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MAY 1990

REVIEWED THIS MONTH

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For The Radio Listener

SWM SWM SWM SWM SWM SWM

ISSN 0037-4261

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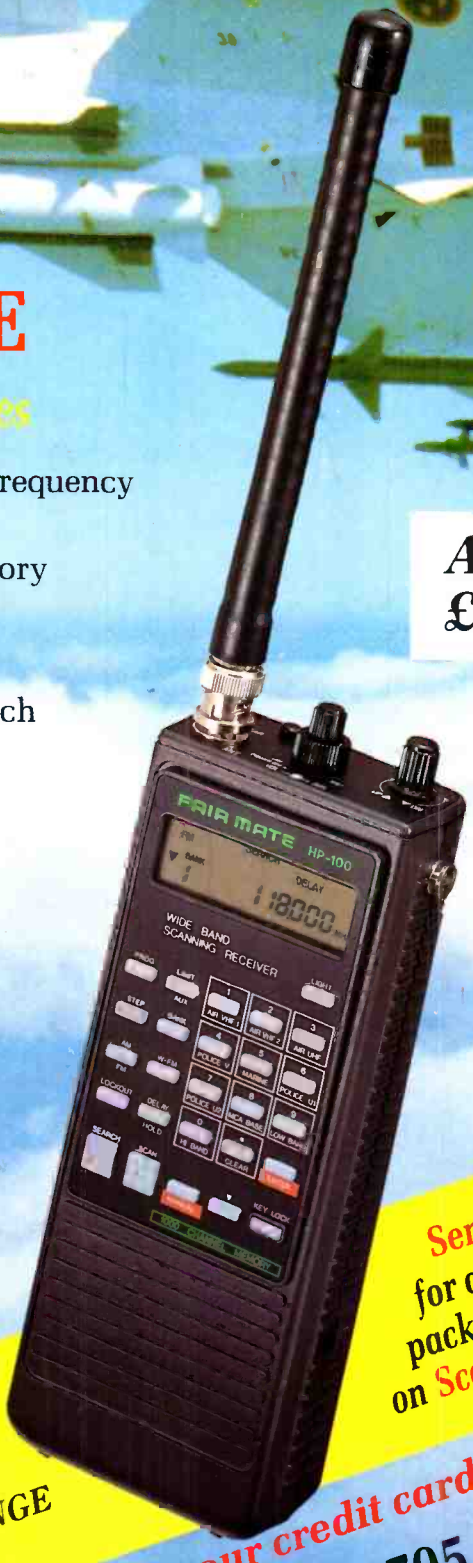

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|25| **PC-HF-FAX Program Reviewed.**

Cover The IBM PC, or any of its many clones, is rapidly growing in popularity for shack use. Mike Richards G4WNC, our Decode columnist, has just equipped himself with one of the Amstrad versions and has tried out PC-HF-FAX, the latest piece of radio software for this computer.

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Short Wave Magazine

GOOD LISTENING

A WORD IN EDGEWAYS

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS USED 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 other magazines.

Dear Sir

There were two letters in your March issue that caught my eye. Both Robin Clark's and Edmead Kangai's letters struck a note with me. All the more so as that issue was the first I've ever bought. When I was about thirteen I suddenly discovered short wave on my radio. At first it was like a revelation. To hear broadcasts from around the world seemed fantastic at the time and so my hobby grew and grew. I would stay up until the early hours trying to hear some elusive station usually only to hear static or interference! But sometimes you got to hear what you were after, hours later.

One day though my old Eddystone set decided to call it a day and there was no one locally to me who could repair it. My father had a go but alas it came to no avail. My old set finally met its maker and so did all the other things that go into making a DXer.

At 25 years old and some ten years since that sad day when my hobby ended I've finally got back to listening. For some reason I went into my local 'Currys' and saw a World Receiver for sale, the Saisho SW5000. After some time thinking about it I decided to buy it and in many ways it has re-opened my interest.

I will never forget receiving my first QSL card (Radio Bagdad) and I hope I'll be getting a few more. My only hope now is that this set lasts a little bit longer than the last one.

MARK ROBERTS
LARKHALL
BATH

WHAT'S NEW

Expedition Group.

The Thistle Award: This is issued for contacting four separate Scottish Tourist Board Events in Scotland. To claim you must send a log extract to: **The Awards Manager, PO Box 59, Hamilton, Lanarkshire ML3 6QB**. The cost of the award is $1, 2 or equivalent, plus postage. This award must be claimed separately, prior to applying for the Supreme Tartan Banner Award.

The Supreme Taran Banner Award: This is issued for contacting a total of six Scottish Tourist Board Events (i.e. including four for the Thistle Award). Claims as for the Thistle Award, but enclosing £1.50, $3 or equivalent, plus postage. Please quote the number of your Thistle Award.

Annotations will be awarded to the Supreme Tartan Banner Award on a yearly basis for contacting a further six events in a year. The cost for this is 50p, $1 or equivalent. Again, please quote the number of your Tartan Award.

Straight Key Day

The European CW Association's Straight Key Day, organised on behalf of EUCW by the Scandinavian CW Activity Group (SCAG), will be held of Saturday 23 June 1990, and is open to all amateur c.w. operators who enjoy working on the hand key, whether regularly or just occasionally.

It is not a contest. The idea is to put aside the electronic keyer for the day and use a hand-key for relaxed QSOs! Those taking part should call CQ SKD on frequencies between 3.540 and 3.570MHz, 7.020 and 7.040MHz, 14.050 and 14.070MHz, or anywhere on the 10MHz band.

Participants having at least five contacts with other straight key stations may vote for the best hand-style or 'fist' worked, one vote for each of the three considered best. A 'Straight Key Award' will be sent free of charge to every operator who receives at least two votes. Although it is expected there will be good support from British based EUCW member clubs, **all** UK c.w. operators are invited to join in to help make this event a resounding success. Logs and votes should be sent before 17 July 1990 to: **The SKD Manager, Daniel Klintman SM7RXD, Adjunktsgatan 3D, S-214 56 Malmoe, Sweden.**

AMSAT-UK

The AMSAT-UK Colloquium will be held at the University of Surrey on July 26-29. Full details and a booking form can be obtained from: **Ron Broadbent G3AAJ, AMSAT-UK, 94 Herongate Road, Wanstead Park, London E12 5EQ.**

AMSAT-UK
The Radio Amateur Satellite Organisation of the United Kingdom

Inner & Outer Hebrides DXpedition

Alan G1EUU and Colin G1JME will be using the callsign GM1WAB/M whilst on their inner and outer Hebrides DXpedition. Their timetable is as follows:

May 26 - Grantham to Ardrossan
May 27 - Arran, Gigha, arrive late on Islay
May 28 - Islay, Jura, Luing
May 29 - Mull, (Iona*), South Uist
May 30 - South Uist, Benbeculla, North Uist, Baleshare, Grimsay, Bernae
May 31 - Skye, Harris
June 1 - Harris, Lewis, Great Bornae
June 2 & 3 - Activate NB, NC, ND, NH, NJ, NO, NT, NS, NX and NY squares. The frequencies in use will be 144.440 & 50.200MHz, 430MHz by arrangement on 144MHz.

*The Isle of Iona may not be mobile operation.

QSL via with s.a.e. via: **G1EUU, 68 Aire Road, Grantham, NG31 7QP.**

Eddystone Users' Group

Mr W.E. Moore has decided to form an Eddystone Users' Group. During a recent visit to the Eddystone factory, he obtained an agreement to use facts and data from their manuals in a group newsletter. This would be sent to members and would be operated on a non-profit basis, with only a nominal charge made for post and printing.

Anyone interested should send an s.a.e. to: **Mr W.E. Moore, 112 Edgeside Lane, Waterfoot, Rossendale BB4 9TR.**

WHAT'S NEW

Stereo TV in South Wales

NICAM Digital Stereo comes to IVC and S4C in South Wales from April 27 as part of an IBA initiative to bring the new digital audio technology to almost 80% of British viewers by the end of this year.

NICAM stands for Near-Instantaneously Companded Audio Multiples. It adds a special digital signal to a standard television transmission to enable reception of stereo sound with quality similar to Compact Disc. The system can also be used to provide a second language soundtrack.

In order to receive NICAM, it is necessary to have aTV set or video cassette recorder incorporating a NICAM decoder. In the last year or two, a wide variety of receivers and v.c.r.s have been produced with the option of NICAM sound. Older sets with stereo speakers will probably not be suitably equipped.

Petrol Tokens

When you fill your car up with petrol or diesel, do you collect the vouchers that are on offer, or do you never seem to get enough for the 'gift' of your choice? Well, the Belfast RAIBC are collecting BP Lifestyle Tokens to provide their members with equipment. Last November they had two Trio TS-440 h.f. transceivers and accessories presented to them by BP and they are still collecting tokens. Send your unwanted ones to: **RAIBC (NI), PO Box 87, Belfast BT12 5PU.**

Cirkit Catalogue

Cirkit have recently published their Summer 1990 catalogue. The 184-pages feature more than 3000 product lines, arranged alphabetically in sections for quick, easy reference - from batteries to test equipment and tools. The mail order service runs so that all orders received by 4pm are dispatched that same afternoon. **Cirkit, Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 441306.**

PRO-2004 Upgrade Kit

If you own a PRO-2004 you will be well aware that it has 300 memory channels. This modification kit gives you the opportunity of increasing this by 100, like the 2005.

For just £2.50 you get the the two necessary diodes and a new keypad overlay and full, detailed instructions. Also included with the package is an A4 sheet of other mods you may wish to do, such as fitting a mains socket, 30MHz stepping, etc.

The instructions for the modification should be straightforward enough for most users to be able to do. Although, as you are warned, if your set is still under guarantee this modification will invalidate that guarantee.

P. Beckett, 3 Pasture Close, Whitmore, Newcastle, Staffs ST5 5DQ.

SERVICES

Subscriptions

Subscriptions are available at £19 per annum to UK addresses £21 1n Europe and £22 overseas. Subscription copies are despatched by Accelerated Surface Post outside Europe. For further details see the announcement elsewhere in this issue. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £32 (UK) and £37 (overseas).

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. See page 45 for full details.

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past ten years are available at £1.65 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available price £4.50 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 p.c.b.s, back numbers, binders and items from our Book service should be sent to **PW Publishing Ltd., FREEPOST, Post Sales Department, Enefco House, The Quay, Poole, Dorset BH15 1PP**, 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 Poole (0202) 665524. An answering machine will accept your order out of office hours.

LISTEN OUT FOR

International Marconi Day 1990

Following the tremendous success of the world-wide events held in recent years, the Cornwall Radio Amateur Club are once again co-ordinating International Marconi Day on April 21.

The event will run from 0001Z through to 2359Z and the stations participating are:

K1VV/IMD - Operation of this station is under the Direction of 'Whitey' and our other good friends in the Cape Cod area, where the first Europe to USA contact was made.

VE1IMD - Operation of this station is by our colleagues in Nova Scotia - at the Marconi site where the new Marconi Museum has been opened recently.

VO1IMD - This station will be operated from St Johns, Newfoundland, as this is the area where the first transatlantic contact was made.

EI2IMD - No Marconi Day would be complete without our good friends working the official Marconi Club Station in Italy. This station is located in Villa Grifone, near the village of Pontecchio, and it was at this site that the very first transmission in the history of radio was made by the Young Marconi in 1895.

GB0IMD - Under the direction of Vernon, a keen Marconi Historian, this station will operate from the area on the Isle of Wight where many early experimental transmissions were made by Marconi and his associates.

GB4IMD - This is the Cornish RAC station operating from the original Marconi site on the top of the Magnificent cliffs by Poldhu Cove on the Lizard Peninsula in Cornwall and very close to England's most southerly point. This was the European station site when the first transatlantic transmissions were made.

GB2IMD - The Marconi station for Northern Ireland will be under the direction of Ivor GI4WRI. The site is near Rathlin Island, the well-known Marconi experimental site in that area.

IY0TCI - Last year, Pat worked as a 'guest' only, but this year will operate as an official Marconi Day station in Civitavecchia. It was near this site that Marconi carried out his first experiments on 500MHz.

IY1TTM - Last year, this station worked as a guest only, but will participate fully in 1990 working from the Tigullio Tower, Marconi. The location of the tower is at Sestri Levante on the Italian Riviera near Genoa. It was from this tower that the early experiments on v.h.f. and u.h.f. for marine direction finding purposes and propagation studies were carried out.

ZS6RSA - This station is representing the South African influence of Marconi. It was from the site in Poldhu, Cornwall that the first transmissions to South Africa were made. During the event last year, special broadcasts were made on the radio station the Voice of South Africa and the SARL held a very successful open day to celebrate International Marconi Day.

DA0IMD - Greg DL1BFE actually came to visit Cornwall last year and this year will be in charge of this station on the north German coast. It is interesting to note that the first ever 'Marconigram' was sent from Borkum Island on 28 February 1900 and the German PTT officially opened the world's first wireless service at this site on 15 May 1900.

GB2MDI - John and his colleagues in the Salisbury Radio Club will be operating from the area near Salisbury where in September 1896 and March 1897 Marconi conducted his early field experiments for the benefit of the British Army. This site is where the old Roman road meets the A30, just south of Figsbury Rings.

GB4MDI - David and his friends hope to operate their station from Flatholm Island in the Bristol Channel, a famous Marconi experimental site. They will, in fact, be on the island for about five days using the call GB2FI and will change the call to GB4MDI for the 24 hour period of the International Marconi Day. If the weather prevents access to the island then the station will work from the Marconi site on the Welsh mainland, near Barry.

F(?)IMD - Associates in northern France will be operating for the first time this year to represent their Marconi Contribution.

Operations this year will be voice only and the following table gives the various band segments on which to listen:

3.7 - 3.8MHz
7.05 - 7.1MHz
14.15 - 14.35MHz
18.1 - 18.168MHz
21.15 - 21.45MHz
24.93 - 24.99MHz
28.3 - 29.69MHz
28.3 - 29.69MHz (f.m. at the top end of the band)
50.1 - 50.5MHz

This year, to qualify for the Marconi Award, it will be necessary to work any 10 of the 15 special stations. QSL cards can be exchanged via the bureau, or if preferred directly (with stamps or a donation towards the costs please).

All official award claims must be accompanied by either $5(US), £2(UK) or 10 IRCs. The official award is for full two-way working only, but in addition there is a separate award for short wave listeners where claimants will have to record at least 10 of the Marconi Day stations together with the times heard (UTC). The s.w.l. award will cost $3(US), £1.50(UK) or 6 IRCs.

CRAC (or IMD), PO Box 100, Truro, Cornwall TR1 1RX.

GB2SEM: On May 19 and 20, this station will be running from the Old Power Station, Bargates, Christchurch, Dorset. Running on h.f. and v.h.f. bands, colour QSL cards via the bureau or direct from G6DUN, QTHR on receipt of an s.a.e. The Old Power Station will be open to the public from 10am to 4pm both days with talk-in on S22. Also on show will be the Journeaux Vintage Wireless collection.

GB2RBC: A return visit, by Royal Permission, will put this station on the air over the weekend of June 9/10. **Paddy GM3MTH, PO Box 59, Hamilton, Lanarkshire ML3 6QB.**

GB2SSD, GB2OBD, EI7M & EI2WW: These stations will be on the air for the Heritage of Whisky Four Distillery Event. The locations will be: Scotland's smallest distillery, Pitlochry, Perthshire; the Old Bushmills Distillery, Bushmills, Co. Antrim, Midleton Distillery, Midleton, Co. Cork & John Jamieson's Distillery, Dublin respectively. A certificate is available for overseas stations if they work any two of the stations or for the UK if they work any three. Annotation is available for working all four stations and the cost of a certificate is 50p, $1 or the equivalent. **Robbie GM4UQG, PO Box 59, Hamilton, Lanarkshire ML3 6QB.**

GB2STB: This station will be on the air on the final day of Beith Civic Week from Beith, Ayrshire. That's June 16. **Paddy GM3MTH, PO Box 59, Hamilton, Lanarkshire ML3 6QB.**

GB2NTS: This station will be on the air over the week July 15-22 for the Castle Country Four Castles Event. The castles will be Grampian Region Drum Castle, Castle Fraser, Craigievar Castle and Leith Hall. A certificate is available for overseas stations if they work any two of the stations or for the UK if they work any three. Annotation is available for working all four stations (the cost for the certificate is 50p, 1 dollar or equivalent). **Robbie GM4UQG, PO Box 59, Hamilton, Lanarkshire ML3 6QB.**

GB70SIG: To celebrate the 70th Anniversary of the formation of the Royal Corps of Signals, the Scarborough Special Events Group, together with members from RSARS, RNARS and RAFARS, are proposing to run a special event station from the Royal Signals Training Centre, Burniston Barracks, Scarborough over the period June 10 to July 7.

Operation will be around 3.725 and 7.055MHz on the h.f. bands, plus 144MHz s.s.b. and f.m., in addition to activity on the RSARS nets. Special QSL cards will be available and further details can be obtained from: **Roy Clayton G4SSH, QTHR.**

TRADING POST

FOR SALE Sony Air-7 scanner, excellent on airband, also a.m., narrow and wide f.m., including public service band, 40 memories, 10 on each band, £170. Chris Cotton, 73 Salcott Rd, Battersea, London SW11 6DF. Tel: 01-228 6158.

FOR SALE Sony ICF-2001 receiver, 150-29.999kHz, a.m., s.s.b., plus 76-108MHz f.m. Digital readout, memories, direct or manual tuning, complete with power supply and instructions, v.g.c., £100. T. W. Hyder. Tel: Hythe, Southampton 843347.

FOR SALE TM701E 2m/70cm T/Rx, £385. AR950, £185. Signal R535, NiCads, case, etc, £235. All items manuals boxed, v.g.c. John Lockwood G3XLL, QTHR. Tel: Mellis 596.

WANTED Sony 2001D receiver or Philips D2935 receiver. **Exchange** for an AR800E hand-held scanner. Ray, 41 Gwerwllwyn Terr, Tylorstown, Rhondda, Mid-Glam. Tel: Ferndale 755876.

FOR SALE Sony ICF PRO-80 hand-held communications receiver, boxed, as new, £200 o.n.c.o. Peter. Tel: 01-769 1499 evenings.

FOR SALE Realistic PRO-34, 200 channel, hand-held, v.h.f./u.h.f. scanner. Mint condition, unused/unwanted gift. Own interest lies in h.f. only, hence sale (no 'swaps' Yaesu 7700 owner), £150. Noel. Tel: Steeple Aston 320441.

FOR SALE for Commodore 64/PK232: ICS cartridges Comfax, Pakratt, interface, motherboard, £50, with documents. Easyfile, Easyscript, Tasword, Toolkit 4. All disk, £20. Or £60 the lot, post paid. G. Bryson. Tel: Stanley, Perth 828991.

WANTED hand-held scanner, v.h.f./u.h.f. from 68MHz with airband frq. **Will swap** Casio CT-320 electronic keyboard with full-size keyboard plus stand. Clive Powis, 28 Kington Gardens, Chelmsley Wood, Birmingham B37 5HS. Tel: 021-788 8447.

FOR SALE Philips World Receiver D2999, purchased July 1989, excellent condition, £240 o.n.o. F. Pock. Tel: Mickle Trafford, Chester 301855.

FOR SALE Relaistic PRO-2021 scanner, 200 channel, home or mobile, still with original box, excellent condition, but have lost manual, £140 o.n.o. Nick Morton. Tel: Abingdon 33107 evenings.

FOR SALE National Panasonic DR-48 communications receiver, digital frequency display, 10m to 80m, m.w., f.m., l.w., bands, v.g.c. + Pye transceiver converted for 2m band, v.g.c., £230 for both. B. Connell. Tel: Stockton-On-Tees 584179.

FOR SALE Atari 520ST computer mouse, two joysticks, £200 of games, £200. Philips colour monitor, £125. All as new. J. Cox, 100 Gwendoline Street, Treherbert, Rhondda, Mid-Glamorgan. Tel: Treorchy 774053.

FOR SALE Plustron TVR5 u.h.f. TV with f.m./m.w./l.w. radio, good for DXing, £30. Ken Whayman. Tel: 01-303 4357 (Bexleyheath, Kent).

FOR SALE Portable 12-band Elizabethan radio, l.w./m.w./s.w.1-s.w.4, LP-B, f.m., air, HPB, u.h.f. bands, two aerials, a.c./d.c., b.f.o., s.s.b., u.s.b., l.p.b., treble, bass, signal meter, world map flap, £120. Buyer collects. R. Rankin. Tel: 051-334 5501 (Wirral).

FOR SALE Black Jaguar Pocket Scanner BJ200 MkIII with instruction book, case, charger and flexible aerial. Purchased 12th August 1989 (receipt available). Hardly used, cost £200, will accept £180. R. Gaskin, 4 Crescent Grove, Hilton Park, Prestwich, Manchester M25 8WR. Tel: 061-798 7357.

FOR SALE complete ham station, Yaesu FT201 transceiver (250W 80m-10m). Yaesu FT221R multi-mode 2m transceiver. Yaesu FC707 antenna tuner. Europa transverter (combines with FT201 to give 150W on 2m). All v.g.c., £470. J. Brogan, 38 Graig Park Circle, Newport, Gwent. Tel: Newport 859641.

FOR SALE Kenwood R5000 RX, as new with VC20 v.h.f. unit and YK-88A-1 filter, complete with manual and box, £650, no offers, postage extra. V. Doe. Tel: 091-258 5289 after 6pm.

FOR SALE Murphy B40, 1950s Royal Navy receiver, 0.6 to 30-5MHz a.m./s.s.b., not in original condition but full working order, £30. Vega Selena radio, f.m./l.w./m.w./s.w. 16-49m, £25. C. Blake. Tel: Swindon 613599 evenings and weekends only.

