2006	D,E,F,N,PR
5.040	Voz del Upano, Macas	Ecuador	0155	D,N
5.040	R.Maturin	Venezuela	0030	N
5.045	R.Cultura do Para	Brazil	0110	D,N
5.047	R.Togo, Lome	Togo	2014	B,D,E,K,N,PR
5.050	Voz de Yopal, Yopal	Colombia	0225	O
5.050	Em Jesus Gran Poder	Ecuador	0015	N
5.050	R.Tanzania	Tanzania	1938	N,P
5.055	R.Difusora, Caceres	Brazil	0125	D
5.055	RFO Cayenne(Matoury)	French Guiana	0309	D,E,N,O
5.055	TWR Manzini	Swaziland	0400	N
5.060	Sist d'Em Progreso	Ecuador	0245	N
5.075	Caracol Bogota	Colombia	0120	D,G,N,O,R
5.083	R.Mundo, Cusco	Peru	0030	N
5.097	R.Eco, Iquitos	Peru	0127	D
5.323	R.Origin	Peru	0130	D

Eu 2200-2300) SIO454 at 2215 in Edinburgh; WWCR, Nashville 13.845 (Eng to E.USA 1200-0200) 43333 at 2220 in Kilkeel; UAER, Abu Dhabi 13.605 (Eng to USA 2200-0000) SIO444 at 2230 by **John Sadler** in Bishops Stortford.

In the **11MHz (25m)** band R.Australia has been frequently heard here on 11.910 from Shepparton (Eng to Pacific areas 0630-0900), logged as 53433 at 0841 in Talgarth; 11.660 from Carnarvon (Eng, Chin to S.Asia 1430-1800) 32332 at 1535 in Woking; also 11.695 from Shepparton (Eng to Pacific areas 1430-2055) 33333 at 1600 in Bridgwater.

Also received here were Slovak R.Int, via Velke Kostolany 11.990 (Eng to Aust 0830-0857) noted as 43323 at 0831 in Sunderland; VOA via Greenville 11.915 (Eng to C.Am, Caribbean 1000-1200) 25333 at 1058 in Barton-on-Humber; KTWR Agana, Guam 11.580 (Eng to S.Asia 1445-1700) SIO222 at 1530 in Macclesfield; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N.Africa 1400-1600) 33222 at 1540 in Warrington; R.Pakistan, Islamabad 11.570 (Eng to M.East 1600-1630) 55545 at 1615 in Norwich; China R.Int, Beijing 11.575 (Eng to E/S.Africa 1600-1755?) 34233 at 1650 in Newry; Voice of Israel, Jerusalem 11.675 (Eng to E.U, Russia, W.Asia 2130-2200) 34233 at 2136 in Woodhall Spa; WEWN, Birmingham 11.820 (Port to Am 2200-2300) 43333 at 2250 in Kilkeel.

Programmes for European listeners were noted from R.Finland via Pori 11.755 (Eng, Fin, Sw, Fr, Ger, Russ 0530-2125?) SIO333 at 0640 in Bishops Stortford; HCJB Quito 11.835 (Eng 0700-0830) SIO444 at 0715 in N.Bristol; ERA Thessaloniki, Greece 11.595 (Gr 0900?-2255?) 34333 at 0906 in Oxted; R.Romania Int, Bucharest 11.940 (Eng 1300-1400) 55544 at 1300 in Stirling; R.Pakistan, Islamabad 11.570 (Eng, Ur 1700-1855) 45554 at 1710 in Walsend; AIR via Bangalore 11.620 (Eng, Hi 1745-2230) SIO333 at 1800 in Co.Fermanagh; R.Kuwait via Kabd 11.990 (Eng 1800-2100) SIO455 at 1830 in Edinburgh and 33333 at 2014 in Gibraltar; REE via Noblejas 11.775 (Eng 1900-2000) 53344 at 1900 in Appleby; R.Bulgaria, Sofia 11.720 (Eng 1900-2000) 55555 at 1945 in Chester; R.Damascus, Syria 12.085 (Eng 2005-2105) 44343 at 2013 in E.Worthing; R.Japan via Moyabi 11.925 (Eng 2100-2155) 44333 at 2130 in Morden; Israel R, Jerusalem 11.603 (Eng 2130-2200, also to USA) 54333 at 2134 in Ross-on-Wye.