WANTED Icom R-9000, AOR-3000 or PRO-2005 receiver. J. House, 4 Elizabeth Way, Kenilworth, Warwicks CV8 1QP. Tel: Kenilworth 54556.

WANTED AOR-2002/1 interface and software for BBC-B or IBM clone, also weather map, facsimile interface and software for BBC-B or IBM clone. A. Priestley G8MWX, 55 Derwent Avenue, Garforth, Leeds LS25 1HN. Tel: Leeds 865726.

FOR SALE Drake 2B receiver, matching speaker, crystal calibrator, crystals fitted for 80, 40, 20, 15, 10, service/instruction manual, spare set valves, £150. J. Wilkes. Tel: Crediton 4577 evenings.

FOR SALE Grundig Satellit 2100 world-band receiver, l.w./m.w./f.m./s.w. 1.6-30MHz without gaps, u.s.b./l.s.b. (amateur 10-160m bands), eight bandspreads, switchable bandwidth, mains/battery, carrying case and manual, v.g.c., £165. A. Steele. Tel: Hatfield 266876.

WANTED Kenwood R-5000 or Icom R-71, also Yaesu 9600 or Kenwood R-21 with coverage to 950MHz and mains p.s.u., must be in excellent condition with manuals, full details to David Head, 69 Cowleigh Rd, Malvern, Worcs WR14 1QL.

WANTED Yaesu FRG-7 communications receiver about £100. **For Sale** Philips D2935 digital world receiver, unused, £80. F. Steele. Tel: Edge Hill 780 (Warks).

FOR SALE Standard AX700 panadapter scanning receiver, £450, Realistic PRO-2004 scanner, £230. Also Realistic PRO-32 hand-held scanner, £100. C. Palmer. Tel: 01-902 4914 (Greenford, Middx).

FOR SALE Immaculate Icom IC-R71E communications receiver with f.m. and a.t.u. in makers carton with manual, £550. G. Smith. Tel: 01-556 5131 (East London).

FOR SALE Sony ICF-2001 receiver, 150kHz-30MHz + f.m., no power pack, £50. Panasonic KXP 1081 printer with BBC lead, £70. Buyer collects. J. Gatfield. Tel: 01-894 5443.

FOR SALE Sony ICF-7601L 12 band s.w. RX, dual conversion (*SWM* reveiw Dec '89), £60. Signal 537S airband monitor, £55. Both with accessories. Tel: Livingston 411598.

FOR SALE Icom IC-R71E, mint, showroom condition, manual, original box and packing, less than seven hours use, must be seen, real bargain at £570 o.n.o. Buyer collects. E. Chorley. Tel: 01-204 7734 (Kingsbury, London).

Write out your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it, together with your payment of £2.30, to Trading Post, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Advertisements will be published in the earliest available issue and *SWM* reserves the right to exclude any advertisement not complying with the rules. You must send the flash from this page, or your subscription number as proof of purchase of the magazine.

FOR SALE Sony 7601L s.w. receiver, £55. Bearcat 100XL scanner, wide band rubber duck and airband telescopic antennas, case, charger, £110. Both items still under guarantee and in excellent condition. A. Ryan. Tel: Radcliffe-On-Trent, Notts 332327.

FOR SALE Realistic PRO-34, 200 channel hand-held scanner, 66-88, 108-174, 380-512, 806-960MHz, immaculate condition and boxed, £130 o.n.o. David. Tel: Cambridge 426442.

FOR SALE Fairmate HP-82 hand-held v.h.f./u.h.f. scanner, 118-174MHz, 222-370MHz, 830-950MHz with carrying case, charger and four NiCads, £115. A. Twinn, 59 Welbeck Ave, Aylesbury, Bucks HP21 9BJ. Tel: Aylesbury 88385.

FOR SALE Icom R-70 communications receiver, very good condition, £350 o.n.o. S. McDonald. Tel: Burnley 54918.

FOR SALE Dressler ARA active antenna, £75. Novex 12in amber monitor, £60. Dactron 13.8V, 3A p.s.u., £14. T. Searle. Tel: 01-556 2969 anytime.

FOR SALE Sony PRO-80 receiver, 150kHz to 223MHz, AN-1 active antenna and power adaptor AC-D4M for PRO-80, all boxed, good condition, £200 the lot. A. Sullivan. Tel: Parkstone, Poole 731835.

FOR SALE Sony PRO-80 short wave and v.h.f. scanner, boxed, excellent condition, 150kHz-108MHz and 115-223MHz, a.m. wide/narrow f.m., n.f.m. and s.s.b., £195. P. Hannan, 4 Hillhouse Road, Denny, Stirlingshire FK6 5PG. Tel: Bonnybridge 814541.

FOR SALE Yaesu FT-7 h.f. transceiver with 160m, £350 and Yaesu FRG-8800 h.f. receiver with v.h.f. converter, mint condition with packaging and handbook, £475. G. Bath G3NMZ, 87 Stanmore Cres, Luton LU3 2RJ. Tel: Luton 591749.

FOR SALE Yaesu FRG-7700 with memory board, FRT-7700 a.t.u. and FRG-7700 v.h.f. converter, excellent condition, boxed, £300. M. Emmott. Tel: Maidstone 36283.

FOR SALE Sony ICF-7600D p.l.l. synthesised receiver, pouch, p.s.u. wavebook, £89. Also Trio TR-2400 hand-held 2m transceiver with charger, £79. David Cross. Tel: 01-429 0806.

WANTED AR-88D rubber foot, RA1B tuning knob, B40C audio and aerial Plessey connectors, SP600 IX6 top and botton dust covers, RA117E top dust cover, R209 power socket, Canadian WS19 meter. K. Barker, 29 St. Andrews Court, Benton, Newcastle-Upon-Tyne NE7 7UT.

FOR SALE Solartron LM1450 DVM, £25. AS951 100-200V 100mA, AS515 250-300V 200mA stabilised p.s.u., £20 each. CD1212 40MHz oscilloscope with four plug-ins, £200. 100W guitar amplifier with speakers, £90. John Huntingford, 'Astro-Lode', Hogs Back, Guildford, Surrey GU3 1DD. Tel: Guildford 505504.

FOR SALE Yaesu FR-50B receiver in mint condition, £100 o.v.n.o. C. Ryan. Tel: Porthcawl 718136.

FOR SALE ERA microreader Mk I, boxed with instructions, unwanted Xmas gift, £110. K. Davies. Tel: Aberdare 876586 9am-5.30pm Mon-Friday.

FOR SALE GOC RTTY system for BBC computer, £35. Trio R600 150kHz-30MHz with f.m., £200. Grundig Satellit 1400SL with dry-fit battery, £150. Buyer collects. C. Earl, 1 Mayfield Drive, Daventry, Northants. Tel: Daventry 702265.

Advertisements from traders, apparent traders or for equipment which it is illegal to possess, use or which cannot be licensed in the UK will not be accepted.

SWM MAY 90 TP

GRASSROOTS

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. May 3 is Lambda diode projects G3MYM, the 10th is The Z Match ATU G3MYM, the 13th is the 6th QRP Convention at the Preston Centre, the 17th is Smith Chart - analysis of the G5RV antenna G3MYM and the 24th is Analysis of a QRP Record G3MYM. David Bailey G1MNM, Flat 7, Thatchem Close, Yeovil BA21 3BS.

Horndean & District ARC have a Visit to Copnor Fire Station on May 3. 1st Thursdays, 7.30pm at Horndean Community School, Barton Cross (off Catherington Lane). S. Swain, 35 Mavis Crescent, Havant, Hants PO9 2AE.

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford. April 27 is Indoor Direction Finding Contest, May 4 is 2m Direction Finding Contest, the 11th is Dr Best - CAIRO (provisional) and the 18th is Night in the Air (Gliding, provisional). Neil Blair G7ASZ on Coventry 523629 (home) or 523523 Ext. 2541 (work).

South Bristol ARC meet Wednesdays at the Whitchurch Folkhouse, Bridge Farm House, East Dundry Rd, Whitchurch. May 2 is How to Use an Oscilloscope G4YTH, the 9th is an HF Activity evening G0JZH, the 16th is Construction evening G4YTH and the 23rd is Microwave Activity evening - club station. Len Baker G4RZY on Whitchurch 832222.

Shefford & District ARS have a social on April 26 and Looking Forward to Competitive Radio G3WRJ on May 3. Thursdays, 8pm at the Church Hall, Ampthill Rd, Shefford. Brian G4MEO on Sandy, Beds 80043 or Nigel G1JKF on Royston, Herts 71149.

Trowbridge & District ARC meet 1st & 3rd Wednesdays in the TA Club. May 2 is Homebrewing Talk G3TSO. Ian Carter G0GRI on Bratton, Wilts 830383.

The Radio Society of Harrow meet Fridays, 8pm at The Harrow Arts Centre, Uxbridge Rd, Hatch End. April 27/May 11 are activity evenings and May 4 is a Junk Sale. Chris Friel G4AUF on Ruislip 621310.

Dunstable Downs RC have a new secretary, so please address all future correspondance to Mr M. Spacey, 54 Dovehouse Hill, Luton, Beds LU2 9ES, Tel: Luton 30664.

Chelmsford ARS have an Open day to celebrate G0MWT - at QTH of G3PMX/G6HKM. Usual meetings are 1st Tuesdays, 7.30pm in the Marconi College, Arbour Lane. Roy Martyr G3PMX on Chelmsford 360545 (home) or 353221 Ext. 3815 (work).

The University of Lancaster ARS meet 2nd & 4th Mondays in the Assistant Staff House at the University. For further details contact Sue on Lancaster 64239.

Worksop ARS have a Natter night on May 1, a talk on Contest Work by Bill G3ZVG on the 8th and a Family Outing to Drayton Manor Park on the 13th. Meetings on Tuesdays, 7.30pm at 59-61 West Street, Worksop. Mrs C. Gee G4ZUN on Worksop 486614.

Wirral & District ARC meet 2nd & 4th Wednesdays at Irby Cricket Club, Mill Hill Rd. May 2 is D&W, Bassett Hound, Thingwall, the 9th is a talk on RAYNET, the 16th is D&W, The Greave Dunning, Greasby and the 23rd is Club Project Night G8MMM/G4OAR. Vic Allen G4UDR on 051-648 3859.

Bromley & District ARS have a Quiz on May 15. 3rd Tuesdays, 7.30pm at The Victory Social Club, Kechill Gardens, Hayes, Kent. Geoffrey Milne G3UMI on 01-462 2689.

Rugby ATS meet Tuesdays, 7.30pm at the Cricket Pavilion, outside Rugby Radio Station. May 8 is the 3rd Annual Construction Competition, the 15th is Vintage Wireless night and the 22nd is 144MHz direction finding competition round one. Kevin Marriott G8TWH on Coventry 441590.

Spalding & District ARS meet Fridays, 7.30pm at the Old Fire Station, Albion Street. Dennis Hoult G4OO on Spalding 750382.

Hornsea ARC meet Wednesdays, 8pm at The Mill, Atwick Rd. On May 2 Ferriby Club visit Hornsea, the 9th is a committee meeting, the 16th is 'Amiga - Further Revelations by G4YTV, the 19/20th is the 2m Contest and the 23rd is Power Factor G1YVL. Jeff G4IGY on (0964) 533331.

Verulam ARC meet 2nd & 4th Tuesdays, 7.30pm at the RAF Association HQ, New Kent Rd, St. Albans. Andy Ince G0BZS at Cottage No. 1, Rounton, 28 Nascot Wood Rd, Watford WD1 3SD.

Norfolk ARC have Club Visit to BBC transmitter site at Tacolneston on May 2, First HF NFD Briefing on the 9th, GB3NB repeater AGM on the 16th and Amateur Radio on a Shoestring by G3RJV on the 23rd. Wednesdays, 7.30pm at The Norfolk Dumpling, The Livestock Market, Harford, Norwich. Steve Sewell G4VCE on Mulbarton 78258.

THE Sutton & Cheam R.S.G.B RADIO SOCIETY AFFILIATED R.S.G.B

Sutton & Cheam RS meet 3rd Fridays, 7.30pm at Downs Lawn Tennis Club, Holland Ave, Cheam with Natter Nights on 1st Mondays in the Downs Bar. May 1 is a committee meeting, the 7th is a natter night, the 12th is VHF National Convention at Sandown Park, Esher and also their Annual Dinner at Stoneliegh Inn and the 18th is their AGM. John Puttock G0BWV at 53 Alexandra Avenue, Sutton, Surrey SM1 2PA.

Cheshunt & District ARC have Arrow Electronics on May 2, natter nights on the 9/23 and a Portable Evening - Baas Hill Common, Broxbourne on the 16th. Wednesdays, 8pm in the Church Room, Church Lane, Wormley. Roger Frisby G4OAA on Hoddesdon 464795.

Felixstowe & District ARS meet 8pm in the Back Room of the Ferry Boat Inn, Felixstowe Ferry. April 30 is Night on the Air (Orwell Park School) and May 14 is ESWR Planning. Paul Whiting G4YQC on Ipswich 642595 (daytime).

South Manchester RC meet Fridays, 8pm at Sale Moor Community Centre, Norris Rd, Sale. April 27 is Understanding and Repairing a 2m FM Transceiver G4HON, May 4 is Contest Preparation Night, the 11th is Frequency Stable UHF Signal Source G3SVW and the 18th is their AGM. Ian Butterworth on 061-231 5870.

Mid-Warwickshire ARS meet 2nd & 4th Tuesdays, 8pm at St. Johns Ambulance HW, 61 Emscote Rd, Warwick. May 8 is 2m DFing Made Simple Demo in the field by G0GLU and the 22nd is HF Antennae For You, chalk and talk by G3OAY. Mike Newell G1HGD on Kenilworth 513073.

Stamford & District ARS meet 1st & 3rd Wednesdays, 7.30pm at The Flat, Marshalls Garage, St. Pauls Street, Stamford, Lincs. May 7 is Visit to the HQ of the 10th Tactical Fighter Wing USAF at RAF Alconbury. Peter Fancourt G3HEE on Stamford 55001.

Stevenage & District ARS have a Slow Scan TV demo by G1ZZH, 7.30pm on May 2, Reading EPROMS G1ZOO, 7.30pm on the 16th and a committee meeting at 81 Whomerly Rd, 8pm on the 23rd. Meetings held in Ground Floor Lecture Room, 'D' Block, Ridgemond Training Enterprise, Ridgemond Park. Pete G0GTE on Stevenage 724991.

Wimbledon & District ARS have Desert Island Radio II on April 27 and a construction contest on May 11. 2nd & last Fridays, 7.30 in St. Andrews Church Hall, Herbert Rd. Nick Lawlor G6AJY on 01-330 2703.

Southgate ARC meet 7.45pm at Holy Trinity Church Hall (Upper), Winchmore Hill, London N21. May 10 is Marconi Historian, Stan Wood, giving a talk on the History of Valves part 5 and the 24th is Rig Diagnostic evening by G4DFB. Brian Shelton on 01-360 2453.

South East Kent (YMCA) ARC have natter nights on May 2/16, a 144MHz Fox Hunt on the 9th and Waldershare Vintage Weekend (GB2WVW) Planning on the 23rd. Wednesdays, 7.30pm at the YMCA in Leyburne Rd, Dover. G8ZYZ on Dover 852533.

Derby & District ARS meet Wednesdays, 7.30pm at 119 Green Lane. May 2 is a Junk Sale, the 9th is TVI and BCI, it's cause and cure by Derek Brimhill, the 16th is Technical Topics and the 23rd is Visit to the new BBC Radio Derby Studios at St. Helens Street, Derby. Kevin Jones G4FPY on Derby 669157.

Keighley ARS meet in the Clubroom, rear of Victoria Hall, 8pm. May 1/8/22 are natter nights and the 15th is an Annual Foxhunt. Kathy on Bradford 496222.

Thornbury & District RC have Amateur Satellites by G3JMY on May 2 and HF activity/natter night on the 16th. All meetings take place at the United Reform Church, Chapel Street, 7.30pm. Tom Cromack G0FGI on Thornbury 411096.

Lothians RS meet 2nd & 4th Wednesdays, 7.30pm at Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. May 9 is Home Construction by Alf Lowe GM4UZP and the 23rd is a DF Hunt. Peter Dick GM4DTH, 21 West Maitland Street, Edinburgh EH12 5EA.

Loughton & District ARS have Night on the Air - G4ONP on 6m from Loughton Hall on May 4 and Aylmers Farm Planning Night on the 18th. All meetings in Room 14 of Loughton Hall, 7.45pm. John Ray G8DZH on 01-508 3434 (after 6pm) or on St. Albans 59292 Ext. 4611 (office).

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at the Railway Enthusiasts Club Premises, off Hawley Lane (by M3 bridge). May 9 is a Special Open Evening and the 23rd is HF Field Day Preview and Planning. Tim FitzGerald G4UQE on Camberley 29231 or Adrian Hammon G0HNA on Farnborough 519773.

RALLIES

* SWM & PW in attendance

April 29: The Bury Radio Society will be holding its annual Hamfest at the Castle Leisure Centre, Bolton Street, Bury. Doors open at 11am (disabled at 10.30am). Talk-in on S22 and SU8. Catering facilities and a licensed bar are available as well as the giant Bring & Buy. **C. Marcroft G4JAG, Mosses Community Centre, Cecil Street, Bury**.

May 6: The 7th Anglo-Scottish Rally will be held in the Tait Hall, Kelso. Doors open 11am. All the usual facilities will be available, hot and cold food, bar, Farmer John's ice cream, etc. **Bruce GM4UIB, QTHR**.

***May 12**: The VHF Convention will take place at Sandown Park Racecourse, Esher, Surrey.

***May 13**: The Yeovil Amateur Radio Club will be holding its 6th QRP Convention in the Preston Centre, Monks Dale, Yeovil. **D.J. Bailey G1MNM, 7 Thatcham Close, Yeovil, Somerset BA21 3BS**.

May 19: The Swindon Radio Rally will be held in the Oasis Centre, Swindon. **J. Broadfoot. Tel: (0793) 611859**.

***May 20**: The 33rd Northern Mobile Rally will be held at the Great Yorkshire Show Ground, Harrogate. **Mike G0MKK. Tel: (0423) 564353/ 507653**.

May 20: The 7th National Amateur Radio Car Boot Sale will be held at the new venue of Stockwood Park, Luton. This is easier to get to (not far from junction 10 on the M1). Private sellers £7 in advance or £9 on the day, traders £20. The group would like to thank all those who have supported the Sales for the past six years when they were held at the Shuttleworth collection during September. **Clive G4ENB. Tel: Luton 27907**.

May 20: The Parkanaur Amateur Radio Rally will be held at the Silverwood Hotel, Lurgan, Co. Armagh. Doors open at 12 noon and the entrance fee is £1. There will be the usual trade stands, Bring & Buy, bookstand, QSL bureau, etc. Talk-in on S22. The proceeds of this rally go to the Stanley Eakins Memorial Fund at Parkanaur near Dungannon. **Jim Lappin GI1YGS. Tel :(0762) 851179**.

May 20: The Cambridge & District ARC are holding their 5th Annual Rally & Radio Car Boot Sale at Coleridge Community Centre, Radegund Road, Cambridge. Doors open at 10.30pm. **Brian G4TRO. Tel: (0223) 353664**.

May 27: The 14th annual East Suffolk Wireless Revival will be held at the Civil Service Sportsground, Straight Road, Bucklesham, Ipswich. There will be a Bring & Buy, Car Boot Sale, a transceiver clinic, 50MHz demo station, all the usual traders and lots more including a children's play area. **Paul Whiting G4YQC. Tel: (0473) 642595**.

May 27: The Plymouth Radio Club are holding their annual Radio & Electronics Fair in Plymstock School, Church Street, Plymstock, Plymouth. The doors open at 10am with all the usual attractions - traders, Bring & Buy, raffle and a licenced bar and refreshments. There will also be an RSGB zonal meeting and lecture along with Morse tests. **Jan Fisher. Tel: (0752) 340946**.

May 28: The 1990 Bircotes Radio Rally will be held near Bawtry, Doncaster. Doors open at 11am (10.30am for the disabled). Talk-in on S22. Details and or booking forms from: **Pat Smith, 23 Florence Avenue, Balby, Doncaster. Tel: (0302) 857526**.

June 2: The first Belfast Amateur Radio Convention, organised by the RAIBC (Northern Ireland Area), is being held in the Ormeau Park Recreation Centre, Ormeau Embankment, Belfast. All the usual convention attractions will be there plus demonstrations and talks on the hobby by local well-known amateurs. They are also trying to cater for the XYLs by having demonstrations on microwave cookery, crafts and first aid. The special event station operating on the day will be GB2BRC. **David Caldwell GI0HOW. Tel: (0232) 471370**.

June 3: The Southend & District Radio Rally and Boot Sale will be held at the Rocheway Centre, Rocheway, Rochford, Essex. There will be the usual trade stands plus a Bring & Buy, licensed bar and coffee bar. Doors open 10am with talk-in on S22. **John Stone G0OFE. Tel: (0702) 202216**.

June 10: The Mid Lanark ARS Annual Open Day will be held at Newarthill CE Centre, High Street, Newarthill Doors open 11am. There will be the usual traders, a Bring & Buy, demonstrations of packet radio, a talk by John Branegan GM4IHJ on his experiences with satellites, demonstrations of equipment and the annual award of their EHI Trophy. Catering will be provided. **David Williams. Tel: (0698) 732403**.

***June 10**: The Royal Naval Amateur Radio Society Annual Mobile Rally will be held in the Sports Field, HMS Mercury, near Petersfield, Hants from 1000-1700.

June 17: The Newbury Radio Boot Sale is being organised by the Newbury & District ARS at Ackland Hall & Recreation Ground, Cold Ash, Newbury between 10am and 3pm. There will be refreshments available, with free entry and parking for visitors. Talk-in will be provided by GB4NBS. **Mike G3VOW. Tel: (0635) 43048**.

***June 24**: The Annual Longleat Mobile Rally will be, as usual, held at Longleat near Warminster, Wilts. **Shaun O'Sullivan G8VPG. Tel: (0225) 873098**.

July 1: The Worcester & District Droitwich Strawberry Rally will be held at the High School, Droitwich. There will be the usual trade stands, Bring & Buy, family entertainment and strawberry fields (weather permitting). Gates open at 11am with free car parking and entrance. **Tony G4OPD. Tel Worcester 620507 or Derek G4RBD. Tel: Worcester 641733**.

July 1: The York Radio Rally will be in the Tattersall Building, York Race Course, The Knavesmire, York. Doors open at 11am with an entrance fee of 50p (children admitted free). There is ample free parking. On show will be amateur radio, electronics and computing, arts and crafts, there's a grand Bring & Buy, Morse tests, lectures on various aspects of amateur radio, a raffle and talk-in on S22. A licensed bar and cafe will be available for refreshments. The Knavesmire is well signposted and there will additional RAC signs round the main approaches to York. **Frank Webb G3ZKS. Tel: (0904) 625798**.

July 1: Newport ARS are holding their 3rd Grand Surplus Equipment and Junk Sale at the Brynglas Community Education Centre, Brynglas Road, Newport. The Sale is open from 10.30am to 4pm (10am for the disabled). **Kevin GW7BSC. Tel: (0633) 262488**.

July 6, 7 & 8: The Popular Flying Association Rally is again being held at Cranfield Aerodrome, Bedfordshire. All activities related to flying, including airband radio will have a place there.

***July 14**: The Cornish Radio Amateur Club Rally will be held in the Richard Lander School, Truro. There will be the usual trade stands, Bring & Buy, a computer display/demo and a weather satellite demo. There will be refreshments, good free parking and the doors open at 10am (9.30am for the disabled). **Rolf Little G7FKR. Tel: (0872) 72554**.

***July 15**: The Sussex Amateur Radio and Computer Fair will be held at Brighton Racecourse. All the usual traders and other attractions will be there. Doors open from 10.30am to 4.30pm, with entrance at £1. **Ron Bray G8VEH (QTHR). Tel: (0273) 415654 office hourse or (0903) 763978 other times**.

July 22: The Burnham Beeches and the Maidenhead & District Amateur Radio Clubs are staging the 7th McMicheal Rally at the Haymill Centre, Burnham, near Slough. Doors open to the public at 10.30am (10.15am for the disabled). Admission is £1, the car boot sale pitches cost £5. There will be the usual trade stands, packet radio demo, refreshments, (tea and coffee on the RAIBC stand this year - honestly!), bar as well as the GB4MR special event station. Contact **Bob Hearn. Tel (0494) 29868.**

***July 29**: The Scarborough ARS Rally will be held at the Spa, Scarborough. Doors open at 11am. Many trade stands, large Bring & Buy, Morse exam and demonstration for the Morse examiners, refreshments and bar. Details from **Ian G4UQP (QTHR). Tel: (0723) 376847**.

July 29: The Rugby ATS will be holding their Car Boot Sale at Lodge Farm, Walcote, near Lutterworth, Leicestershire. Talk-in will be provided by GB8CBS on S22. Pitches are £5 for the whole day, entrance for visitors is 50p per car. Gates open at 10am. **David G4DDW. Tel: (0455) 552599**.

***August 12**: Hamfest '90 will be held at the Flight Refuelling Sports Grounds, Wimborne, Dorset. The event will feature Radio and Electronics Trade Stands, Craft and Gift Fair, Bring & Buy, a vintage wireless exhibition and full family entertainment. Talk-in on S22. The event opens at 10am. Free parking and overnight camping on the Saturday night by prior arrangement. **John G0API. Tel: (0202) 691649 or Rob G6DUN. Tel: (0202) 479038**.

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The NRD-525 from JRC

In America, they refer to the NRD-525 as JRC's superset, and it's not a bad description, because there is little doubt that the NRD-525 stands in a class of its own. Whatever you want a receiver to do, it's likely that the NRD-525 will do it; whatever you want to hear, the NRD-525 will allow you to listen to it.

What will the NRD-525 do for you? In a space so limited as this page, I cannot possibly cover all the answers, so I will let a respected reviewer make some comments for you. Here's what Rainer Lichte, author of "Radio Receivers — chance or choice" said about it:-

Accuracy and stability
"The tuning accuracy and the matching display are impressive indeed, Still the more impressive is the receiver's frequency stability. Drift is virtually non-existent, it was measured at less than 5Hz/hour."

And about dynamic range:-
"ICP 3rd order (3rd order intercept point) was measured at +17dBm at 7MHz and +14dBm at 25MHz. These are excellent values, and they are not the result of decreased sensitivity. The NRD-525 is amongst the most sensitive receivers I've measured so far. . . . Dynamic range was computed to 102dB, an equally outstanding value."

All very well you may say, but what does this technical jargon mean in real life? Let me quote Rainer Lichte again:-

"The signal quality under adverse conditions is remarkable, e.g. the 40 metre band here in Europe is fairly cluttered with high-power stations and most receivers just quit when you try to extract some intelligence from a weak radio amateur signal. The NRD-525 is unimpressed and functions in a truly professional manner."

In other words, there is virtually nothing you cannot resolve. If it cannot be received by the NRD-525, it cannot be received by anything. As a final quote from the review, let me give some conclusions:-

"The receiver is a joy to operate and a joy to listen to."

"The new NRD-525 very impressively manifests itself as the No. 1 receiver outside the commercial/military bracket."

"Performance-wise, the NRD-525 is way ahead of the competition because this receiver delivers outstanding results in all modes of operation."

When you try an NRD-525 for yourself, all that Rainer Lichte has said will be clearly true, but that's not the end of the story, because the NRD-525 has a range of options which will extend its use even further; to VHF/UHF with an internally fitted converter; to more demanding applications with a range of high performance IF filters; to almost anything you want it to do.

For more advice on this outstanding receiver, just send for details, or call in here at Matlock, or at any of our branches across the country. You will find us helpful, knowledgeable and competent, and when you buy from us you have the comforting thought that you have the backing of Europe's best service team should you require it. That's why JRC, Kenwood, AOR, Signal, Daiwa, and all the other well known names have chosen us to be their sole UK distributors. Others may sell the radios, but we do so much more. Try us and see.

NRD-525	90kHz to 34MHz	**£1095**
Options		
CMK-165	VHF/UHF converter	**£391**
CMH-530	RTTY demodulator	**£102**
CMH-532	RS232 interface	**£91.75**

The NRD-525 is fitted with 12kHz, 6kHz and 2.4kHz filters as standard. Option filters are available for 300Hz, 500Hz, 1kHz and 1.8kHz bandwidths.

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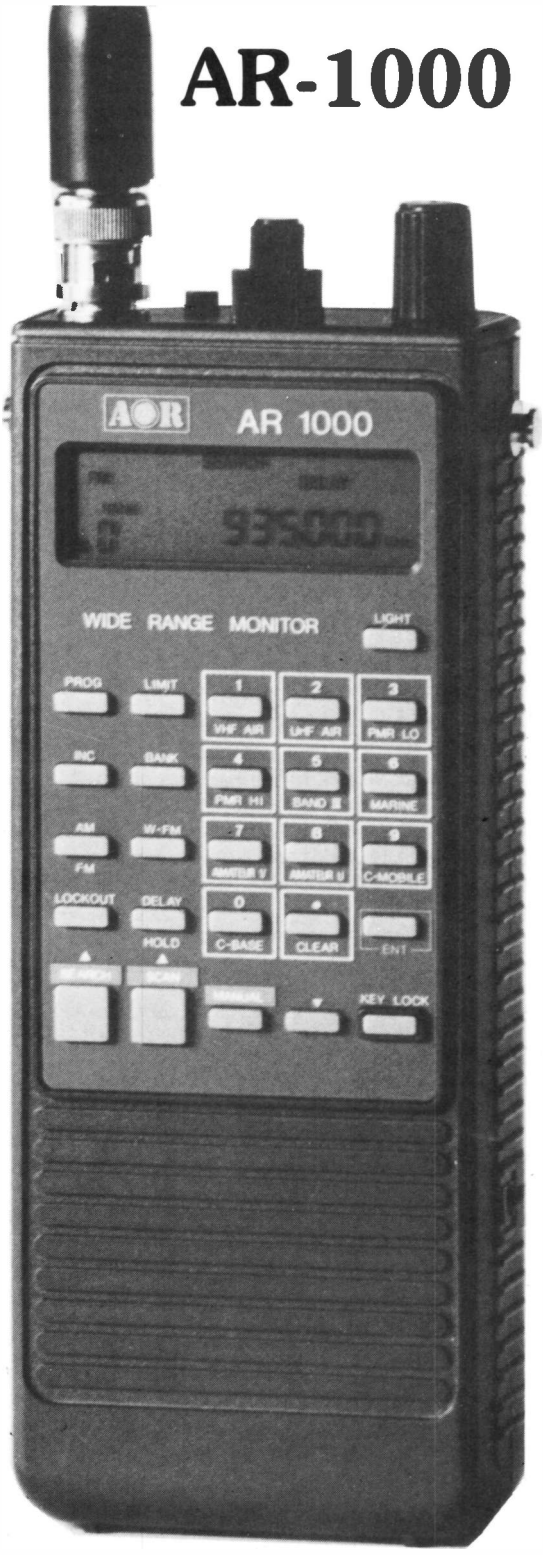

We are delighted to give firm information about the new AR-1000 handheld scanner from AOR. Their design aim of producing a handheld version of the AR-2002 but improving on the spec. at the same time seems to have been fulfilled.

BASIC SPECIFICATION.

Frequency ranges 8 to 600MHz continous, 805 to 1300MHz continous.

Frequency selection By direct keypad entry or by tuning knob on top panel.

Memory channels 1000 arranged conveniently in ten banks of 100, with direct keyboard access to any memory.

Search bands Ten bands which come pre-loaded with the ten most important UK bands of interest as follows:-

1. VHF air	118-138MHz	2. UHF air	225-400MHz
3. VHF PMR 1	71-87MHz	4. VHF PMR 2	165-174MHz
5. Band 3	174.5-225MHz	6. VHF marine	156-163MHz
7. VHF amateur	144-146MHz	8. UHF amateur	433-435MHz
9. Cell mobile	890-905MHz	10. Cell base	935-950MHz

Note that this is only the factory pre-loading, and any search band can be easily re-programmed by the user for any frequency range they wish. What is important is that the new owner can unpack the receiver and by pressing just 3 keys can begin using the unit straight away.

Reception modes AM, FM (narrow), and FM (wide) which gives access for the first time to FM broadcast and TV sound in a handheld scanner.

Frequency steps User programmable from 5 to 995kHz, in any multiple of 5kHz or 12.5kHz.

Scan speed 20 channels per second.

Search speed 40 channels per second.

Power source 4.8V rechargeable NiCd.

The battery pack is four separate 600mA/H AA size cells which are provided, but the user can easily remove them and replace them by four standard AA pencells. Also, and most importantly, the AR-1000 can be powered from any external dc supply of 13.8 V nominal, which not only powers the receiver but also charges the NiCd batteries — so satisfyingly simple.

Other features include a 10dB switched RF attenuator; concentric easy to use volume and squelch controls; a brilliantly designed keypad layout which anyone can understand and use; and a simple interactive operating system in which the display clearly indicates what the user's next move shoud be.

All the performance and features which we wanted from AOR are here in a stylish handheld package, measuring only 70 x 35 x 170mm, and weighing a mere 300g. (excluding batteries).

The ARO-1000 comes complete with the following accessories:-

- Set of 600mA/H NiCd batteries
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- DC power cord with cigar lighter plug
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- Carrying strap
- Earpiece
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USING A SOLAR RADIO TELESCOPE

Ron Ham

Part 1

Before we start I must explain that radio has never been a hobby to me and my various activities in this field have always contributed toward my living which is why I was able to put so much time and effort into this solar project.

As time went by it became important for me to know more about the behaviour of radio waves and while gathering information about beacon signals in the 28MHz band, openings in the East-European broadcast band (66-73MHz) and keeping records of atmospheric pressure and disturbances to the domestic radio and television networks, I decided to build a simple radio telescope. Such an instrument would add another dimension to the subject of propagation and tell me when the sun was 'active' and likely to be ejecting streams of particles toward the earth causing auroral or ionospheric disturbances.

The First Step

Radio astronomy is a young science and in the 1960s information was limited so I began by referring to the book *Solar Radio Astronomy* by Kundu. I already knew that when sunspots are present, the sun is a powerful transmitter of radio waves and a chart in this book showed that noise from large solar bursts and storms can be received on earth in the 100-200MHz region, peaking around 150MHz. Fortunately, I had previously heard solar noise on a communications receiver and knew that descriptions of it sounding like 'hissing', 'the sea rolling across the shore' and 'whoOOOoshing' over a wide bandwidth were correct.

Where to 'Listen' and Where to Build

Before starting to create such a tool I had to find an observational frequency that was clear of terrestrial and satellite signals plus a south-facing site on which to build the antenna. After prolonged tests with a converter and dipole I found that 135.95MHz met the first requirement and by watching the sun's path I decided that the southern end of my garden would be ideal for the second. The site, with the completed antenna, 21 years ago, can be seen in the photograph.

The Antenna

The main frame, supporting the four Yagis is 3 x 2m, made from 50mm rough sawn batten, held together with about 120 No.10 wood screws and covered with 12mm wire mesh to act as the reflector. The mesh was secured to the frame with a large number of wire staples to keep it as tight and flat as possible. Next came the business part of the antenna. Following a chat with the late

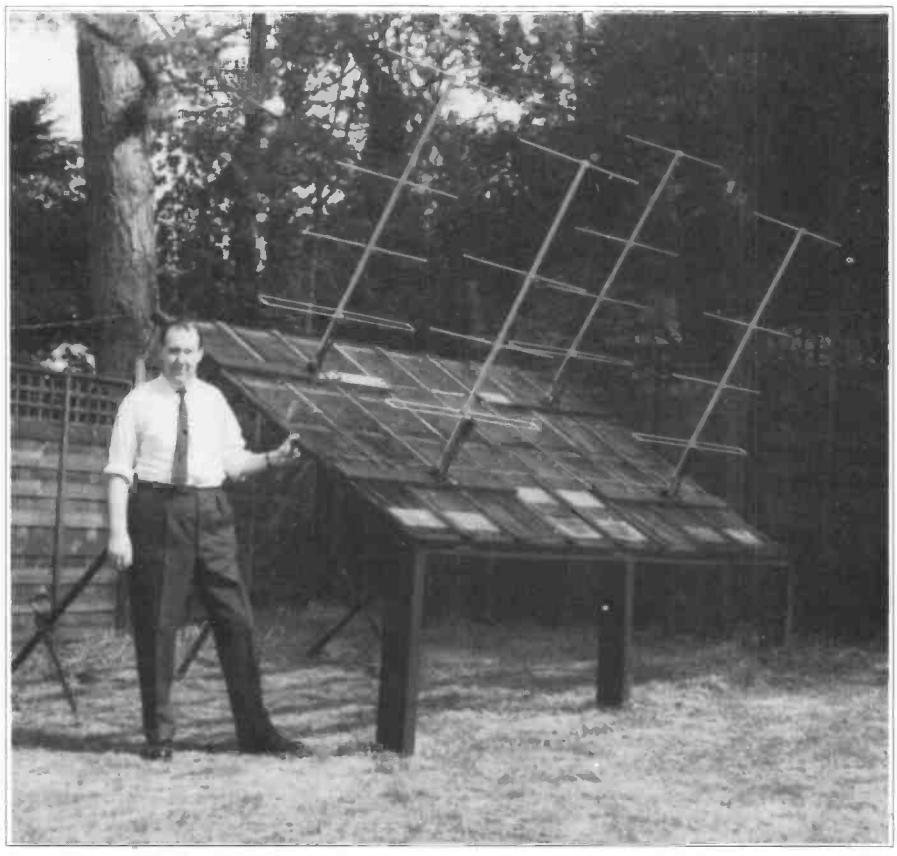
Articles about v.h.f. radio waves, generated by active areas on the sun's surface and detectable on earth with large antennas and receivers, were published in the technical magazines of the '40s. The thought of receiving radio waves from a natural source so far away stirred the 'armchair' astronomer in Ron.

Vic Hartopp, then a director of Jaybeam, his firm promptly supplied all the parts I needed to make the four Yagis and the coaxial matching harness.

The selected site had a clear view of the midday sun for about three hours and was well away from sources of local ignition or electrical interference. This was ideal, because the rotation of the earth would move the antenna across the sun in the horizontal plane, known as earth-drift, leaving me to adjust its angle about five times per year to keep the sun within its vertical beamwidth. This was achieved by hinging the reflector on its bottom rail and supporting the back with a couple of 4m long television masts and a simple arrangement of universal clamps. This weighty assembly rested on three, 2m lengths of 230 x 75mm timber, evenly spaced with approximately 610mm of each protruding above the ground. The short-ends of three long reflector hinges, with their moving parts well greased, were bolted to a plank which in turn was secured to the three ground-posts with coach screws.

The Receiver

Briefly, the receiver used in this radio telescope was a 'spreadout' superheterodyne with an added means of recording the incoming signal on a paper chart, Fig. 1.1. Basically, a superheterodyne receiver can be divided into three sections, first the r.f. amplifier, local oscillator and mixer; then the intermediate frequency amplifier and detector and finally the audio output stage. Section 1, a crystal-controlled converter, was installed in a waterproof container near the antenna thus allowing for a short, coaxial feeder at the observational frequency, Fig. 1.1 'A' and 'B'. The first converter inside container 'B' was home-brewed using an r.f. stage to amplify the incoming signal at 136MHz, a crystal oscillator chain giving an output of 110MHz and a mixer which produced an intermediate frequency of 26MHz (136 - 110 = 26MHz). This conversion enabled any solar noise, at 136MHz, to reach the rest of the receiver, in the



Ron Ham with the 136MHz solar telescope antenna array in his garden in 1968.

USING A SOLAR RADIO TELESCOPE

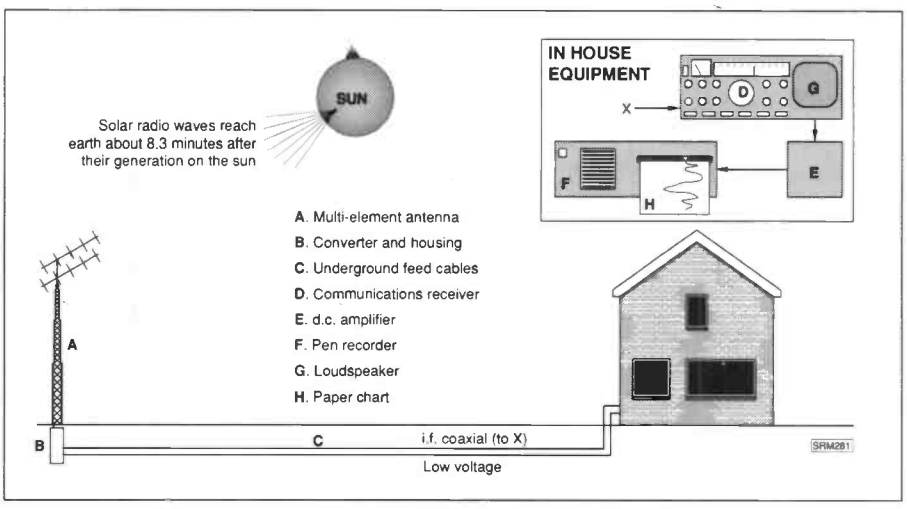


Fig. 1.1: The 'spreadout' superhet radio telescope.

house, some 30m away, via an underground coaxial cable at 26MHz. A top quality u.h.f. television antenna cable was ideal for this purpose because it offered very low-loss at 26MHz and by laying it underground, 'C', it was out of sight and the covering earth provided extra screening against unwanted signals appearing at 26MHz. For added mechanical protection this cable was placed inside a hose-pipe and a twin plastics covered flex was laid alongside to carry the low-voltage d.c. required to power the converter.

By connecting this cable to the antenna socket, 'X', of a communications receiver 'D', sections 2; the i.f. amplifier and detector and 3; the audio output, 'G', were complete in one internally-powered box. If the communications receiver is now tuned to the 26MHz signal carried by the i.f. cable and the receiver is switched to a.m. and its r.f. gain control is set reasonably low, any solar noise, at 136MHz, should be heard through the loudspeaker 'G', as a type of 'hiss' above the receiver's own background noise.

This system was tested by tuning between 136 and 137MHz (now converted to 26-27MHz on the dial of 'D') to find a signal from an orbiting satellite and then re-tuned to its operational frequency when the check was complete.

The set first used in position 'D' was an ex-military AR88 which was just right because, apart from its good performance, it was fitted with a 'diversity' terminal fed from its detector and a convenient place to connect the movement of a sensitive pen recorder 'F'. Although the energy at this point was insufficient to move the pen, the addition of a d.c. amplifier 'E', using a 741 operational amplifier i.c., made this possible.

The DC Amplifier

There are many published circuits using a 741 to drive such a movement, but some experimentation is required to get the right component values, especially the feedback, to make the pen move to full scale with a low input voltage. It is essential to fit a zero control to the 741 which can be adjusted in conjunction with the receiver's r.f. gain control. In my case, I zeroed the movement and then increased the r.f. gain until the receiver's noise line was drawn about 10mm in from the edge of the paper chart 'H'.