There is much of interest the listener in the **9MHz (31m)** band! In the morning Monitor R.Int via WSHB Cypress Creek 9.840 (Eng to Eu 0600-0800) was 33333 at 0755 in Stalbridge; R.Australia via Shepparton 9.710 (Eng to Pacific areas 0630-0900) 31422 at 0801 in Talgarth; HCJB Quito, Ecuador 9.745 (Eng to S.Pacific 0715-1125) 44333 at 0844 in Aberdeen; R.Nederlands via Flevo 9.895 (Eng to Eu 0830-

DXers:

- A: Leo Barr, Sunderland.
- B: Charles Beanland, Gibraltar.
- C: Scott Caldwell, Warrington.
- D: Robert Connolly, Kilkeel.
- E: Geoff Crowley, Aberdeen.
- F: John Eaton, Woking.
- G: David Edwardson, Walsend.
- H: P.Gordon Smith, Kingston, Meray.
- I: Bill Griffith, W.London.
- J: Simon Hockenhill, E.Bristol.
- K: Sheila Hughes, Morden.
- L: Tony King, Swindon.
- M: Ross Lockley, Stirling.
- N: Paul Logan, Lisnaskea.
- O: Eddie McKeown, Newry.
- P: Fred Pallant, Storrington.
- Q: Clare Pinder, Appleby.
- R: Harry Richards, Barton-on-Humber.
- S: Chris Shorten, Norwich.
- T: Tom Smyth, Co.Fermanagh.
- U: Phil Townsend, E.London.

(Ger, Eng, Fr, Sp to Eu 0400-1800) SIO444 at 0730 in N.Bristol; R.Vlaanderen Int, Brussels 13.690 (Eng to Eu 0900-0930) 55555 at 0900 in Aberdeen; R.Australia via Darwin on 13.605 (Eng, Chin to Asia 0900-1355) 34433 at 1144 in Newry. After mid-day, UAER, Dubai 13.675 (Eng to Eu 1330-1400) was SIO222 at 1330 in Co.Fermanagh & (Eng to Eu 1600-1640) 35333 at 1635 in E.Bristol; R.Nederlands via Flevo 13.700 (Eng to S.Asia, M.East 1330-1625) 43343 at 1538 in Norwich; VOA via Selebi-Phikwe 13.710 (Eng to Africa 1600-2200) 45544 at 1605 in Stirling; UAER, WJCR, Upton 13.595 (Eng 24hrs) SIO333 at 1733 in Talgarth; AWR (KSDA) Guam 13.720 (Eng 1700-

1900, Sat/Sun only) 24232 at 1810 in Bridgwater.

Later, DW via Juich? 13.790 (Eng to W.Africa 1900-1950) was 44444 at 1910 in Chester; SRI via Sottens? 13.635 (Eng, Fr, It, Ger to Africa 2000-2200) 43333 at 2030 in Rugby; WHRI, South Bend, 13.760 (Eng to E.USA, Eu 1700-0000) 35443 at 2044 in E.Worthing; RCI via Sackville 13.650 (Eng to Eu 2030-2130) 45555 at 2108 in Storrington & 13.670 (Eng to Africa 2030-2130) 34333 at 2058 in Woking; Monitor R.Int via WCSN 13.770 (Eng to Africa 2000-2057, Eng to Eu 2100-2157) 43333 at 2110 in Stalbridge & via WSHB 13.770 (Eng to Eu, Africa 2200-0000) 35333 at 2234 in Barton-on-Humber; WEWN, Birmingham 13.615 (Eng to

1030) 44343 at 0904 in Oxted; WEWN, Birmingham 9.370 (Eng to Eu 1000-1200) 24222 at 1019 in Sunderland; SRI via Lenk? 9.535 (Eng to Eu 1000-1030) 55545 at 1020 in Ross-on-Wye; R.Prague, Czech Rep 9.505 (Eng to Eu 1030-1057) SIO433 at 1030 in Swindon; R.Mediterranean Int via Nardor, Morocco 9.575 (Fr, Ar to Eu 0500-0100) SIO222 at 1135 in Macclesfield.

After mid-day, R.Austria Int via Moosbrunn 9.870 (Ger, Sp, Eng to W.Africa 1300-1500) was 44444 at 1430 in Morden; Polish R, Warsaw 9.525 (Eng to Europe 1500-1550) 54544 at 1500 in Stirling; BBC via Kranji 9.740 (Eng to S/SE.Asia 0900-1830) 34444 at 1530 in Chester; Voice of Greece, Athens 9.425 (Gr, Eng to Eu 1500-1550?) SIO455 at 1537 in Edinburgh; R.Australia via Carnarvon 9.770 (Eng to Asia 1430-1630) 43422 at 1600 in Newry.