Pen Recorder

I was lucky to find an Evershed & Vignoles pen recorder, with a 1mA movement and a 240V chart motor, on the surplus market. The mains driven motor meant that observation times could be commanded by a time-switch. Gear wheels were obtained from the makers to give a chart speed of approximately 12mm per minute which is optional, but reasonable on a three hour run. I set the time-clock to switch on at 1130, as the sun entered the antenna's horizontal beamwidth and off at 1430 when the sun was outside. These times are not too critical but must be adjusted to suit the location and antenna direction. Each daily observation produced about 2m of chart which enabled increases of noise and/or individual bursts to be timed and clearly seen.

In 1978, I replaced units 'B' and 'D' with a Microwave Modules 144MHz converter and a Yaesu FRG7 communications receiver which were suitable for the work and performed very well. I fed the d.c. amplifier from the FRG7's RECORD socket and adjusted a couple of resistance values in the d.c.amplifier to suit the output of the FRG7. This was trial and error.

Results

The completed instrument began its daily work in May 1968 and early recordings proved that solar radio noise could be logged under two headings; individual

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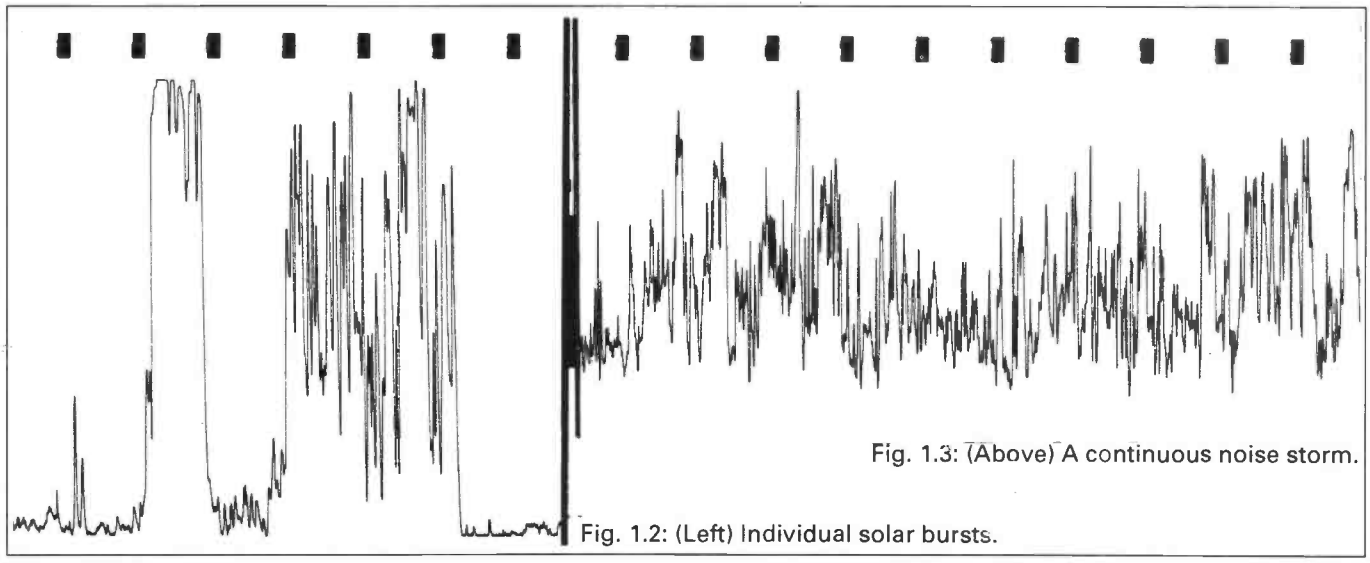

Fig. 1.3: (Above) A continuous noise storm.

Fig. 1.2: (Left) Individual solar bursts.

RIGHT THE FIRST TIME

Rev George Dobbs G3RJV

Part 8

So far in this series the radio receivers have been very much home-made items. The first radios were limited in the number of stations and the selectivity to isolate individual stations was poor. Even the 'one-i.c.' radio, which receives local a.m. broadcast stations well on its own ferrite rod antenna, only worked personal headphones. Typical radios receive plenty of stations and drive a loudspeaker. Such a radio requires adequate audio amplification to power the loudspeaker and usually includes a volume control to adjust the output to the required listening level.

The 'one-i.c.' radio is a surprisingly good receiver for the number of components used and could make the basis of a useful domestic radio set. Alone, it is incapable of driving a loudspeaker and therefore needs further audio amplification.

It would be possible to build several extra transistor stages to give this further amplication, each stage would require the associated components around each transistor to achieve the correct operating conditions and each stage could give only a limited amount of extra amplification. The best solution is to use an audio amplifier integrated circuit: another i.c.

Integrated Circuits

There are several audio amplifier i.c.s (integrated circuits) which could do the job. Indeed some of these are capable of very high levels of audio output. The one chosen for this project is an inexpensive and readily available type ; the LM386. It has been chosen because it is cheap, easy to obtain and also because it requires very few external (or extra) components to get it working. It also has a low standing current, that is, it does not draw much current from the battery when signals are not being amplified. I like the LM386 and have used it in many radio projects over a number of years.

The circuit of the 'two-i.c.' radio is shown in **Fig. 8.1**. The LM386 is a package called the 8-pin d.i.l. (dual-in-line) which gives a very compact

The final stage of development for the simple radio we have been building in this series is the addition of an i.c. audio amplifier to drive a speaker.

arrangement. There are two rows of 4 pins, spaced 0.1in apart, either side of the flat package. A notch marks the positions of pins 1 and 8 (opposite sides of the package) and some makers add a marker, or dot, to denote pin 1. Looking from the top of the i.c., the pins are numbered in an anti-clockwise direction from pin 1. The pins must be wired correctly or the i.c. will not work and could even be damaged.

The Circuit

The circuit is far more complex than any other circuit diagram we have used so far in this series. Do not be put off by the number of components and stages. Circuits diagrams can usually be split up into units or stages according to function. This circuit can easily be divided into two units to the left and right of the volume control, R4. The left-hand side is the 'one-i.c.' Radio and the right-hand side is the audio amplifier built around the LM386.

The left-hand section looks much like the original circuit of the 'one-i.c.' Radio in **Fig. 7.2**. The LT700 audio matching transformer has been replaced by a resistor, R2, which is connected to another resistor, R3. R2 provides the audio signal load, in the same way as T1 of **Fig. 7.2**. R3 simply serves to drop the voltage from the battery supply to a suitable level for the ZN414. In this circuit a 9V battery will be used as the power source.

The audio output from the ZN414, at pin 1, is fed to a volume control, R4. Resistor R4 is a potentiometer (variable resistance) which can be adjusted to allow only the required amount of audio signal to pass to the amplifier to produce the required amount of sound output. The whole of the audio signal appears across the carbon track of R4. The wiper arm, controlled by the rotating shaft allows a portion of the total signal to pass via C4 to the amplifier. The nearer the wiper is to the top of R4 the more signal is allowed to pass. Turning the wiper down towards the bottom of R4, the ground (or earth) end gives less signal.

Potentiometer

The potentiometer has a value of 10kΩ and follows a logarithmic law, usually sold simply as '10kΩ Log. Pot'. Logarithmic and linear laws of change are too complex to be explained here - if you really must know, look it up in a maths book!

The choice of the log potentiometer, rather than one with a linear track, is because of the human ear. The ear follows a logarithmic law in its response to sound. To put it very simply: the louder a sound level, the greater in proportion must the sound be increased to register an increase in human hearing. A sobering thought for live pop music fans and Walkman users!

The signal from the volume control is coupled, via C4, to the input of the LM386 at pin 3. Capacitor C5 helps to roll off some of the high-pitched notes and makes the operation of the amplifier more stable. The output of the LM386 appears at pin 5 and can directly drive an 8Ω loudspeaker. Capacitor C9 couples the output to the loudspeaker and R6 and C8 provide a simple filter to stablise the operation of the LM386.

Supply Voltage

The supply voltage for the LM386 comes from a 9V battery via R5, with C10. These components 'decouple' the supply, this is, they prevent any of the audio signal getting onto the power supply line. Should this occur, the signal will appear across R5 but then be led to ground by C10. The capacitor, C7, is used to set the overall gain of the amplifier (the amount it amplifies) which in this case is 200 times. Capacitor C6 is a decoupling capacitor required for the internal working of the LM386.

In Part 9 we will get down to building the 'two - i.c. Radio'.

Turn to page 15 for resistor values.

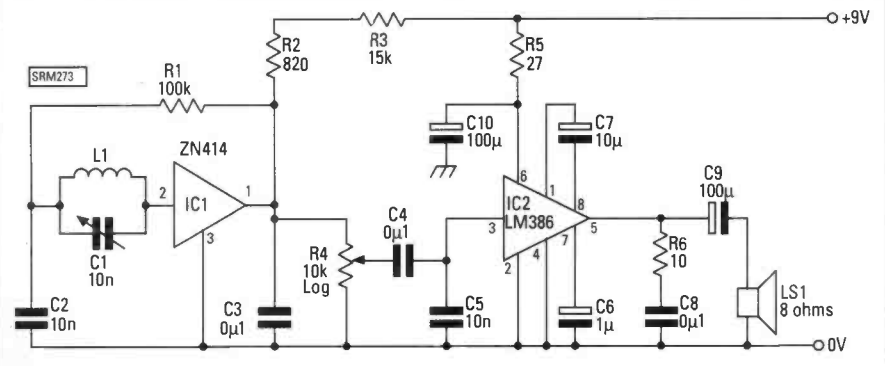

Fig. 8.1: The circuit diagram of the 'two - i.c.' receiver.

Abbreviations	
a.m.	amplitude modulation
d.i.l.	dual in-line
i.c.	integrated circuit
in	inch
kΩ	kilohms
V	volts
Ω	ohms

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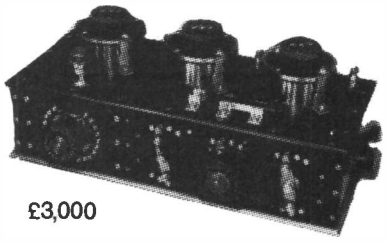

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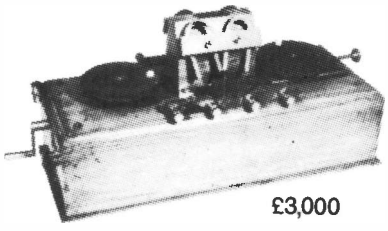

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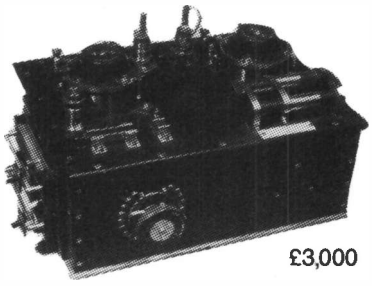

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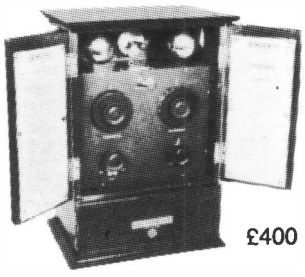

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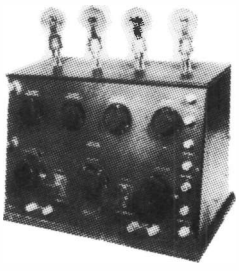

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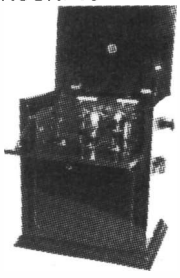

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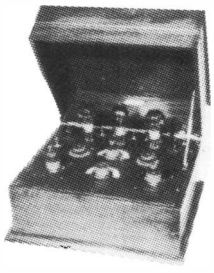

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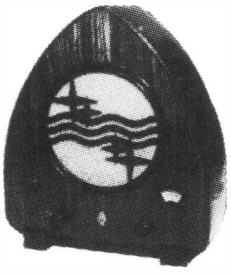

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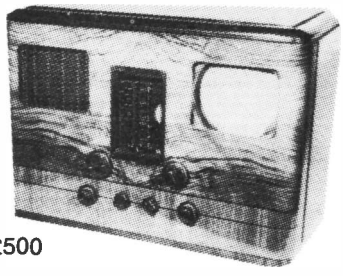

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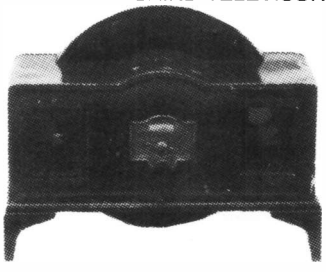

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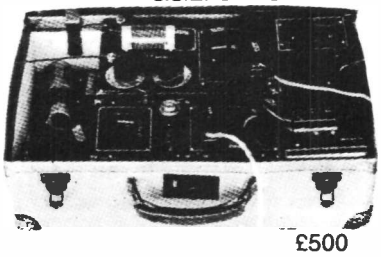

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RIGHT THE FIRST TIME

RESISTOR VALUES

The colour coding for resistors may include a fourth band to indicate the **tolerance** of the resistor, that is, how accurate we might expect the stated value to be in practice. Most modern resistors are ±5% but ±10% or even ±20% resistors are common. For example a YELLOW-VIOLET-YELLOW resistor would have the stated value of 470000Ω (470kΩ). If it has a silver fourth band (±10%) the value can be between 470000 - 4700 and 470000 + 47000, that is 423000Ω to 517000Ω. This may seem a 'rough' value but it is accurate enough for most radio applications.
Obviously resistors cannot be made for every value of resistance, so manufacturers use a system of **preferred values**. The chart shows what these values are for the three common tolerances. The relationship may seem odd but it does reflect the tolerance extremes and complete coverage of values without duplication.
The preferred values are used for the whole range from 1Ω upwards, so the values available for 10% resistors would read: 1, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2, 10 and so on up the range of resistance.
Capacitors also use the same system of preferred values.

5%	1.0	1.1	1.2	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1
10%	1.0		1.2	1.5		1.8		2.2		2.7		3.3		3.9		4.7		5.6		6.8		8.2	
20%	1.0			1.5				2.2				3.3				4.7				6.8			

USING A SOLAR RADIO TELESCOPE

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bursts, (Fig. 1.2) and the continuous noise storm, (Fig. 1.3). The former can last up to 10 minutes and the latter may continue for several days depending on the size and life-span of the area on the sun where the radio-waves are being generated. The 93mm length of chart in Fig. 1.2 represents 7 minutes of recording time and clearly shows the two burst lengths of 1 and 2.25 minutes respectively.

A typical noise storm can be seen in Fig. 1.3. The system switched on automatically as the sun entered the antenna beam and Fig. 1.4 shows this start, plus about eight minutes of recording.

Take a close look at the bottom left of the chart and you will see the level of the receiver background noise when I checked the system against 'cold' sky some three hours earlier. Now compare this with the increase in noise level when the sun, with a mild noise storm in progress, entered the antenna beam.

Although solar activity is generally random and complex there are many similarities between events. For example, the appearance of an active sunspot usually produces a few small bursts which increase and decrease in numbers as the spot crosses the central meridian before disappearing off the opposite limb. This takes about 13 days because the apparent movement of the spot across the sun's disc is due to the approximate 27-day rotation of the sun on its axis.

Noise storms are often recorded while spots are in mid-travel and one never knows what activity is round the corner and yet to appear, Fig. 1.5.

In Part 2 Ron tells us how he put his creation to work listening to the sun. □

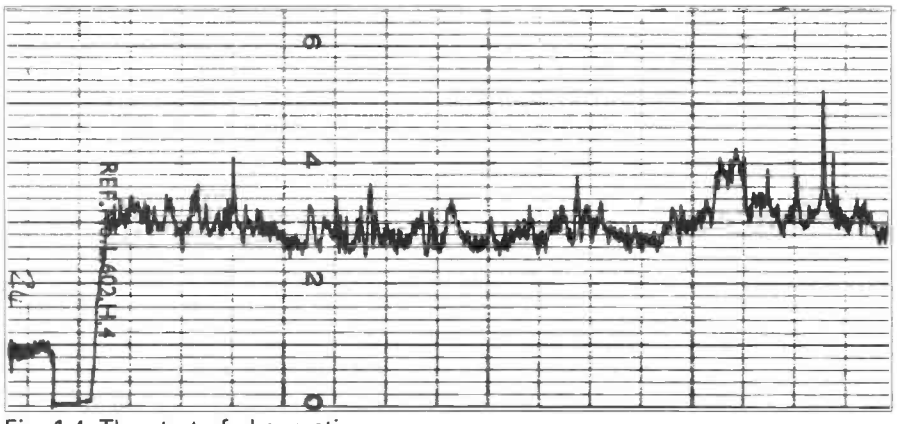

Fig. 1.4: The start of observation.

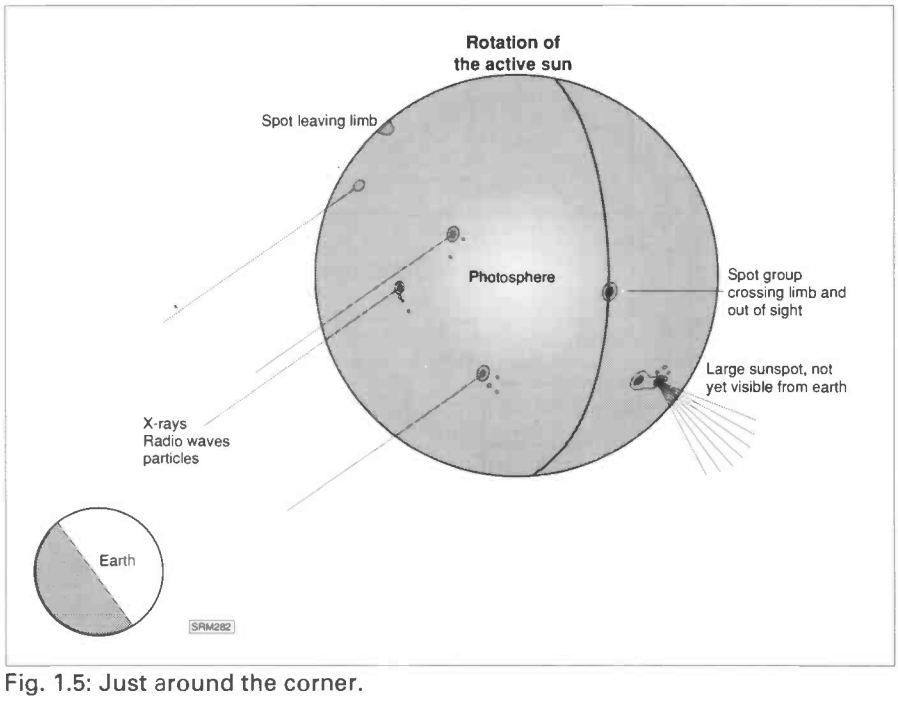

Fig. 1.5: Just around the corner.

DECODING THE DATA

Part 2

Mike Richards G4WNC

Last month Mike covered the translation of a key-press on the computer into a binary number for transmission as data from the computer's serial port. Now he explains how this digital signal is processed so that it can be sent over a simple radio link.

Before diving off into the technicalities let's review the details of the serial signal that's being sent from the computer. You will remember that I described the signal as being t.t.l. (Transistor-Transistor-Logic) which uses voltages between zero and +5V with approximately +5V representing a logic '1' and approximately 0V for logic '0'. This, of course, is only one of the standards, the other common one being RS-232. In this case voltages between -3 and -25V are used for logic '1' and +3 to +25V for '0'. Despite this wide range in the specification, the most common voltages encountered on RS-232 ports are ±6V.

Mark and Space

Rather than continue with the terms logic '1' and '0', it's time we changed to the more common telegraphy terms 'mark' and 'space' to represent a logic '1' and '0' respectively. So, how can we send this voltage variation over a radio link so that it can be resolved at a distant location? The most common technique is to use what is known as frequency shift keying and is abbreviated to f.s.k. With this technique the transmitter has the capability to switch between two frequencies which are very close together - typical spacings being 170Hz, 425Hz or 850Hz. The technical term for the spacing between these frequencies is the 'shift'.

So a station operating with a spacing of 170Hz is said to be using '170Hz shift'. You may have already guessed that the two frequencies are used to represent the mark and space states of our serial data. The convention being that the mark is represented by the higher of the two frequencies. There are some stations that use the opposite sense and these are said to be using reverse, or inverted, shift.

So why are there a variety of different shifts in use as it would seem that the 170Hz shift is the best because it uses less of the valuable frequency spectrum? Well the wider shifts reduce the number of errors and also allow data to be sent at a higher speed, which is of particular value to commercial operators. The wider shift also places less demands on the design of the terminal unit, but more of that later.

Practical Example

Let's now move on to describe a practical example using a typical commercial press station with a shift of 425Hz and a speed, or baud rate, of 50 bauds. You may remember that in the first part of this series I described the generation of serial data representing the letter A, well I'll continue from there and describe how that letter is transmitted. The waveform of the serial data complete with start and stop bits is shown in **Fig. 2.1**. In order to show how this is transmitted all we have to do is change the mark and space legends to the two transmitter frequencies.

So if for the sake of this example our theoretical transmitter is operating on 12.1MHz for the mark condition, a space will result in the carrier changing to 12.099575MHz i.e. 425Hz lower in frequency. This change is shown in **Fig. 2.2**, as is the rate of change which is shown by the timings in milliseconds along the bottom of the graph.