In the evening AIR via Delhi? 9.950 (Eng to N.Africa 1745-1945) was 33333 at 1813 in Woodhall Spa & 9.910 (Eng to Pacific areas 2045-2230) 34433 at 2111 in E.Worthing; Israel R, Jerusalem 9.435 (Eng 1900-1930) 55555 at 1900 in Appleby (Eng to W.Europe, N.Am 2130-2200) SIO323 at 2130 in Co.Fermanagh; RAI Rome 9.575 (Eng to M.East? 1935-1955) 32233 at 1940 in Rugby; China R.Int, Beijing 9.920 (Eng to Eu 2000-2155) 54433 at 2000 in Bridgwater; VOA via Gloria, Portugal 9.760 (Eng to Eu, N.Africa M.East 1700-2100) 33333 at 2001 in Gibraltar; Voice of Greece, Athens 9.395 (Various [Eng 2007] to Eu 2000-2050) 45554 at 2007 in Wallsend; R.Yugoslavia via Bijeljina 9.595 (Eng to Eu 2100-2130) 54344 at 2120 in Norwich; Voice of Turkey, Ankara 9.445 (Eng to USA 2200-2250) SIO322 at 2200 in Bishops Stortford; UAER, Abu Dhabi 9.770 (Eng to NW.USA 2200-0000) SIO222 at 2212 in Elgin; RFI via Moyabi 9.790 (Fr to Africa 2000-2300) 45444 at 2234 in Woking; R.Bulgaria, Sofia 9.700 (Eng to N.Am 2245-2345) SIO444 at 2315 in N.Bristol.

In the **7MHz (41m)** band WEWN Birmingham, USA 7.425 (Eng to N.Am 0600-0800) was logged as 43333 at 0630 in Morden; WJCR, Upton 7.490 (Eng to E.USA 2100-1000) 32222 at 0630 in Stalbridge; R.For Peace Int, Costa Rica 7.375 (Eng [u.s.b. + p.c.] to C/N.Am 0000-1300) 14331 at 0800 in Chester; Tajik R, Tajikistan 7.245 (Eng to Asia 1645-1700) 24332 at 1645 in Stirling; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) 44334 at 1530 in Woking, 43343 at 1630 in Norwich and SIO222 at 1700 in Co.Fermanagh; WRNO, New Orleans 7.355 (Eng to E.USA 2300-0300) 32332 at 2335 in Kilkeel; WHRI, South Bend 7.315 (Eng to E.USA 2300-1300) 44333 at 0019 in Barton-on-Humber.

While broadcasting to Europe R.Japan via Skelton, UK 7.230 (Jap, Eng 0400?-0800) rated 24232 at 0740 in Woodhall Spa; AWR via Slovakia 7.180 (Eng 0830-0930) 55555 at 0845 in Bridgwater; WYFR via Okeechobee 7.355 (Eng 0600-0800, also to Africa) SIO333 at 0940

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener	Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum R	I	7.50	B,C,E,H,J,K,M,O,Q	1161	Humberdale (Gt.Yks)	I	0.35	B,E,K,L,M
585	R.Solway	B	2.00	E,K,L,M	1170	GNR Teeside	I	0.32	C,E,G*,L
603	Cheltenham (CD603)	I	?	B,E,H,J,K,O,Q	1170	Hi Wycombe 1170AM	I	?	E,G,Q
603	Invicta SG (Coast)	I	0.10	B,J,P,Q	1170	Portsmouth (SCR)	I	0.12	E,G,J,Q
630	R.Bedfordshire (3CR)	B	0.20	B,E,H,J,K,L,M,O,Q	1170	R.Orwell (SGR)	I	0.28	B,E
630	R.Cornwall	B	2.00	E,J,K,Q	1170	Signal R (S.Gold)	I	0.20	A,E,K,L,O
657	R.Clywd	B	2.00	B,D,E,H,J,K,M,N,O,Q	1170	Swansea Sound	I	0.58	E,G*
657	R.Cornwall	B	0.50	E,J	1242	Invicta Snd (Coast)	I	0.32	E,P,Q
666	DevonAir R	I	0.34	E,F,G,H,J,Q	1242	Isle of Wight R	I	0.50	E,J,Q
666	R.York	B	0.80	A,B,C,E,G,K,L,M,O,P,Q	1251	Saxon R (SGR)	I	0.76	E,K,P,Q
729	BBC Essex	B	0.20	B,E,H,J,K,L,N,O,Q	1260	Brunel R (Cl.Gold)	I	1.60	E,H,J
738	Hereford/Worcester	B	0.037	B,E,H,J,K,L,M,P,Q	1260	Marcher Snd (Gold)	I	0.64	E,K
756	R.Cumbria	B	1.00	E,L,M,N*	1260	Sunrise R	I	0.29	E,O,Q
756	R.Maldwyn	I	0.63	B,E,H,J,K,O,Q	1260	R.York	B	0.50	B,E,L,M
765	BBC Essex	B	0.50	B,E,H,J,K,L,M,O,Q	1278	Bradford (Gt.Yks)	I	0.43	E,K,L,M,O
774	R.Kent	B	0.70	B,E,J,Q	1305	Barnsley (Gt.Yks)	I	0.15	E,K,L,M,O
774	R.Leeds	B	0.50	A,B,E,L,M	1305	Red Dragon (Touch)	I	0.20	E,G,H,J,Q
774	Gloucester (3CSG)	I	0.14	E,H,J,K,O	1323	R.Bristol (Som.Snd)	B	0.63	E,H,J,Q
792	Chiltern (S.Gold)	I	0.27	B,E,H,J,K,L,M,O,P,Q	1323	Brighton (SCR)	I	0.50	E,G,K,P,Q
792	R.Foyle	B	1.00	E	1332	Hereward R (WGMS)	I	0.60	A*,B,E,K,L,M,O,P,Q
801	R.Devon & Dorset	B	2.00	E,F,J,K,O,Q	1332	Wiltshire Sound	B	0.30	E,H,J,K,Q
828	Chiltern (S.Gold)	I	0.20	B,D,E,H,O,P,Q	1359	Essex R (BreezeAM)	I	0.28	B,E,P,Q
828	R.Aire (Magic828)	I	0.12	E,L,M	1359	Mercia Snd (Xtra-AM)	I	0.27	E,K,O
828	R.WM	B	0.20	E,H,K,O	1359	Red Dragon (Touch)	I	0.20	E
828	ZCR (Cl.Gold)	I	0.27	E,J,Q	1359	R.Solent	B	0.85	E,J
837	R.Cumbria/Furness	B	1.50	E,K,L	1368	R.Lincolnshire	B	2.00	B,E,K,L,M,N*,O,Q
837	R.Leicester	B	0.45	B,C*,E,H,J,K,L,M,O*,Q	1368	R.Sussex & Surrey	B	0.50	E,J,P,Q
855	R.Devon & Dorset	B	1.00	E,J	1368	Wiltshire Sound	B	0.10	E,H,J
855	R.Lancashire	B	1.50	A,C*,E,L,M	1413	Sunrise R	I	0.125	E,J,P,Q
855	R.Norfolk	B	1.50	B,C,E,L,M,P,Q	1431	Essex R (BreezeAM)	I	0.35	B,C,E,J,K,O,Q
855	Sunshine R	I	0.15	E,H,K,O,Q	1431	R.210 (Cl.Gold)	I	0.14	E,H,J,K,L,Q