That's all there is very broad terms to generating an f.s.k. RTTY transmission. So now we will move on to how the signal is resolved at the distant end. First of all let's define just what we require of the reception system. It must take an r.f. signal with a shift of 425Hz and convert it back into a serial digital signal which can be handled by a computer. Rather than try and describe a sophisticated commercial decoding system, I'll deal with a common system that is used by a large number of short wave listeners.

By far the simplest way to convert the f.s.k. signal into something more manageable is to use a conventional s.s.b. receiver. When an f.s.k. signal is demodulated by an s.s.b. receiver the result is two audio tones with the difference between the frequencies being the same as the shift of the original signal. The actual frequency of the audio tones will vary as you tune through the signal but the difference between them will always be the same as the shift, i.e. 425Hz in our example. If you've a receiver to hand you can try this simple experiment to illustrate this point. You will need to tune very slowly between 14.080MHz and 14.095MHz - the RTTY section of the 14MHz amateur band. I chose this band as there is almost always some RTTY activity, whereas many commercial stations operate to timed schedules. Once tuned to this band you should hear a few RTTY signals, which have a warbling sound as the signal switches between the two carrier frequencies.

You may also notice that the signal often stops on one frequency then starts again - this is due to the amateur operator typing slowly and pausing between letters, but nevertheless serves to illustrate the process quite well. Now that you appreciate how the RTTY signal can be converted into audio tones we need to consider the next step. What is needed is a device that can accept this two-tone audio signal and convert it back into a digital form that can be handled by

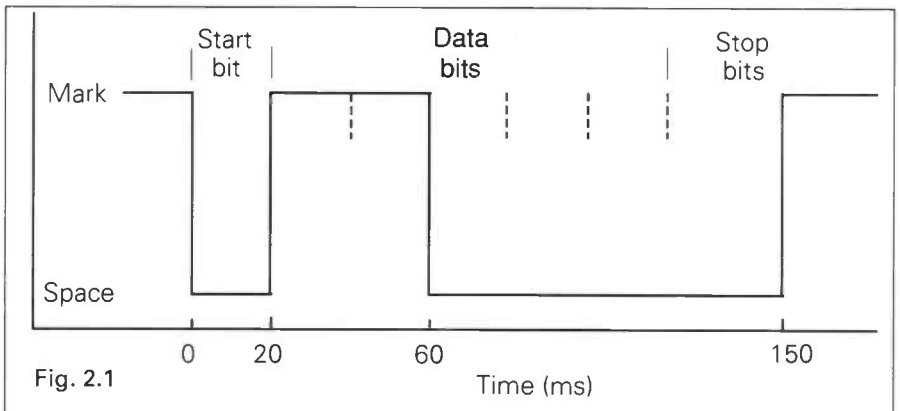

Fig. 2.1

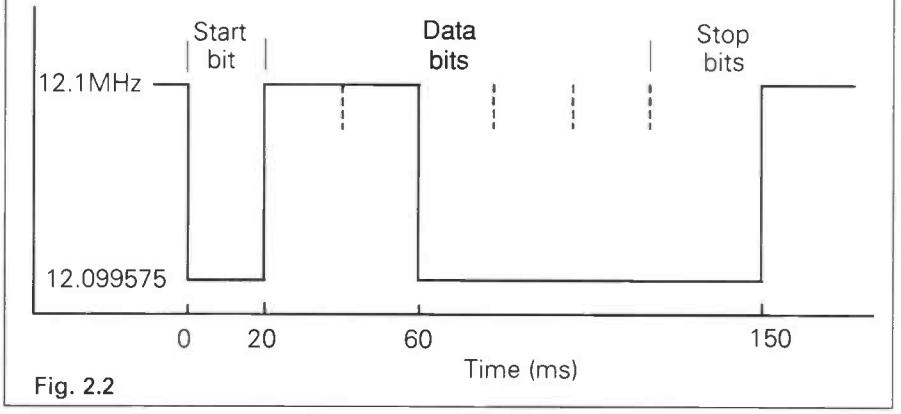

Fig. 2.2

DECODING THE DATA

a computer. There are in fact many ways of doing this, but for the sake of this example I will briefly explain a common type of terminal unit. The name terminal unit is used to describe an electronic device that converts audio RTTY tones into a d.c. signal which varies according to whether a mark or space tone is received.

One of the most common types of terminal unit is known as the filter type and uses two audio filters and a detector to achieve the conversion. A greatly simplified block diagram is shown in **Fig. 2.3**. Before we go any further I ought to talk about the actual receive tones used. If you tried the test I described earlier where you tune across a RTTY signal you will have noted that the actual frequency of the RTTY tones varies widely as you tune. This leads us to the next problem - the filters in the terminal unit will only respond to two fixed tones. There is no real reason why terminal units shouldn't use whatever frequencies they like, but for some sort of commonality, standards have been adopted. Unfortunately there are two standards, known as 'high tones' and 'low tones'. The 'high tones' being used primarily in the USA and the 'low tones' in Europe. The frequencies used for the high and low tones are shown in the table below.

	Low Tones		High Tones	
Shift (Hz)	Mark (Hz)	Space (Hz)	Mark (Hz)	Space (Hz)
170	1445	1275	2125	2295
425	1700	1275	2125	2550
850	2125	1275	2125	2975

One significant point you may have noticed from this is that with low tones the mark tone is always the higher of the pair whereas with high tones the space is always higher. As a result of this the received data is inverted when using high tones unless a correction is made within the terminal unit.

So to get back to our example, you can see from this table that to receive a signal with 425Hz shift using European low tones, our two terminal unit filters need to be set to 1275Hz and 1700Hz for the mark and space signals respectively. Let's use our original graph again, but this time I'll show the audio tones from the receiver that are applied to the terminal unit - **Fig. 2.4**. In a perfect terminal unit the d.c. output signal from the unit to the computer will mimic this waveform exactly. To complete the process all we now need to cover is the display of our letter A on the computer terminal. By employing the principles that I described in the first part of 'Decoding the Data', but in reverse. The serial signal is converted back into a parallel data number, which the computer then looks up against the ITA No.2 (International Telegraph Alphabet) to see what letter needs to be displayed on the screen. The actual display of the letter on the screen is an internal function of the computer so we don't need to go into too much detail. In order to summarise the whole process from end to end, I have constructed the flow chart shown in **Fig. 2.5**. □

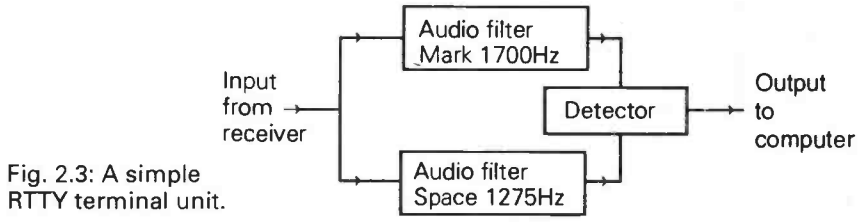

Fig. 2.3: A simple RTTY terminal unit.

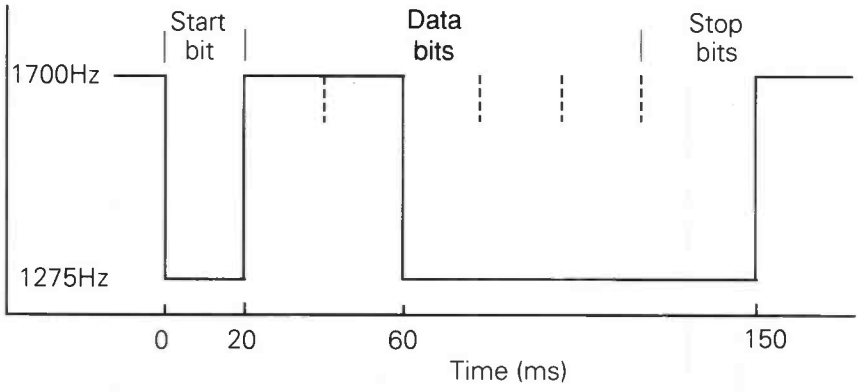

Fig. 2.4: Received tones for letter A.

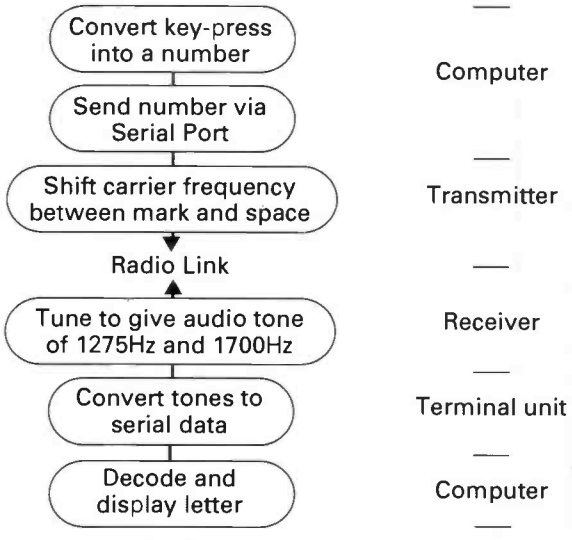

Fig. 2.5: RTTY system flow chart.

Abbreviations	
TTL	transistor-transistor logic
d.c.	direct current
Hz	hertz
RTTY	Radio TeleTYpe
MHz	megahertz
f.s.k.	frequency shift keying
s.s.b	single sideband
r.f.	radio frequency
V	volts

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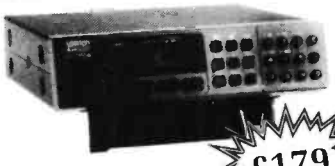

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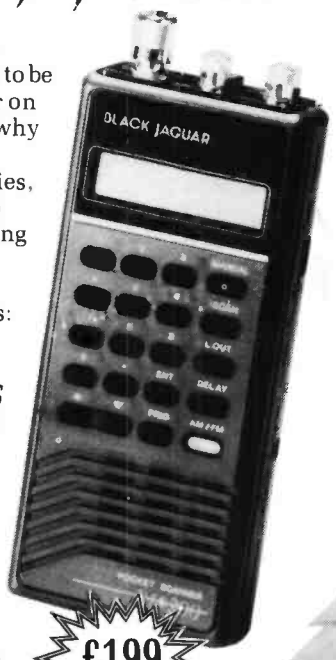

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Flying Experiences

Continuing the story of his involvement with BEA, **Geoff Halligey** (Bridgend, Mid-Glamorgan) recounts his days as radio operator (!) on Vikings, Elizabethans (Ambassadors to us) and Viscount 700s between 1951 and 1962. Here's his description of an early form of ground controlled approach: "In front of you is a thick blanket of fog. The bloke on the ground keeps saying 'Commence your descent, you are passing the middle marker, left 2°, the runway is straight ahead;' all you see is white-out. At 200ft (if you're lucky) you spot a lead-in light, and eventually up comes the runway". Thanks, Geoff; do tell us about the days at Croydon on c.w. and how the Americans used radio ranges.

Your Questions Answered

VOLMET and a.t.i.s. broadcasts interest **Neil Oakley** (Whitstable, Kent). London VOLMET South is still on 128.6MHz and Heathrow a.t.i.s. for both arrival and departure is on 133.075MHz. Both transmissions originate from ground stations with the intention of their being received by aircraft at altitude; it is not possible to predict the coverage from any particular location. All v.h.f. aircraft communications use a.m., not s.s.b.

David Hulme (Manchester) wants the u.h.f. frequency of London Mil North. Both my Aerad and RAF *Supplements* give this as 342.8MHz but if anyone knows better, please write in.

I'm often asked about receipt of oceanic clearances. The best description I've seen is in *From the Flightdeck 1: Heathrow-Chicago* by Stan Stewart (Ian Allan). During the later stages of climb over north-west England the aircraft is controlled by London Airways; however, the co-pilot obtains the oceanic clearance by contacting Shanwick on the second v.h.f. set. Later, Scottish Airways hands the flight over to Shanwick by giving the appropriate primary and secondary h.f. frequencies; this should satisfy **J.D. Toseland** (Woodford, Northants).

Donald Jackson (Stanford-le-Hope, Essex) - forgive me if I haven't read the signature correctly - will find a complete description of n.d.b.s, v.o.r.s and other navigational aids in part 2 of my 'Aeronautical Radio' series in the June '87 *SWM*. Why is this subject important? There are four reasons. Firstly: knowing the usage of nav. aids is the only way to understand the conversations between controllers and i.f.r. flights. Even v.f.r. aircraft make use of beacons. Secondly: the current pattern of i.f.r. traffic can vary to take into account unserviceability of nav. aids. Thirdly: some v.o.r.s also carry useful a.t.i.s. transmissions, helping aircraft which might be out of range of the airport's own transmitter. Fourthly, beacons are a reasonably constant signal source which are of interest for propagation tests.

At last, winter is over and the air display season starts. If you are going to an air show look out for Godfrey's Museum logo and you might meet him!

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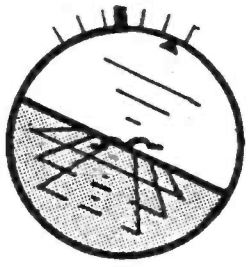

Taking the mystery out of flying

Dave Wright (Sheffield) is troubled by adjacent-channel interference on h.f. stations separated by just 3kHz. Remedies include buying a receiver with better selectivity (an old-fashioned v.f.o. is often better than a synthesiser in such cases of adjacent channel breakthrough). However, this is expensive advice so first try simpler remedies to reduce the unwanted signal before it reaches the first mixer in your receiver. I suggest adding an attenuator and/or an a.t.u. and/or a preselector between the antenna and the receiver. The problem you are experiencing is becoming increasingly important with modern receiver designs and ever more crowded bands.

Roger Ryton (Newbury, Berkshire) notes that his local TACAN at Greenham Common is on a published frequency of 108.0MHz. Actually, it's on channel 17 which is really 978MHz. What happens in the aircraft is that the v.h.f. nav. set tunes in a v.o.r. and the appropriate d.m.e. is automatically selected on u.h.f. at the same time. There isn't a v.o.r. on 108MHz but you still select this frequency on the cockpit controller in order to gain automatic access to the d.m.e. part of the TACAN. There is no separate d.m.e. receiver tuning control. Now, still on the subject of navigation, can someone tell us where the GIBSO reporting point is?

Company operations reports don't follow the rigid procedure laid down for communications with controllers. Typically consistent, though, is reporting of times off blocks/airborne, saying 'diagonal' where I've printed a '/' (slash). Roger will no longer be puzzled by this. But, he does want to know about secondary surveillance radar. The aircraft replies on 1090MHz and no, you couldn't tune in to this and generate a plan on your computer. Both direction and distance are only determined once the ground antenna direction and timing of the interrogation pulse are known. The reply signal means nothing on its own.

Finally, a good idea from Roger is to couple a receiver's squelch output (the R535 has one) to a tape recorder (a dictating machine is best, it starts and stops more sharply) so that no recording time is wasted on a silent channel. Sorry, I can't comment on any particular combination of antenna/receiver that you might set up at your location; there are too many variables.

Follow-ups

In the March issue **Stephen Pattrick** (Wisbech, Cambridgeshire) asked for the location of Eastern Radar's transmitters. **Jim Wright** gives them as Trimmingham, Norfolk; Rothwell, Lincolnshire; Walesby and Grantham; **Steve Foster** (Burton-on-Trent) adds Chedburgh. The first three are shared with Anglia Radar. Can anyone pinpoint the Grantham site with more precision, for Steve's information? Midland Radar has moved from North Luffenham to amalgamate with Eastern Radar, both being controlled from West Drayton. Border Radar is now controlled from North Luffenham. There must be a good reason for all these changes!

Now for the remaining callsigns requested by **P.J. Salisse** (Highgate, London), also in March. BALAIR is a Swiss charter operator; CHALLENGER could be a Canadair Challenger business jet, the 'flight number' actually being its registration; MARTIN could be Martinair, the Dutch cargo airline; ROOK is probably military, e.g. Alconbury TR-1As. Thanks to Steve Foster, David Hulme and Dave Wright.

Frequency News

Geoff Halligey reports on Novair's new long-distance operations control using 6.556, 10.021 and 11.363MHz.

Barry Craner (Leicester) is well informed about East Midlands Airport. Barry recommends a day out at the Aeropark which is an aircraft museum on the airport; the advertising leaflet has enticing pictures of an Argosy, a Whirlwind, a Varsity and of course the Vulcan. You can get quite close to the runway for photography. Apparently Tower (124.0MHz) relays on

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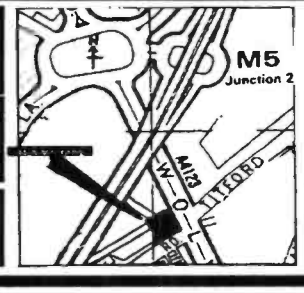

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DX LETTER FROM AMERICA

Gerry L. Dexter

More news of short wave broadcasting activity from the Americas.

The new station of High Adventure Ministries, KHBN on Guam, is still a long way from being on the air on its own.

Problems with the lease for the land on which the station is to be built have created a considerable delay, but a fellow religious broadcaster on the island is enabling High Adventure to get on the air anyway. The short wave station of Adventist World Radio, KSDA, has sold a daily four-hour time block to KHBN for its own programming beamed to China. So, KHBN can currently be heard via KSDA's facilities from 0400 to 0800 on 15.225MHz. Once it begins operations on its own KHBN will probably show up on 9.830 and 9.840MHz.

Herald Broadcasting KHBI

Herald Broadcasting's KHBI on Saipan (the former KYOI) has returned to the air, having added a second 100kW transmitter and new antenna systems. The station, which carries the same programming as WCSN and WSHB, is currently scheduled as follows: 1800-2000 on 11.980MHz, 1800-2200 on 17.770MHz, 2000-2200 on 9.455MHz, 2200-0000 on 15.275 and 15.405MHz, 0000-0200 on 15.445MHz, 0400-0800 on 17.780MHz, 0600-0800 on 17.855MHz, 0800-1000 on 9.530 and 17.855MHz, 1000-1200 on 9.530 and 15.115MHz, 1200-1400 on 9.465 and 15.285MHz and 1400-1800 on 9.530 and 15.385MHz.

Radio Clarin

Radio Clarin in the Dominican Republic has made the predicted change in frequency from 11.700 to 9.950MHz. Shortly after making the move the station began carrying a programme called 'La Voz de Fundacion', an anti-Castro broadcast produced by the Cuban American National Foundation. The programme's purpose is to serve as a link between the Cuban exile community in the United States and the people of Cuba. The programme airs at 0100-0200, in Spanish. Reception reports can be sent to Mr Delsin Pernas, Cuban American National Foundation, 7300 NW 35th Terrace, Suite 104, Miami, Florida 33122, USA.

Voice

According to a report in the newsletter of the Association of North American Radio Clubs, funding for the Voice of America's *Voice* magazine was to be discontinued at the end of 1989. The magazine featured the VOA programme schedule, along with feature articles and stories about upcoming Voice of America programmes. According to the news item there was some hope the magazine might be taken over and turned into a commercial venture by a private company but nothing definite had developed when the newsletter story was written. Listeners in the US are barred by law from receiving the magazine.

American SW Listener's Club

The American Short Wave Listener's Club has ceased operations. The club had been in existance since the early 1960s and, for most of its existance, had been run by Stewart MacKenzie of Huntingdon Beach, California. Lack of support was cited as the reason for ending club operations. The club has been suffering from declining membership for the past several years.

Nicaragua

The Voice of Nicaragua has left 6.100 and is now being heard on 5.998-5.999MHz with Spanish and English language programming around 0000 and through to 0500 or 0600.

Radio Reloj

Long time Costa Rican broadcaster Radio Reloj has resumed use of its 6.006 frequency. Silent at present is 4.832MHz which operated in parallel for many years. Earlier, the situation was just the reverse, with 4.832 active and 6.006 inactive, so it may be that the station has only one serviceable transmitter. With 4.832 gone, reception of the Venezuelan Radio Tachira in San Cristobal is excellent.

Radio Nacional

Radio Nacional de Ecuador continues to be heard on short wave through the facilities of HCJB. Radio Nacional airs a half-hour in Spanish daily at 1730-1800 on 15.270. HCJB even handles QSLs for this programme.

It's reported that, eventually, Radio Nacional plans to have its own transmitters on short wave, as it did many years ago. We've seen no timetable for this, however.

La Voz de Nahuala

The Guatemalan station, La Voz de Nahuala, on 3.360MHz opened up a second frequency, 5.040MHz, which is being heard very well after 0000 with religious and cultural programming in Spanish and Indian languages.

Radio La Hora in Cusco, Peru, once active on 4.977, is now heard on 4.860, although usually with poor signals. The best time for listeners in Great Britain would seem to be between 0200-0400.

Radio Iris

Long standing Ecuadorian broadcaster, Radio Iris, is reported to have moved from Esmeraldas to Quito. The new address is Edif Benalcazar 100, Av. 10 de Agosto y Riofrio, Quito. The station operates on 3.381MHz variable between 1000-1400 and 2200-0100. Years ago the schedule ran to 0400 or 0500 so Radio Iris has suffered some cutbacks.

RAE in Argentina

RAE in Argentina has regained the use of its second transmitter for its international service so two of the standard three frequencies (9.690, 11.710 and 15.345MHz) are in use during each transmission. English is currently scheduled at 1630, 2100, 0100 and 0300.

The short wave outlet from Belize has been silent since June of last year, although it is supposed to return. Belize normally operates with 1kW on 3.285.

C-SPAN

C-SPAN, the cable TV service which provides coverage of the US and House of Representatives has added a pair of audio channels carrying international short wave. One channel provides the BBC World Service 24 hours a day, the other is carrying programmes from Radio Canada International and Radio Beijing. C-SPAN hopes to add to this list later.

Major Events

Several major events for s.w.l.s are already on the 1990 calendar. The Third Annual Winter SWL-Fest was scheduled for the weekend of February 23-25 at Kulpsville, Pennsylvania. This event was an instant hit when it made its debut in 1987 and was expected to draw well over 100 participants.

Although details have not been made available yet, it seems the annual Association of North American Radio Clubs convention (ANARCON) will be held in September as a part of an annual Ham-SWL-Computer Fest held in Virginia Beach, Virginia.

That covers the highlights from North America for now. We'll be back with another 'DX Letter From America' in August. Until then, good listening! □

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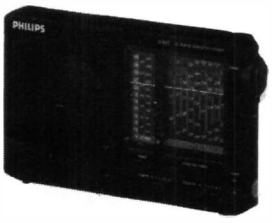

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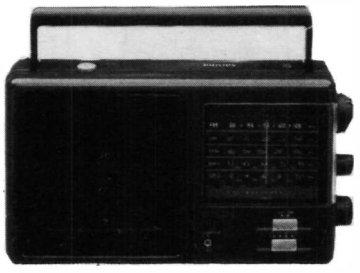

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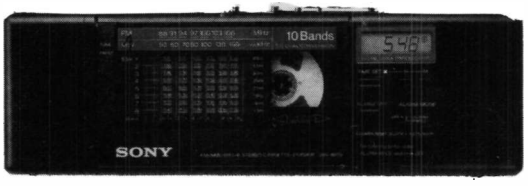

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PC-HF-FAX PROGRAM

Mike Richards G4WNC

Although PC-HF-FAX is distributed by Comar Electronics, it is actually an American program written by John Hoot of Software Systems Consulting. The manual was remarkably comprehensive and comprised a card-bound, 88-page, A5 book. The first few chapters dealt with the general installation details and hardware requirements. These were straightforward, needing a basic IBM compatible with at least 384K of RAM.

On the video side the program supports CGA, EGA, HGA and VGA graphics systems, though VGA gives the best results. Connection to the outside world was achieved via the serial port, so obviously one of these is required as is MS-DOS 2.1 or higher. PC-HF-FAX provided adequate printer support with drivers for IBM, Epson 9 and 24-pin, OKI and Laserjet. As these are all industry standard printers, you will find that most other printers can emulate at least one of these modes. Although a printer is useful, the program was fully operational without one, so it's not a necessity.

The manual continued with a brief outline of the main modes followed by a very interesting section giving some background to weather FAX transmissions. Although this was based very much around the activities in the States, it did cover universal aspects such as the common symbols used on weather charts which was useful. The next chapter gave a variety of useful hints to overcome some of the problems that the new user may encounter. The function of each of the commands was then described in detail. Although there was little use of diagrams the explanations were very clear. The final sections of the manual comprised a number of appendices which included a FAX frequency list and schedules for a number of American FAX stations. Overall a remarkably comprehensive manual for a software package of this type.

Setting-up

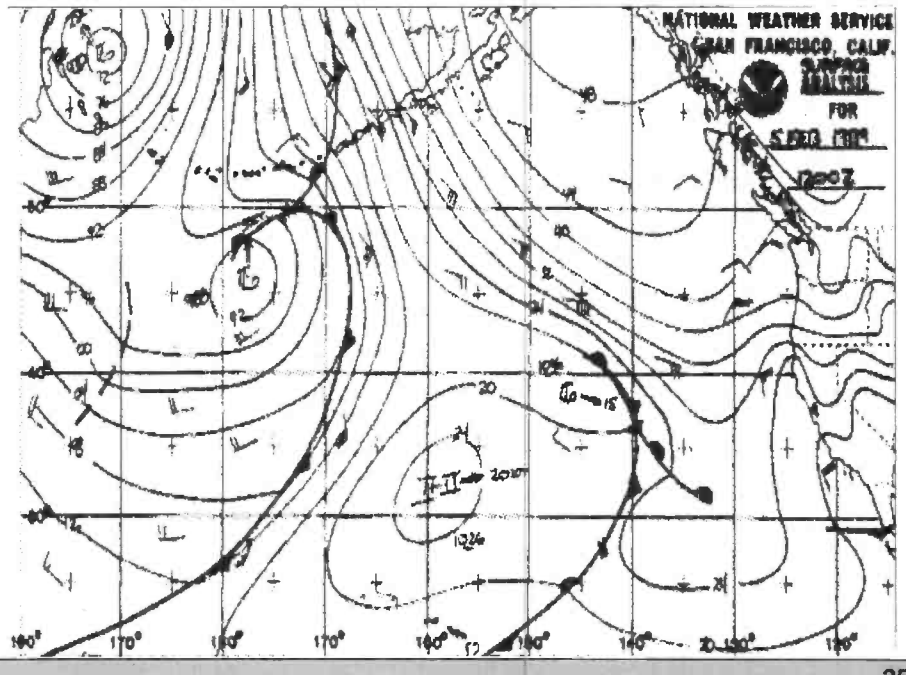
The PC-HF-FAX was simplicity itself to get going, needing a minimum of connections. The only connection between the receiver and the computer was a single lead terminated with a 3.5mm jack plug. This plug was simply inserted in the external speaker socket of the receiver. The other end of this lead comprised a standard 25-way D connector which contained some basic signal processing electronics. I checked out the sensitivity of the interface and found that it could handle a wide range of signal levels. This meant that, in addition to using the external speaker socket, the PC-HF-FAX could be fed from the fixed level auxilary output available on many receivers.

With the external connections complete and the program installed, the next stage was to select 'Hardware Configuration' from the main menu. As the name suggests, this allowed the adjustment of various pre-set parameters. One notable point about all forms of FAX decoding is that the timing is critical to obtain a correctly proportioned image. The PC-HF-FAX program uses the internal PC clock as its main timing reference. The only problem that may be encountered here is the variation of clock frequency from machine to machine. This however had been catered for by the provision of two software timing adjustments. The first is called 'Clocks per Pixel' and allows the user to adjust the number of clock cycles at 2.38MHz for each of the 640 pixels in the display line. The second adjustment defines how many clock cycles are added at the end of each line in order to hold synchronisation. Although all this sounds a bit complicated, the software comes set-up with default values and these were spot on for my Amstrad PC-2086.

With the growing popularity of the IBM PC in our hobby, new software is greeted with interest. PC-HF-FAX is the latest, with sofware-controlled decoding of most s.w. FAX images.

Most users should find that only minor adjustments are necessary. One advantage of software decoding is that it becomes easy to alter parameters that would be difficult with hardware systems. An example of this in the PC-HF-FAX, is the facility to alter the black and white frequencies. These are the frequencies that represent the black and white extremes of the picture. The default settings of 1460Hz and 2087Hz are just about right for normal 800Hz shift h.f. signals, but these could easily be altered, for example to receive l.f. FAX which uses a 300Hz shift. As I mentioned earlier the printer type could be set to a number of industry standards, this was supplemented by the ability to choose between LPT1 and LPT2 printer ports. The selection of the appropriate graphics card and monitor type was also achieved using the hardware menu.

With a lot of PCs these days being fitted with more than one serial port it was useful to be able to set the PC-HF-FAX to use either port 1 or 2. For the radio enthusiast this means that you could for example connect your RTTY terminal unit to port 1 and the PC-HF-FAX to port 2, this saves having to keep swapping plugs around. It was in this section of the program that you could set the appropriate graphics card and monitor type according to your own hardware. Adjustment of the Index of Co-operation (IOC) could be achieved by altering the number of scans per displayed line. The range here was 2 to 16 with VGA graphics which gave a usefully wide range of adjustment. One final area of hardware adjustment dealt with the colour palette where all sixteen colours could be adjusted at will. This was a very powerful feature as it allowed the user to completely alter the red, green and blue content of each colour. Once finished with the hardware configuration menu, you are given the choice of either making the changes permanent or just using them for the current session. So you only needed to set up the default options once leaving you free to make temporary adjustments without upsetting your default settings.



PC-HF-FAX PROGRAM

Image Reception

With all the options set up it was time to get on the air and start receiving some FAX images. For all the on air tests I used the PC-HF-FAX with my Amstrad PC-2086 computer, Icom IC-720A receiver and Epson RX-80 printer. The antenna was my old faithful nest of dipoles. The first operation was to find a FAX station - its best to start with a strong local one such as Bracknell on 4.782MHz.

I was particularly impressed with the tuning system used with the PC-HF-FAX. This was selected from the main menu and comprised a full-screen, oscilloscope type display. There were two horizontal lines - one representing the white level and the other for black. To set the optimum tuning point all you had to do was adjust the receiver until the FAX signal evenly overlapped these two lines.

The system was extremely simple to use and very effective - probably one of the best tuning systems I have encountered. It was at this point that I discovered that rather than just a FAX tuning aid, this display was also very effective for identifying other utility signals. The waveforms of RTTY and many other data signals showed up remarkably clearly and for the experienced, the format could be identified. This point has not been overlooked by the author, as he states in the manual that he hopes to further enhance the software to provide RTTY, ARQ and SSTV decoding. With the tuning point set it was time to return to the main menu and select the 'Monochrome Image Capture' option. At this point the screen cleared and the image started building up on the screen.

One common problem when receiving FAX images manually is setting the synchronisation point. If this is not done the edge of the image rarely aligns with the edge of the screen. In PC-HF-FAX pressing 'S' while receiving an image caused the program to search for the sync pulse and re-start accumulating the image. This feature worked best during the initial stages of a transmission and could understandably be confused when a lot of image detail was being sent. The only other option available whilst capturing an image was the 'T' key which returned the scan to the top of the screen and was useful for getting rid of rubbish at the beginning of a transmission. Capture of the image could be suspended at any time by pressing a key, whereupon the program returned to the main menu. With the image captured in memory, there were then a host of features available for manipulating and refining the result.

One of the most important and useful features was the ability to store the captured image on disk. The standard format used 120K of disk space for each picture, so allowing six pictures to be stored on a standard 720K 3.5in disk. Although the image may have been collected using the monochrome capture, you could use the Display option cycle through all the capture modes to see which best suited the received image. The modes available were monochrome which, with VGA graphics, gave a resolution of 640 x 480 with 16 grey levels. The second mode was Black and White which was primarily designed for chart reception and designated the image elements as either black or white.

The next mode was rather novel and exteremly effective. It was titled Blue/Grey and used a grey scale but with black represented by blue. This had the effect of showing the sea as blue on re-broadcast satellite images. The next two modes were full colour, the first being a 16 pseudo colour display, whilst the second option used the colour palette set-up by the user and could provide some very interesting effects. It is very useful to be able to move the received image around the screen and the PC-HF-FAX provided some very impressive features in this area. First the image could be moved from left to right or vice versa in one or eight pixel steps. This was very useful for those occasions when an image has been received out of synchronisation, as the resultant page slip could quickly be corrected. Vertical movement of the image was also possible, but only in single pixel steps.

One of the most infuriating reception problems is when the image is received as a mirror image. However with PC-HF-FAX this is no longer the case as the image could be flipped left to right and top to bottom - it could even be inverted into a negative image if required. The final adjustment enabled the image to be lightened or darkened for best effect. This very powerful range of adjustments meant that you really could get the very best of any image received.

Utilities

As if the facilities described so far were not impressive enough, there were a couple of utilities supplied with the program which opened up a whole new range of options. The first of these was called FAXTOPCX and converted the images stored using PC-HF-FAX into standard PCX image files. This might at first seem a little pointless, but there are a number of software packages on the market which can import PCX files for further manipulation. An example of this would be in desk top publishing, where a FAX image could be imported and all manner of useful text added to enhance the overall image.

There are also a number of programs that allow very sophisticated modifications to be made to imported images and you could tidy up your received images by eliminating streaks or dots that were caused by interference. The second utility enabled animation of received images and was appropriately called FAXSHOW. This utility used its own command language and enabled the user to sequence a number of images to make up an animated show. The options within the command language were very powerful and allowed mode changing, variable delays and screen clearing to name but a few. With a little patience some entertaining results could be obtained with this feature.

Conclusion

So how did the program fare? I must admit I was very impressed with its performance using VGA graphics. The detail available in the monochrome mode with its 16-level grey scale was very impressive. The other modes also had their uses but I always seemed to return to monochrome for the best results. One important point to note about this program is that it has been designed primarily to produce screen images. Because of this, the results when driving an external printer are not quite as good as some routines that have been designed with printer output as the prime mode. However the printer results were quite acceptable for the intended purpose. I must admit though that for general monitoring, I prefer to use a screen orientated package.

To finalise then, PC-HF-FAX is a very impressive package which I can thoroughly recommend - in fact I shall be purchasing the review copy for my own use! The package is available from **Comar Electronics, 1A Birmingham Road, Cowes, Isle of Wight PO31 7BH**. The current price is £99.00 inclusive of VAT but post and packing is £2.57 extra. My thanks to Comar for making the review copy available. □

Abbreviations	
ARQ	**A**utomatic **R**epeat **R**equest
CGA	**C**olour **G**raphics **A**daptor
EGA	**E**nhanced **G**raphics **A**daptor
HGA	**H**ercules **G**raphics **A**daptor
Hz	hertz
in	inch
IOC	**I**ndex **o**f **C**o-operation
K	1024 bytes
l.f.	low frequency
MHz	megahertz
mm	millimetres
RAM	**R**andom **A**ccess **M**emory
RTTY	**R**adio **T**ele**TY**pe
SSTV	**S**low-**S**can **T**ele**V**ision
VGA	**V**ersatile **G**raphics **A**daptor

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LUNAR ECLIPSE PHENOMENON

F. C. Judd G2BCX

Most of the country was covered in cloud during the recent lunar eclipse. Fred Judd was lucky. No one else, except possibly the Rutherford Appleton Laboratory, would have been able to see and record this phenomenon. He ran his ionospheric sounding equipment during the event and made the observations recorded here.

Just prior to the onset of the eclipse of the Moon at 1730 on Friday, 9 February 1990, the virtual height of the ionospheric F region was recorded as being 250km above earth. Echoes from the region, obtained by pulse transmission, included the primary (1F) which indicated the height of 250km against the c.r.t. calibration. The transmitted pulses were actually making a total journey of 500km, up to the region and back. There was only one secondary echo (2F), this having made the journey to the F region and back twice, i.e. a total travel of 1000km.

Increasing

After the start of the eclipse, the c.r.t. display showed the number of echoes due to **multiple reflection**, to be increasing, although the primary echo (1F) still showed the region's virtual height to be 250km.

At about halfway through the eclipse the number of echoes reached a maximum of 16 as shown in the photograph. In fact the timebase had to be run at half normal speed to accommodate the vast distance covered by all the echoes, up to the sixteenth, the smallest detectable. This meant that the transmitted pulses had travelled a total distance, between the F region and earth, of 500 x 16 or 8000km!

In the Polaroid photograph, Fig. 1, echo 16F is marked with an arrow. It can be seen more clearly near the end of the upper trace which shows the rectified signals. The lower trace shows the r.f. signals. The transmitted pulse is marked Tp with the first F region echo - showing virtual height as 250km - being marked '1F'.

Totality

As the eclipse continued towards totality, the number of echoes decreased and continued to do so even as the other half of the Moon became bright again. At the end of the event they had disappeared, leaving only the primary (1F) still indicating the region's virtual height to be 250km, plus a variable amplitude 2F more or less as before.

No Explanation

I can offer no explanation for this phenomenon. Had this been an eclipse of the Sun, the reflection of radio signals from any ionospheric region would have disappeared completely during the major period, just as Prof. E.V. Appleton found when he made similar tests with pulse transmission during the eclipse of the Sun in 1927. This prevented radiation from the Sun reaching the ionosphere thus reducing ionisation of any of the regions to nil. □

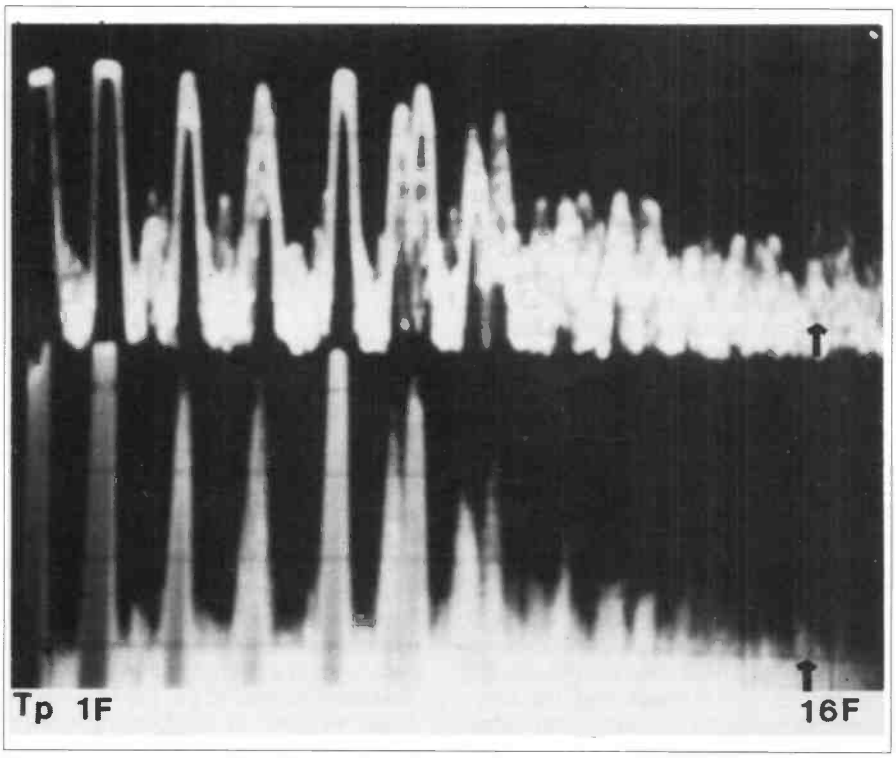


Fig. 1: (Upper trace) Rectified pulse signals. (Lower trace) Tp - transmitted pulse 0.5ms duration; p.r.f. = 35p.p.s.; 1F - primary signal from F region; 16F - sixteenth multiple echo.

ANTENNAS

F. C. Judd G2BCX

Unfortunately the Power Loss Table referred to in Antennas Part 14 as Table 15.1 was omitted. It is reproduced here.

Providing the v.s.w.r. is not greater than about 2:1, r.f. power loss is not excessive as can be seen from Table 15.1 - although this assumes no loss in the transmission line or antenna itself.

Abbreviations			
c.r.t.	cathode ray tube	p.p.s.	pulses per second
km	kilometres	p.r.f.	pulse repetition frequency
ms	milliseconds		

	TX Power to Antenna			
VSWR	100W	50W	25W	10W
1.0	0	0	0	0
1.1	0.2	0.1	0.1	0.12
1.2	0.8	0.4	0.2	0.08
1.3	1.7	0.9	0.4	0.17
1.4	2.8	1.4	0.7	0.28
1.5	4.0	2.0	1.0	0.40
1.6	5.3	2.7	1.3	0.53
1.7	6.7	3.4	1.7	0.67
1.8	8.2	4.1	2.0	0.82
1.9	9.6	4.8	2.4	0.96
2.0	11.1	5.6	2.8	1.11
2.1	12.6	6.3	3.1	1.26
2.2	14.1	7.0	3.5	1.41
2.3	15.5	7.8	3.9	1.55
2.4	17.0	8.5	4.2	1.70
2.5	18.4	9.2	4.6	1.84
	↑	Reflected Power		↑

THE LINDENBLAD ANTENNA

Peter Rouse - GU1DKD

This practical antenna design is suitable for listening to both amateur and weather satellites as well as the aircraft band.

A Linden-what? A Lindenblad, my friend, is a strange-looking assembly that consists of four folded dipoles spaced round a ring and slanted at a slight angle to the horizontal plane. Go on...check the front cover and make sure this isn't the April issue.

I came across the Lindenblad whilst browsing through *The Satellite Experimenters Handbook* by Martin Davidoff - K2UBC. It is published by the ARRL and available from the *SWM* Book Service.

Having discussed the more common types of non-steerable antennas, Mr Davidoff makes brief mention of this antenna on pages 6 - 18 and gives some dimensions but seems to avoid further details in a manner that suggests he is wary of going too near the beast in case it should bite. It looks very odd and no mention is made of gain nor general impressions of its behaviour.

I assume its inventor was a Mr Lindenblad although first mention of it was apparently back in 1947 in a technical paper from RCA in America.

It could well be the solution to the problem that some weather watchers are now experiencing with with Mercury and Racal paging transmitters on 138.075 and 138.175MHz because in extreme cases it will at least provide fairly good coverage without a pre-amplifier (often where the overload problem starts).

However, the two versions that I have constructed both exhibit slightly unusual behaviour. When the satellite is directly overhead there is a brief drop in the signal level. I have yet to find a cure for this, but have not worried unduly about it because it has not caused me any real problems.

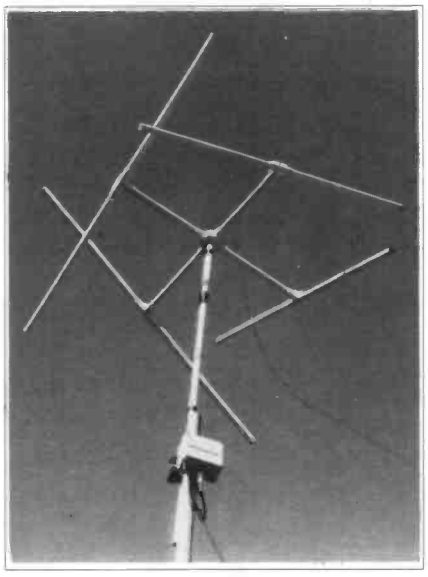
Otherwise, I have been delighted with the results and suspect that the only reason this antenna has not gained wider acceptance is because initially it looks difficult to construct.