873	R.Norfolk	B	0.30	B,C,E,G,H,J,K,L,M,O,Q	1449	R.Peterboro/Cambis	B	0.15	B,E,K,L,M,O,Q
936	Brunel R (Cl.Gold)	I	0.18	E,H,J,K,Q	1458	Fortune	B	5.00	A,E,K,L
945	R.Trent (Gem AM)	I	0.20	A*,B,E,H,J,K,L,M,O*,Q	1458	R.Cumbria	B	0.50	E
954	DevonAir (Cl.Gld)	I	0.32	C,E,G,J,Q	1458	R.Devon & Dorset	B	2.00	E,J,Q
954	R.Wyvern (WYVN)	I	0.16	E,H,J,K,L,M,O,Q	1458	R.Newcastle	B	2.00	E
990	WABC (Nice & Easy)	I	0.09	E,H,K,Q	1458	Radio WM	B	5.00	E,H,K,O
990	R.Aberdeen	B	1.00	B,C,E,N	1458	Sunrise R	I	50.00	B,E,H,J,L,M,Q
990	R.Devon & Dorset	B	1.00	E,G,J,Q	1476	Guildford (M.Xtra)	I	0.50	A*,C,E,H,J,K,L,O,Q
990	Hallam R (Gt.Yks)	I	0.25	B,E,L,M,O	1485	R.Humberdale	B	1.00	B,C,E,L,M
999	R.Solent	B	1.00	E,H,J,P,Q	1485	R.Merseyside	B	1.20	E,J,K,N
999	R.Trent (Gem AM)	I	0.25	B,E,K,L,M,O*,Q	1485	R.Sussex & Surrey	B	1.00	E,J,Q
999	Red Rose (Gold)	I	0.80	A,E,K,L	1503	R.Stoke-on-Trent	B	1.00	B,C,E,H,J,K,L,O
1017	Beacon R (WABC)	I	0.70	B,E,G,H,J,K,L,M,O,Q	1521	Reigate (M.Xtra)	I	0.64	B,C*,E,H,J,K,L,N*,O,Q
1026	Downtown R	I	1.70	E,N,O*	1530	Huddersfld (Gt.Yks)	I	0.74	A*,B,C,E,K,L,M,O,Q
1026	R.Cambridgeshire	B	0.50	B,D,E,H,L,M,O,P,Q	1530	R.Essex	B	0.15	E,J,P,Q
1026	R.Jersey	B	1.00	E,H,J,Q	1530	R.Wyvern (WYVN)	I	0.52	E,H,J,K,O
1035	London Country 1035	I	?	E,I	1548	Capital R (Cap G)	I	97.50	C,E,H,J,N*,Q
1035	North Sound R	I	0.78	B,C,E,G*,L,M	1548	R.Bristol	B	6.00	E,J
1035	R.Sheffield	B	1.00	E,L,M,O*	1548	Liverpool (City G)	I	4.40	A,E,K,L
1035	West Sound R	I	0.32	E	1548	R.Forth (Max AM)	I	2.20	C,E
1107	Moray Firth R	I	1.50	B,C*,E,N	1548	Sheffield (Gt.Yks)	I	0.74	B,E,L,M,O*
1116	R.Derby	B	1.20	A,B,E,H,K,L,M,O,Q	1557	Chiltern R (Gold)	I	0.76	A*,B,E,H,M,O
1116	R.Guernsey	B	0.50	E,J,Q	1557	Southampton (SCR)	I	0.50	E,G,J,K,Q
1152	BRMB (Xtra-AM)	I	3.00	C*,E,K,O	1557	R.Lancashire	B	0.25	A,E,K
1152	LBC (L.Talkback R)	I	23.50	E,J,Q	1557	Tendring (Mellow)	I	?	B,E,Q
1152	Piccadilly R (Gold)	I	1.50	A*,E,K	1584	Kettering (KCBC)	I	0.04	C,E,O,Q
1152	Plymouth Snd (Cl.G)	I	0.32	E	1584	R.Nottingham	B	1.00	B,E,J,L,M,O,Q
1152	R.Broadland	I	0.83	B,E,L,Q	1584	R.Shropshire	B	0.50	E,K,L,Q
1152	R.Clyde (Clyde 2)	I	3.06	C,E	1584	R.Tay	I	0.21	A*,C,E*,K
1161	Brunel R (Cl.Gold)	I	0.16	E,H,J,Q	1602	R.Kent	B	0.25	B,C,E,J,K,L,O,P,Q
1161	R.Bedfordshire (3CR)	B	0.10	E,O,P,Q					
1161	R.Sussex & Surrey	B	1.00	E,J,Q					
1161	R.Tay	I	1.40	C,E					