Extensive use of easily obtained pvc electrical conduit and fittings, together with elements constructed from cheap 300Ω ribbon cable have enabled have enabled me to design and build an antenna that not only looks quite professional but is also robust.

The dimensions given in *The Satellite Experimenter's Handbook* are only for the 144MHz version but these have now been re-calculated for 137.5MHz (dimension for three bands are shown).

I have no way of measuring the gain of this antenna but suffice to say it far outperforms the usual crossed dipole arrangement as long as it is mounted well above ground level.

Airband enthusiasts may care to note that a version with the elements cut for 127MHz has provided me with excellent performance over the 118 - 136MHz aeronautical band.



Practical Construction

The antenna consists of four half-wave dipoles which are fed in phase and a simple matching arrangement is used to feed standard 50Ω coaxial cable. My arrangements vary slightly from those shown in *The Satellite Experimenter's Handbook*, where there even appears to be a slight error in calculation of the feed impedance. The feeds from the dipoles use quarter wave instead of half wave sections and a short matching section of 75Ω cable is used to get the impedance down to 50Ω. If ideal mathematical conditions prevail the following formula would apply.

Assuming the dipoles have an impedance of 70Ω and we use quarter wave sections of 300Ω to feed them then:

$$Zt = \sqrt{(Zo \times Zl)}$$

where Zt is the termination impedance, Zo is the feeder impedance and Zl is the load impedance.

So the impedance at the junction of all the feeders will be 145Ω divided by the number of dipoles which will give us just over 36Ω.

If you are going to feed the antenna to a pre-amplifier with just a short section of 50Ω cable then no further matching will be necessary.

However, if you are going to feed 50Ω cable direct then you will need to use a quarter wave matching section. Using the above formula we can calculate that 75Ω cable will give us a termination impedance of 52Ω which is ideal. The matching section will need therefore to be a quarter wave multiplied by the cable velocity factor (0.66 is near enough if you are using normal TV type cable).

Before anyone points out that no account has been taken of the velocity factor of actual ribbon cable used as the dipole elements I would say the above simple formula is more than accurate enough for our purposes.

The direction of the 30° tilt determines either left or right-hand polarisation. The handbook shows a complicated arrangement consisting of wooden frame, ribbon cable feeder, wire elements and Perspex spacers.

In the version presented here all these have been replaced with round, pvc 20mm conduit that is normally used to protect electrical cable, a matching 4-way junction box with rubber gaskets and four inspection T-joints. It is vital to note that you must use the white type and not the black which contains dyes that can seriously upset the electrical characteristics of the antenna.

You will also need about 2m of 17mm wooden dowel to stiffen the inside of the mounting pole (the antenna must be kept a reasonable distance from any metal mast). The ribbon cable is used not only for feeding but also for the dipole elements.

Materials and Assembly

Eight metres of white conduit, 2m of pvc overflow piping and 10m of 300Ω ribbon cable will enable any version shown to be built. The conduit and fittings are usually available from the bigger d.i.y. stores or electrical suppliers or contractors. Do not attempt to substitute the conduit with pvc overflow piping as it is not strong enough and unless you follow the step-by-step procedure shown you will probably end up with problems in the latter stages of assembly.

(1) Take the dowelling and give it a coating of impact adhesive and then insert it into the overflow pipe used for mounting the antenna. You may need to sand the dowelling slightly to get it to go into the pipe as sizes tend to vary a fraction between suppliers.

(2) Make-up the four dipole elements. First cut the ribbon cable to the lengths shown plus 25mm overlap. Trim back the plastic coating on each wire at each end in order that the wires can be bent towards each other and soldered.

Find the centre of the dipole and cut into one side and trim for soldering to the feeder. Cut and trim the ends of the feeder sections but at this stage **do not** solder them to the dipoles.

(3) Cut the required sections of conduit making allowance for the dimensions of the tee connectors and junction box. On each of the dipole arms allow about

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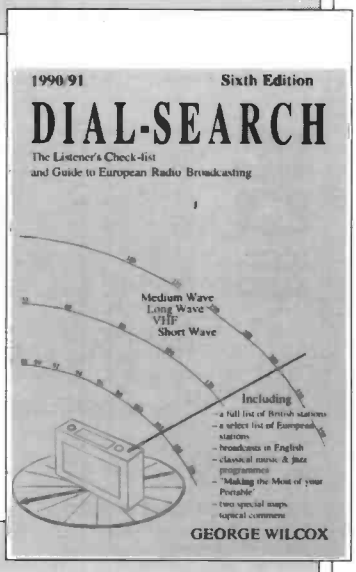
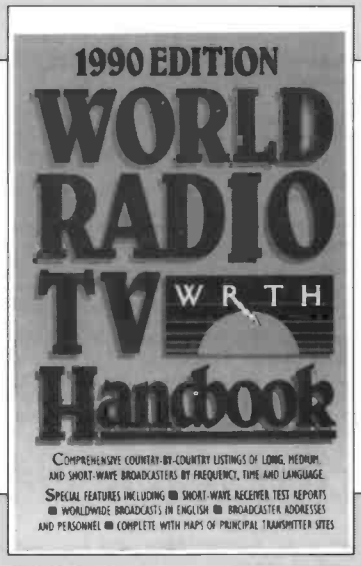


The telephone is designed to 'connect you' to all sorts of interesting and useful people. So is every portable radio. Yet many radios in the home stay tuned to one station all the time! Getting more variety of listening is not a matter of chance or magic or even special training. It is largely a question of having the right details to hand - you need a directory. That's why George Wilcox wrote the first edition of *Dial Search* way back in 1981.

Dial Search can save hours of frustration and make home listening worth while - whether your interest is in music or in news from home or abroad.

There are two maps included in the book, the first inside the front cover is a Map of European Broadcasting Stations. The second, inside the back cover, is of the Broadcasting Stations in the British Isles. Other chapters include: Abbreviations, Spot the Tune, Broadcasts in English, Frequency Bands, Long wave, Medium wave, v.h.f. (f.m.) and Short wave.



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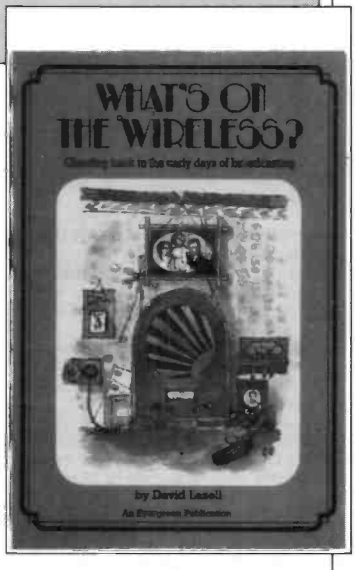

Being asked to review a new book on radio can sometimes provoke mixed emotions; whilst pleased to find literature concerning a favorite subject, one is at the same time likely to be a little apprehensive that the work will fall short on facts or literary style. Thus it is a special pleasure to discover a book that can hardly be faulted on either count, and David Lazell's warm-hearted evocation of the Golden Age of Wireless is most certainly in this category. Readers of the magazine *Evergreen* will be familiar with David's regular articles on this subject, and in *What's on the Wireless?* he presents a splendid collection of nostalgic knowledge covering from the 1920s through to the 1950s. He commences with a short biography of P.P. Eckersley, the engineering genius behind the British Broadcasting Company, then goes on to recall some of the artistes and programmes that captivated audiences in the early days of broadcasting and on into the 1930s. There are chapters devoted to regional broadcasting from Birmingham and Bristol. We meet some of the comedians who were famous 'on the wireless' and are reminded of some of the radio serial stories and 'soap operas' from both the BBC and the Continental commercial stations.

One chapter is devoted to religious broadcasts by such well-known and well-loved churchmen as the Rev Dick Sheppard and Father Martindale. I particularly like David's remark that "...Of course, there was no shortage of people who thought radio quite inappropriate for worship - forgetting, it seems, that the Creator 'built-in' the possibilities of all-electronic communication on the Day of Creation." In a further chapter we learn how Christmas was celebrated in radio programmes.

On a more secular side there are memories of famous radio comedy shows such as *Band Wagon* and *ITMA*, of the cinema organists who provided music from 'The Mighty Wurlitzer'; of *In Town Tonight*, *The Daily Dozen* and many, many others. Altogether this cheerful little book will most certainly brighten a few hours for the reader who, like me, cannot really believe that it is over 50 years since the '30s!

Is there, then, anything to complain of in the book? Well, to prove that I did indeed read every word, I found three small errors; a date that was ten years out due, obviously, due to a simple mis-print; a misquoted film title; and the wrong location for a funeral, but that there were so few in the enormous amount of information given in the book is more in the nature of a tribute than a rebuke.

I would have liked to see a list of chapters at the front of the book and it does seem a great pity that there is no index. Don't let this dissuade you from seeking out this otherwise excellent little book which is decorated with many photographs and drawings, and, thanks to a well-chosen type face, has an appealing 'vintage' appearance, all at a very modest price. C.E.M.

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THE LINDENBLAD ANTENNA

15mm extra as you will need to seal-up the ends later.

(4) Use the correct type of pvc adhesive/cement (it sets very quickly) to join the dipole arms to the tee-junction.

Once set, insert the dipole element with the bared wires facing inwards and then solder these to the feeder cable. Ribbon feeder usually has each wire identified by one silver and one copper coloured wire and you should ensure that each of the four dipoles is wired to the same colour coding to avoid confusion later.

(5) Drill two holes in the base of the 4-way junction box; a small central one for the mounting screw and a larger, offset one, big enough to take the feed cable.

(6) Thread the dipole boom arm over the feeder and attach it to the T-junction with adhesive. Once it has set you must glue the boom arms into the junction box at an angle of 30°.

All the diagrams and photographs show the booms tilted for right-hand, circular polarisation which is suitable for weather satellites and airband. For 144MHz amateur band use you need left-hand, circular polarisation and the elements must be tilted the other way.

(7) The dipole feed cables should now be doubled back on themselves slightly in the form of a collapsed 'Z' so that surplus cable can be fed back down the booms. All feeds to the upper section are now soldered together and to the centre conductor of the coaxial downlead. All lower element feeds join together and go to the braid.

(8) Use corks, rubber bungs, car body filler paste or even silicone rubber sealant to seal the open ends of the dipole housings.

(9) The completed assembly will now need to be attached to the mounting pole. Note that once this is done you will not be able to get the antenna through a normal household door. A single 30mm woodscrew holds the assembly to the pole but the joint needs to be further strengthened with a strong glue such as Araldite which must be liberally applied between the top of the pole and base of the 4-way junction box.

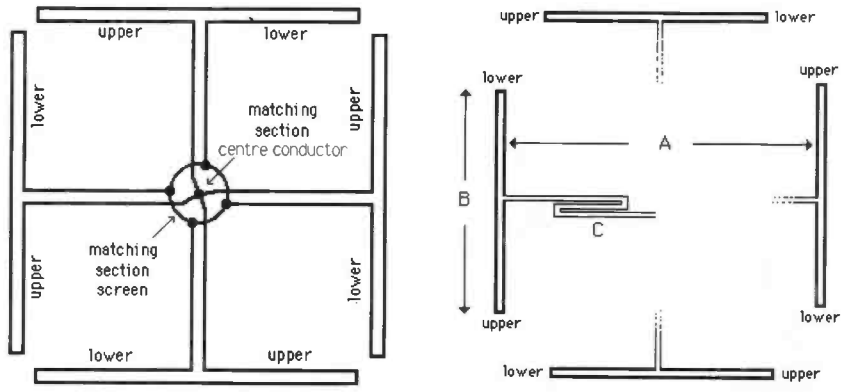


Fig. 1: The layout of the Lindenblad antenna. The dimensions A, B and C are found from Table 1.

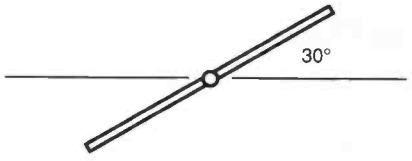


Fig. 2: End view of the dipole for right-hand circular polarisation. For left-hand polarisation the dipole must be tilted the opposite way.

Fig. 3: The Lindenblad antenna viewed from above showing connections for right-hand polarisation.

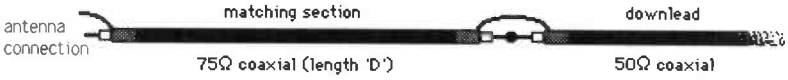


Fig. 4: The matching section uses 75Ω coaxial cable. The length D is found from the Table 1.

Band (MHz)	A (mm)	B (mm)	C (mm)	D (mm)	Polarisation
127.0	710	1180	500	390	right-hand
137.5	655	1090	465	360	right-hand
144.0	615	1025	435	340	left-hand

YOU WILL NEED

Overflow piping, pvc (2m); White pvc electrical conduit, 20mm (8m); Inspection tees with rubber gaskets (4); Circular, 4-way, junction box with rubber gasket and M4 screws (1); Solvent adhesive for pvc; Ribbon cable, 300Ω, (10m); Wooden dowelling, 17mm dia. (2m).

The approximate cost, not including downlead, is £12.

Mounting

The antenna should be mounted as high as possible above ground level but not on a chimney. The emission from the average chimney is at a surprisingly high temperature and will almost certainly melt the conduit.

Although the antenna looks complicated it is suprisingly easy to build if you follow the steps shown and total assembly time should not take more than a couple of hours.

Is it worth the effort? I can only compare it with the usual crossed dipole which is tricky to set-up, does not have a true circular pattern and often displays near nulls in some areas unless phasing is perfect.

The Lindenblad on the other hand performs extremely well without critical phasing elements or matching and I am constantly amazed by the gain at low elevation angles.

Even though I live right at the end of a small valley, in a poor location for reception, I am now able to receive some of the NOAA-11 passes which many people only seem to be able to get with elaborate, steerable, crossed Yagis. □

Abbreviations	
m	metres
MHz	megahertz
mm	millimetres
pvc	polyvinylchoride
Ω	ohms

SCANNING

Alan Gardener

Many scanner users are quite happy just to use the telescopic antenna supplied with the receiver - this is fine if you only want to listen to relatively local signals, but it does seem a bit of a waste after you have spent all that money on the scanner not to go to a little bit of trouble in providing a better antenna system. By siting the antenna away from the scanner it is often possible to reduce the level of spurious signals and hash that are received (many of these are being generated by the control circuits inside the receiver). By moving the antenna just a few metres away from the back of the scanner you may notice an improvement.

Location

The ideal location for any antenna is as high and as well away from any nearby objects as possible. Try and avoid siting your antenna next to domestic TV and radio antennas if you can. This may seem unneccessary but it serves two purposes. The first is to limit the possibility of any hash or oscillator radiation from the TV and hi-fi interfering with reception on the scanner, and the second is to prevent interference to the TV and hi-fi from the scanner.

All scanning receivers generate a low level local oscillator signal in order to operate. A small amount of this signal tends to leak out of the scanner either through the plastics case or via the antenna socket. Modern designs of scanner use local oscillator frequencies which lie within the TV and radio broadcast bands. As a result you can sometimes detect patterning on the TV screen or distortion on the radio if you have an unfortunate combination of frequencies selected. For example you may notice the patterning on a TV screen change as the scanner searches through a particular frequency band. Spacing the antennas by just a few metres from each other can usually solve this problem.

Of course not all of us can put our antennas outside and with the recent high winds still firmly implanted in our minds many people may now be doubting the wisdom of putting up quite such a large array. The amateur radio saying 'If you don't worry about it then it isn't up high enough' may not seem quite so valid after your pride and joy has just impaled the neighbour's cat!

Loft Mounting

Loft mounting an antenna is usually the most popular alternative and good results can be achieved up to the low microwave frequencies. Roof tiles and slates do not seem to have too much effect at the lower frequencies unless it is raining, but a gradual increase in the attenuation of signals starts to become noticeable beyond a few hundred megahertz.

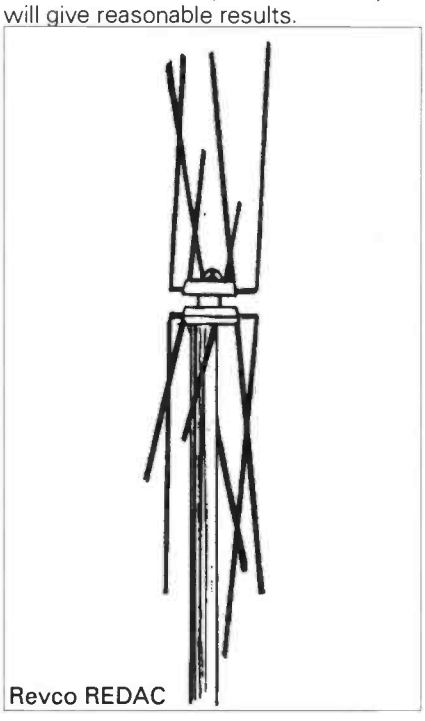
Which type of antenna would you recommend? Not an easy question to answer as requirements vary from person to person. Alan thought it would be a good idea to look at what is available.

One other problem associated with loft mounted antennas is interference. This seems to be transmitted to the antenna either by the mains wiring or by direct radiation from the equipment itself. I partially solved this problem in my old house by putting a layer of galvanised chicken wire on top of the loft insulation. This provided some screening against interfering signals which were being radiated from within the house and had the additional benefit of providing a very large ground plain.

The great advantage of loft mounting an antenna is of course that you can experiment with designs without risking life and limb 10 metres up a ladder. If you do decide on this option please put some boards to stand on between the joists as this can save a lot of heartache - and plaster.

What Type ?

The type of antenna you choose depends on what you want to listen to. If you are just interested in one group of frequencies, for example the v.h.f. airband, then a simple halfwave dipole will give reasonable results.



Revco REDAC

Many different types of antenna are available for the amateur bands but a popular choice is usually some form of dual-band collinear which gives a degree of gain at both v.h.f and u.h.f.

It is always worthwhile experimenting with existing antennas. For example, when I was working away from home I found that the f.m. broadcast antenna mounted on the roof of the temporary accommodation worked very well on the u.h.f. airband.

Another range worth trying are the many and varied CB antennas that are available. Try and avoid the types that are helically wound or have loading coils at the base as these tend to dramatically reduce the frequency coverage.

One word of warning, however, please DO NOT try transmitting on any antenna not specifically designed for the frequency in use. You can get away with it on receive but it usually results in expensive transmitter repairs as the impedance presented by the antenna may be a less than perfect match.

Multi-Frequency Operation

If you are only interested in one or two bands of frequencies then one of the multi-element or 'loaded' types of antenna may prove suitable. The multi-element types usually have two or more elements of differing sizes fed from the same feed point. Each element has a different resonant frequency which corresponds to one of the bands of interest. A typical example of this type is the Revco Radac antenna which has six pairs of elements giving coverage of six separate frequency bands. In addition good results can often be obtained outside the specified ranges, but only on receive.

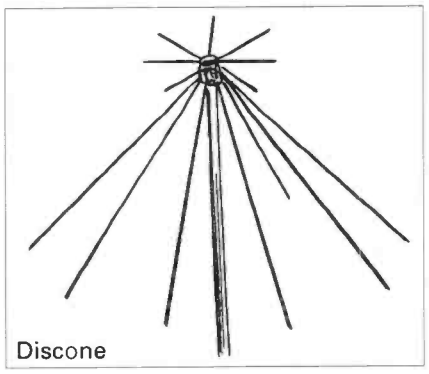
Most cheap 'plastics tube' scanner antennas use a combination of these techniques to achieve the required frequency coverage. Some work better than others so try one before buying - if you can.

Active Antennas

If you want a compact antenna which offers a wide frequency range then the solution may be an 'active' antenna. The term active means that they require an additional power source in order to operate.

This is because they incorporate an amplifier in order to perform two key functions. The first is to convert the feed impedance of the actual antenna element to 50Ω, and the second is to boost the level of received signals before they reach the receiver. This of course means that the antenna can only be used for receive purposes but it does have the advantage of permitting a much smaller design. As

SCANNING



Discone

this makes the antenna much less obtrusive it tends to be very popular amongst flat dwellers or on estates where external antennas are not permitted.

Active antennas are available in a large range of different shapes and sizes with base station versions normally being housed in g.r.p. tubes or cylinders, and mobile versions with stainless steel whip sections mounted on top of the amplifier module. Most designs feed power to the antenna via the coaxial cable, a small interface unit separating the power and signal circuits at the receiver. Active antennas tend to be expensive as the performance is limited by the design of the amplifier circuit. This has to add as little additional noise to the received signals as possible whilst at the same time being able to handle strong signals without overloading. In practical designs these two parameters have to be traded against each other, so beware of using active designs if you live in a major city or close to a TV or radio transmitter site.

There are only two types of passive antennas which can really be described as having wideband characteristics, the discone and the log-periodic beam. Both of these have a nominal 50Ω feed impedance making them suitable for transmission as well as reception.

Discones

The most popular antenna amongst scanner users tends to be the discone. As the name suggests this consists of a circular disc forming the top of the antenna with a series of elements sloping down and away forming the cone. The usable frequency range depends upon the dimensions of the elements with the length of the cone elements approximating to λ/4 at the lowest operating frequency. Because this dimension sets the overall size of the antenna most designs have a lower frequency limit of around 70MHz with the upper limit usually at 500MHz. As the performance tends to fall off rather rapidly outside these limits some manufacturers add an extra vertical element on top of the disc. This helps to extend the lower frequency whilst still keeping the overall size of the antenna to manageable proportions.

The advantage of the discone is that it offers omni-directional coverage which avoids the need to rotate the antenna in order to obtain the best signals. The disadvantage is that the antenna does not provide any additional gain. Many listeners have told me that on the v.h.f. airband for example a simple dipole often gives better results, however the dipole will not operate over as large a frequency range.