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

in Bishops Stortford; Slovak R.Int via Velke Kostolany 7.345 (Eng 1830-1900) was 34433 at 1838 in Oxted; AIR via Aligarh? 7.412 (Hi, Eng 1745-2230) 42332 at 2011 in E.Worthing; R.Prague, Czech Rep 7.345 (Eng 2000-2027) 54433 at 2005 in Ross-on-Wye; RCI via Skelton 7.235 (Eng 2030-2130, also to M.East, Africa) 43433 at 2031 in Newry; BBC via Skelton 7.325 (Eng 2200-0330) SIO333 at 2218 in Elgin.

Some of the **6MHz (49m)** broadcasts to Europe come from R.Nederlands via Fievo 5.955 (Eng 1130-1325) SIO544 at 1200 in Swindon; SRI via Lenk 6.165 (Eng 1230-1300) 35433 at 1258 in E.Bristol; R.Yugoslavia via Bijeljina, Bosnia 6.100 (Eng to Eu 1830-1920) SIO322 at 1830 in N.Bristol;

R.Estonia 5.925 (Eng 1900-1930, Mon/Thurs only) 43443 at 1930 by **Bill Griffith** in W.London; R.Austria Int, via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) 55544 at 1941 in Warrington; R.Sweden via Karlsborg? 6.065 (Eng 2130-2200) 43444 at 2030 in Rugby; R.Vlaanderen Int, Belgium 5.910 (Eng, Fr, Ger, Du, Sp to Eu 1800-?) 22332 at 1856 in Oxted.

- Listeners:
A: Scott Caldwell, Warrington.
B: Sean Cooper, Wells-next-the-Sea.
C: Geoff Crowley, Aberdeen.
D: John Eaton, Woking.
E: Gerry Haynes, Talgarth, Powys.
F: Simon Hockenhill, E.Bristol.
G: Sheila Hughes, Morden.
H: Tony King, Swindon.
I: Laurence Mason, Hassocks.
J: George Millmore, Wootton, IoW.
K: Martin Price, Shrewsbury.
L: Martin Price, Shrewsbury.
M: Harry Richards, Barton-on-Humber.
N: Tom Smyth, Co.Fermanagh.
O: Andrew Stokes, Leicester.
P: Phil Townsend, E.London.
Q: John Wells, East Grinstead.

Station Addresses

Radio Copan Internacional, Ap.955, Tegucigalpa, Honduras.
Radio Nacional de Bolivia, Cas.2532, La Paz, Bolivia.
Radio Vlaanderen International, P.O.Box 26, B-1000 Brussels, Belgium.
Slovak Radio International, 81290 Bratislava, Mytna 1, Slovakia.
Tajik Radio, Chapayev Str.31, 734025 Dushanbe, Tajikistan.
Trans World Radio Pacific, 1868 Halsey Dr, Agana, Guam 96922-3505.

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AOR3000, p.s.u., boxed, £400. R2000, £350. John, Norfolk. Tel: (0379) 652043 evenings.

Armstrong model RF104 1950/1, ten valves, two short wave bands, medium and long, very good condition, 12in Baker speaker in cabinet, output 10W, original leaflet, offers. Buyer collects. Tel: Lincs (0507) 477805 anytime.

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Fairmate HP100E, 8-600MHz, 805-1300MHz, 1000 memories, £160 o.n.o. Tel: Norwich (0603) 300837 or (0850) 689840.

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Grundig Satellit 700, six months old, boxed with manual, £185. Tel: Surrey (0372) 456741.

Grundig Satellit 3400 professional receiver, also Magellan GPS NAV1000 plus nav. system. Both mint, manuals and boxed, £200 each. Tel: Pangbourne (0734) 843765.

Hammond midi organ module, Voce DM164 MkII, 99 pre-sets, programmable, boxed with manual, cost £650, exchange for short wave receiver. Kenwood Ham clock, unused, £15, carriage paid. Seon Smyth, 20 Talbot Drive, Scotstounhill, Glasgow G13 3RR. Tel: 041-959 7466.

Icom IC-R1 communications scanner, 1-1300MHz with case, cigarette lighter cable, mains charger and instructions, all boxed, £260. Sony ICF SW1 with case and instructions, £80. Both in excellent condition. Tel: Lincs (0507) 490504 after 6pm.

Icom IC730 h.f. transceiver, all Ham bands, £350. PRO44 v.h.f./u.h.f. scanner, unwanted gift, £90. Alinco 2m transceiver, 50W output, £235. D. Gorrill GM4UJZ, Fife. Tel: (0383) 823305 after 6pm.

ICS FAX1 facsimile and RTTY receive terminal unit plus 9-pin printer, £145. Seven copies of *Radio & Hobbies Australia* 1948/1953 (about 700 pages of nostalgia), swap for WRTH '94. Tel: Somerset (0749) 670663.

ICS FAX1 weather fax, Navtex, RTTY, receive terminal unit includes cables and manual in excellent condition, £150. G3KZU, Oxford. Tel: (0865) 63000.

JPS NIR10 noise/interference/bandpass digital (DSP) filter, reduces/eliminates white, ignition, power line noise, heterodynes etc. Bandpass mode, steep skirts, adjustable centre frequency and band width for RTTY, Morse, s.s.b. etc., boxed, mint with manual, £300. Tel: Middlesex 081-570 5603.

JPS NIR10 revision 2.1 noise reduction filter, very little used, condition as new. Roberto Robba, 14053 Canelli (AT), Italy. Fax: 141 822022.

JRC NRD525 receiver, mint condition, 12 months old, boxed with manual, RDI white paper. Peter Rouse said in *Short Wave Communications* 'Stunning performance, leaves all others standing', £695. Nigel Cross, Devon. Tel: (0392) 56638 daytime, (0647) 24687 evenings.

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Kenwood R1000 communications receiver, covers all bands 200kHz to 30MHz, a.m., s.s.b., c.w., clock timer, three separate antenna inputs, 'phone output and noise blanker. New condition with manual, £265. Peter, Essex. Tel: 081-505 7207.

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Racal R17 with BFO, £140, very good condition. Sony 2001D, £150. Bearcat base scanner, model 20/20, £90. Tel: Shrewsbury (0939) 232714.

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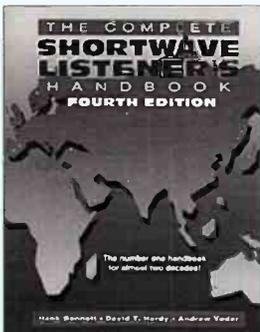
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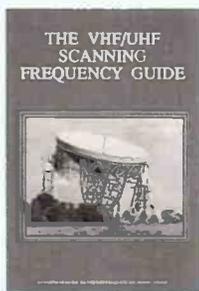
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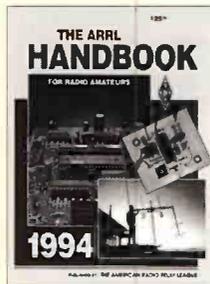
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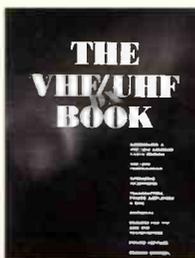
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Edited by Jerry Hall K1TD



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HF ANTENNA COLLECTION (RSGB)

Edited by Erwin David G4LQI
This book contains a collection of useful, and interesting h.f. antenna articles, first published in the RSGB's *Radio Communication* magazine, between 1969 and 1989, along with other useful information on ancillary topics such as feeders, tuners, baluns, testing and mechanics for the antenna builder. 233 pages. £10.99.

INTRODUCTION TO ANTENNA THEORY BP198

H. C. Wright
This book deals with the basic concepts relevant to receiving and transmitting antennas, with emphasis on the mechanics and minimal use of mathematics. Lots of diagrams help with the understanding of the subjects dealt with. Chapters include information on efficiency, impedance, parasitic elements and a variety of different antennas. 86 pages. £2.95

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Joseph J. Carr
As the name suggests, this book offers a practical guide to everything to do with antennas, from h.f. to microwaves. It also has sections on propagation, transmission lines, antenna fundamentals and a helpful introduction to radio broadcasting and communication. The book neatly balances a practical approach with the minimum of mathematics, good diagrams and a lively text. 437 pages. £23.95

G-QRP CLUB ANTENNA HANDBOOK

Compiled and edited by P. Linstley G3PDL & T. Nicholson KA9WRW/GWOLNQ.

This book is a collection of antenna and related circuits taken from *Sprat*, the G-QRP Club's journal. Although most of the circuits are aimed at the low-power fraternity, many of the interesting projects are also useful for general use. Not intended as a text book, but offers practical



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W. I. Orr W6SAI & S. D. Cowan W2LX
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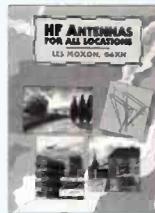
Doug DeMaw W1FB
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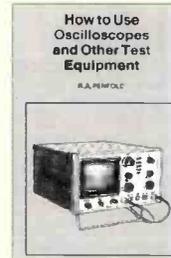
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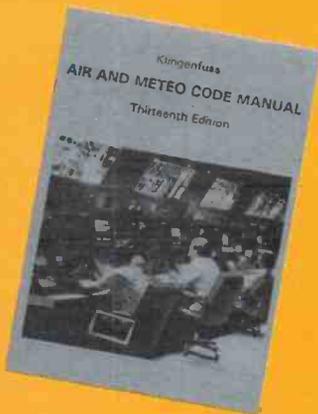
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