Log-Periodic

The log-periodic beam on the other hand is a directional antenna and does provide gain. Its construction is similar to that of a normal Yagi antenna typical examples of which are domestic TV or f.m. radio antennas. The main difference with the log-periodic is that the length of the individual elements taper along the boom with each alternate element being connected to opposite sides of the balanced feed line. In most cases this is formed by the boom being split into two halves, each half being insulated and spaced at the correct distance from the other in order to provide the required feed impedance. Unlike many antennas all the elements in the log-periodic are connected to the feed point but only a few of them play an active part in the operation of the antenna at any particular frequency. Like the discone the lowest operating frequency is set by the length of the longest elements whilst the highest frequency is set by the length of the shortest elements. Most designs offer a frequency range of 100-500MHz but wider bandwidth models are available. The gain depends on the number of elements active at any one frequency, but most designs tend to offer around 8dB as a much greater number of elements are required to achieve even modest improvements on this figure. As I said earlier the antenna is directional and requires mounting on a rotator in order to obtain the best results. However, you may be able to get away with leaving it set in one direction, as signals received off the sides and back of the antenna are often as strong as those received using a discone. As the majority of terrestrial communications use vertical polarisation it is important to mount the antenna with the elements vertical if you want to achieve the best results.

Once you have captured those elusive signals it is important that you don't lose them again by using high-loss coaxial cable between the antenna and receiver. Poor quality cable can mean that signals are actually stronger when using a telescopic antenna on the back of the scanner. Only use thin UR43 type cable for very short runs as the loss very quickly starts to add up, particularly at u.h.f. Thick UR67 or better still Pope H100 or Westflex 103 should be considered where runs of more than a few metres are needed. If long vertical runs of cable are required attach a support rope or cable at regular intervals along the outer of the coaxial cable as this helps to prevent the inner from snapping under the cables own weight after a period of time. Make sure all external joints are well waterproofed as the outer braid tends to act as a wick drawing the moisture along the cable. This corrodes the braiding and dramatically increases the loss.

Testing

Antenna construction is perhaps one of the most popular activities associated with scanning - next to actual listening of course! For just a few pounds you can obtain some very good results and learn something in the process. Once you have built or installed an antenna, how do you go about testing it?

Well you really need a receiver with a signal strength meter but you can do it by ear if you are careful. I keep a list of stations which I know I can hear at my location. I have chosen ones which I know are always present and which are being transmitted from a fixed location and at a fixed power level. Aircraft navigation and marker beacons, amateur repeaters and broadcast stations, are good sources.

Before I make any measurements on a new antenna I make a note of each station's signal strength and background noise level using a test antenna. This is usually either a simple dipole or discone. Once I have done this I replace the test antenna with the new antenna and measure the signal strengths again. It is important to mount both antennas at the same height and position as a difference of only a few centimetres can cause dramatic changes in level. Once the measurements are complete I put the test antenna back and measure the signal levels again. In this way I can compare the results before and after fitting the new antenna as a double check in order to ensure that the signal levels have not changed since the start of the test. By doing this it is possible to obtain an objective set of results for a whole range of antennas. It can often be rather disappointing to find that a short length of wire works just as well as your latest design - but at least you know!

I hope you have enjoyed this brief look at antennas and that it has given you some 'food for thought'. If you would like me to feature any other scanning topics in more detail drop me a line at PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - Good Listening. □

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IMPORTANT

Contrary to Mr James Finch's claim, (Solid State Electronics of Southampton) in his letter to this magazine, the Jupiter does have a 705MHz IF strip! It pays to deal with a company that knows its own products and has the qualified engineers able to give you support and correct advice when purchasing your equipment. WATERS & STANTON, 17 years in the business. Perhaps not a "world first", but an honest statement!

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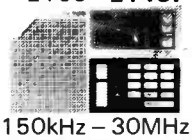

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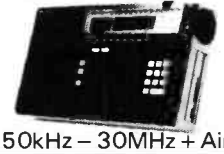

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STARTING OUT

Brian Oddy G3FEX

The demodulated signal may be just a single audio tone, but more often it will consist of speech or music and a number of frequencies of different amplitude and some harmonics will then be present in the complex waveform presented to the input of the audio amplifier. If the waveform is changed in some way by the amplification process, then the output is said to be distorted.

The waveform of the demodulated signal may be changed during audio amplification. Some common techniques used to minimise these effects are outlined this month.

Distortion

Various types of distortion may be introduced by the audio pre-amplifier and power amplifier stages already outlined in this series - see *SWM* March, April '90. One of the most common forms, known as attenuation distortion, arises if the gain of the amplifier is not constant at all frequencies. The relative phases of the frequencies contained in the complex input waveform may also be changed by the amplifier and phase distortion will result. In practice attenuation distortion and phase distortion always occur together so, if a complex waveform is involved, e.g. speech, the phase relationship between the various harmonic components of the signal may be altered and their amplitude may be changed. Note however, that a phase reversal of all frequencies does not constitute phase distortion.

The nature of the coupling employed between the stages is, to a large extent, responsible for these effects. When resistance-capacity (R-C) coupling is used, the reactance of the coupling capacitor becomes important at low frequencies. At the lowest frequency in the amplifier passband the reactance must be low compared with the effective input impedance of the following stage. In a common emitter stage the input impedance is comparatively low, so a large value capacitor will be required, typically 10µF, consequently an electrolytic type is usually employed. The actual value chosen will depend upon the bass response required. The response will start to fall off as the reactance of the capacitor approaches the effective input impedance of the next stage and there will be a 3dB loss at the frequency where they become equal - see **Fig. 1**. It should be noted that a phase shift is also introduced. At low and medium frequencies the effects of the stray capacitance associated with the R-C coupling can be ignored, but at high frequencies it begins to shunt the input to the second stage and causes the high frequency response to fall - see **Fig. 1**. A phase shift is also introduced.

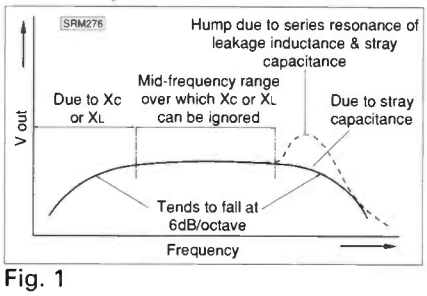

Fig. 1

When transformer coupling is used, the inductive reactance of the primary winding becomes important at low frequencies. At the lowest frequency in the amplifier passband the inductive reactance must be much greater than the effective input impedance of the next stage, otherwise the low frequency response will fall off and phase distortion will be introduced. At high frequencies the stray capacitance associated with the windings is in shunt with the inductance, consequently the response falls off and a phase shift is introduced. Although most of the flux produced by the primary winding of a well designed transformer will link with the secondary, some will only link with the primary turns. The primary can therefore be considered as two inductors in series, the additional one being referred to as the leakage inductance. The stray capacitance and leakage inductance are effectively in series at high frequencies and form a series resonant circuit which may result in a hump in the high frequency response, as indicated by the dotted line on **Fig. 1**.

In another form of distortion, frequency components appear in the output from the amplifier which are not present in the input signal. By plotting a graph of collector current (Ic) against base-emitter voltage (Vbe) for a particular transistor it will be seen that the relationship is non-linear - see **Fig. 2**. Unless the forward bias applied to the base of the transistor is set so that operation is centred on the most linear portion of the characteristic, non-linear distortion will arise, whereby a sinusoidal signal applied to the base will result in a periodic output waveform that is non-sinusoidal - see **Fig. 3a**. An analysis of this type of waveform reveals that spurious harmonics are present. The effect of adding the second harmonic to the fundamental is depicted in **Fig. 3b**.

Negative Feedback

It is possible to modify the characteristics of an amplifier by returning a portion of the output to the input. If the fraction fed back is in-phase with the input signal it will add to it, so the feedback is said to be positive. Usually positive feedback causes an uncontrolled rise in gain which results in self oscillation. If the fraction fed back is in antiphase, i.e. 180° out-of-phase with the input signal, it will subtract from it, so the feedback is said to be negative.

Attenuation and phase distortion can be markedly reduced by the application of negative feedback and since the new frequencies produced by non-linear distortion will be returned to the input in antiphase they will be largely self-cancelling.

Negative feedback can be applied to one or any number of stages within the amplifier. All of the transistors (or valves) and components in the circuit between the point where the feedback signal is obtained and where it is inserted are said to be within the feedback loop. The application of negative feedback will stabilise the signal gain of an amplifier so that it is largely independent of the manufacturing tolerances encountered in individual transistors and components and also of variations in supply voltages. Noise and hum produced within the feedback loop will also be reduced.

The input and output impedances of an amplifier can be modified by the application of feedback. The price that has to be paid for all these advantages is a reduction in the overall gain of the amplifier, so additional stages of amplification may be required. All of these factors are of great importance to the manufacturers of mass produced equipment.

Negative feedback is classified in two ways - by the method of derivation and according to the method of application. The basic circuit of a *npn* bi-polar transistor amplifier with voltage derived, parallel applied feedback is shown in **Fig. 4**. In this arrangement the forward bias is applied to the base of the bi-polar transistor (TR1) via a resistor (R1), which is connected to the collector end of the load resistor (R2). During positive going half cycles of the input waveform the signal voltage at the collector will be negative going, consequently the bias

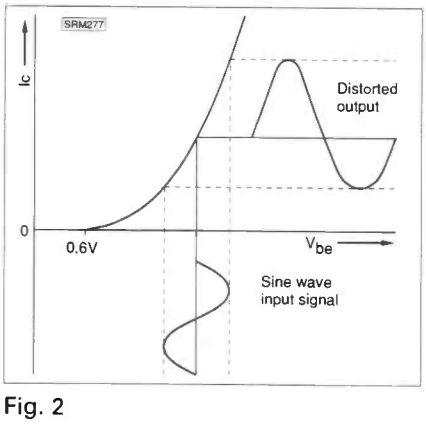

Fig. 2

on the base will be reduced. The reverse will apply during negative half cycles. The characteristics of the transistor may result in a distorted output waveform similar to that shown in **Fig. 3a**, but the effect of the feedback will be to reduce the distortion, since more feedback (less base bias) will be applied during the peaked half cycles and less feedback (more base bias) will be applied during the rounded half cycles of the output.

Current derived, series applied, feedback can be introduced into the amplifier in **Fig. 4**, by removing the by-pass capacitor (C1) across the emitter resistor (R3). The flow of emitter current through R3 results in a voltage drop, thereby self-biasing the emitter.

The role of C1, usually a 10 to 100µF electrolytic, is to prevent the emitter voltage from varying with small changes in emitter current. If C1 is omitted, then the voltage drop across R3 will vary in step with the signal applied to the base. During a positive going half cycle of the input waveform the emitter current will increase and the voltage drop across R3 will rise, thus reducing the signal voltage between the base and the emitter.

The effect of feedback on the input impedance (Zin) and output impedance (Zout) of an amplifier can be summarised as follows:

Zout is reduced by voltage derived feedback, but increased by current derived feedback.

Zin will be increased if the feedback voltage is applied in series with the input, but it will be reduced if it is applied in parallel. □

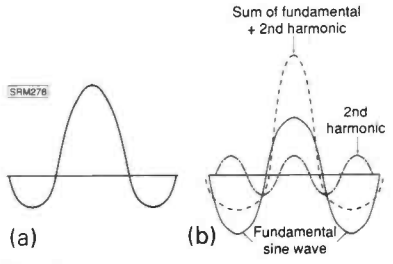

Fig. 3

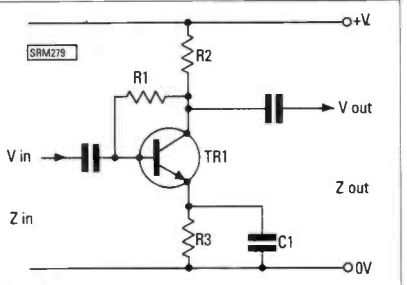

Fig. 4

Appendix

A simple block diagram can be used to illustrate the effect of negative feedback on the voltage gain of a transistor amplifier. Consider first the voltage gain (M) without feedback applied. Refer to **Fig. 5a**. The output voltage (Vout) will be equal to the base emitter voltage (Vbe) multiplied by the gain of the amplifier (M), thus:

Vout = MVbe
M = Vout/Vbe

The block diagram can then be modified to include negative feedback - see **Fig. 5b**. Let M' denote the voltage gain of the same amplifier with feedback applied and the fraction of the output returned to the input. In this example the feedback voltage (Vfb) is derived from a potential divider formed by two resistors (R1, R2), so

Vfb = Vout R2/(R1 + R2)
Vfb/Vout = R2/(R1 + R2) = ß
Now Vout = MVbe
But Vbe = Vin - Vfb = Vin - ßVout
Vout = M(Vin - ßVout)
Transposing gives:
Vout + MßVout = Vin
or Vout(1 + ßM) = M Vin
M' = Vout/Vin = M/1 + ßM

Note:

If ßM is negative (i.e. positive feedback) and of magnitude 1, then:

M' = M/0 = infinity.

If ßM is positive (i.e. negative feedback) then the gain of the amplifier will be reduced by negative feedback.

If ßM is much greater than 1, then:

M' = M/(1 + ßM) M/ßM = 1/ß

The overall gain of the amplifier depends upon the feedback circuit - not on the gain of the amplifier. Variations in components or voltages which would alter the gain are unimportant so long as ßM is greater than 1.

If all this seems a little complex, consider an example where the gain of an amplifier without feedback (M) is 200. The fraction of the voltage output fed back to the input (ß) is 1/50. What will be the gain with feedback applied? Answer: M'= M/(1 + ßM), therefore:

M' = 200/(1 + (200/50)) = 200/5 = 40

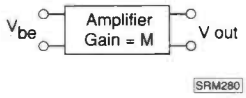

Fig. 5a

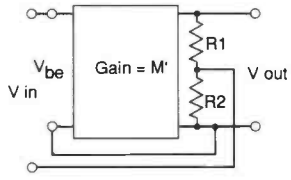

Fig. 5b

Now consider what will happen if the gain without feedback is halved by a transistor fault. What will be the new gain with negative feedback applied? Answer: New gain without feedback

(M) = 200/2 = 100. Therefore the new gain with feedback applied

(M') = M/(1 + ßM)
= 100/(1 + (100 /50)) = 33.

The degree of negative feedback applied to an amplifier is usually quoted in decibels (dB). The voltage gain of an amplifier without feedback is 20 log M and with feedback, 20 Log M'. Feedback applied is 20 log M - 20 log M' = 20 log (M/M') = 20 log (1 + ßM) dB.

SEEN & HEARD

AMATEUR BANDS ROUND-UP

Paul Essery GW3KFE
PO Box 4, Newtown, Powys SY16 1ZZ

Before I make a start on the piece, please let me remind everyone about the time-scales involved. The deadline for your input to this month's column was March 5, so most of your letters were penned in February; what I write today will appear in the May issue, appearing on April 26. That, then is quite a long time - but a query to be answered in the column is obviously going to take the same time. I have often had letters which assume that I can intervene with a late flash a few days before publication. Alas, t'ain't so! Once the offering leaves me, it goes into the sausage-machine and that's that. Nothing can be stopped without the issue coming out late - and it NEVER leaves *PW* Publishing late!

This time I have two main items to consider; first the SLP and second my request for your views on the way this column of mine is put together.

The SLP

Andy Brown (Barnet) reappears in the SLP lists having missed a couple. Sadly, Andy parted with his Trio 9R59D during November, in favour of a computer update to an Atari 520STFM. That was bad enough, but then the trusty old JR500S went silent; it was left on 'stand-by' for several days in error, and now all it does is blow fuses. What's wrong, Andy wonders? I could hardly expect to diagnose a fault given just those as symptoms, but I would just comment that if the fuse is on the mains side that sounds ominously like the transformer (though that would likely be accompanied by a certain aroma!); if the fuse on the secondary side is blowing, then the problem is most probably a component fault. Anyhow, to return to the SLP, Andy took it on with Realistic DX400, coupled through the a.t.u. to a switch-box offering the choice of 28MHz half wave vertical, half-sized G5RV and a random length of wire. On the output side the recovered audio goes through a graphic-equaliser for a car radio, which doesn't look too handsome but does clear some of the noise off the audio and is cheaper than a more elegant filter! Andy found forty-three countries, and all continents, by splitting his six hours in the shack into six bursts of which the longest was only 100 minutes. Some 133 QSOs were logged, and the final score was 5586 points. Looking at the log itself, we note HL1UA on 3.5MHz at 2239 on February 17, HK3JJH at 2349 on the same band, VR6TC at 0752 on 18th, HC2MW and VK2DT on the same band, a few minutes later, on 7MHz HZ1AB at 21.20, and RH1Y just after. As to the general opinion, Andy reckons 3.5 and 7MHz were extremely noisy, but appeared to be well open nevertheless; the higher bands seem to have been also pretty active.

The other entry for the SLP yielded a list of broadcast stations! However, **Ken Fletcher** (Birkenhead) obviously misunderstood the rules as covering these so no real sweat. Most interestingly, Ken obviously listens to the Boulder reports since he notes that at on February 18, 0955UTC (Greenwich or Zulu to us OTs!) the Solar Flux was 154, A Index 21, K Index 3; Last 24 hours Unsettled to Active, Next 24 hours unsettled to active, Stormwarn Alert Saturday February 17. Ken relates this to reality by commenting that some absorption was apparent after 1000, and that the m.u.f. appeared to be 9MHz at 0615.

Neither **John Heath** nor **Phillip Davies** took part this time, but John wrote on other subjects, of which more anon.

Comments

First, **G. Smith** (London E10) who reckons that since the cover says 'For the Listener' he is puzzled to see such items as Decode, Info in Orbit and Television. Further, he doesn't consider Airband and Band II are part of the short waves either. Please, he says, tell G8VFH! (Not on your life - he'll thump me!) Mr Smith does on the other hand reckon on this column and that of Brian Oddy, because we are in his view teaching him something. Otherwise, he finds so many of the articles are full of unexplained technical terms.

This is a point of view one must to a degree appreciate; whereas in pre-WWII days, and indeed up to the Fifties, one could come by books which tried to explain things from the word go. What Mr Smith could use is to either take a Radio Amateurs Examination course, whether or no he ever means to pass the exam; or alternatively to get hold of a text-book and read up at home, to about the same level. On the other side of the coin, Mr Smith implies that most of the readers of of this column are at the same novice stage as he says he himself is at - but one would expect that those who read any given issue would be a broad spectrum of knowledge. Perhaps someone should write such a text!

On a different tack, Reader Smith says he joined the local club but left when they laughed at him for only being an s.w.l. I think, knowing the club concerned, that he is pitching it a little strong here; nobody laughs at you (or indeed with you!) unless they accept you. For example, anyone who has ever attended our local club here will know that the mickey-taking is extremely fierce and no respecter of persons whatever; but those who attend, and accept that they have to take it as well as dish it out, find an infinity of help available. A valuable letter this.

Dave Wright (Sheffield) says he is not normally an amateur bands addict, spending more of his time listening to the BC stations. However, for a change he had a quick trawl around 14MHz recently and tripped over a king-sized pile-up, 3W3RR was underneath it all, and dishing out contacts and numbers at a fair rate of knots. 3W3RR was stated to be in Vietnam, and 3W is a possible prefix for this country although normally they use XV. As to precisely where they might have been in that country, it would probably appear on the QSL card in terms of latitude and longitude or the name of a place, and indeed on the documentation which is submitted to the DXCC Desk at ARRL HQ to verify the operation was genuine. On the other hand it might be poor politics for the great big world to know precisely, in which case the DXAC may be the only one to know precisely.

John Heath (Kirkby Mallory) reflects on the SLP activity, preparation, and attitude; all it requires to place in such a small event is to plan a little, some concentrated listening, and a little luck. John says he 'had to throw in lots of modern technology plus v.h.f./u.h.f. for the multipliers to keep near Phillip Davies', and adds the comment that listening systematically, logging the DX one hears and the times when one hears it, must result in a better 'feel' for propagation. I agree; even if one has such a program as W6EL's Miniprop available, it is only an adjunct to one's own instinct. Perhaps the most useful simple guide was the article yours truly and the late G2DC did in the 'old' *SWM*, which tabulated which parts of the world were likely to pop up at what time of day on what band, for Winter, Spring, Summer and Autumn.(October 1979, pages 409-412). It was done by G2DC dredging through his logs for a complete sunspot cycle, and was based on the assumption that what a top-flight DXer could work, an average s.w.l. could reckon to hear. And of course, it assumes that on the date and time when you choose to use the table there is some propagation. So don't blame us if it says you can hear VK but a solar flare has wiped out all propagation!

Next, John changes tack completely, and asks for:

1. circuits for attenuators and
2. some advice on reporting and QSLing.

To deal with the first, tables for attenuators appear in the majority of the modern text-books; *The RSGB Radio Data Reference Book* has a table for 75Ω and the conversion data to 50Ω, while the *ARRL Handbook* 1985 (the most recent one available here) shows an attenuator construction at page 25-42 to 25-44.

As to signal reports and QSLing to licensed radio amateurs, the guiding motto must be the question of USEFULNESS. Two radio amateurs have a QSO, and so to them the QSL is merely the final courtesy. On the other hand, the s.w.l. report is from an outsider to the original QSO, so it must contain something new in the way of information, and be useful to the recipient. Some good s.w.l. reports, for instance may show how the recipient's signal strength plotted over a period of an hour, or how many 'policemen' (with their calls!) were blotting the chap out, or how his strength compared at your QTH with others from the same part of the world. A personal covering letter probably won't come amiss.

Now, if your man is a fairly normal one, and you don't want to spend too much money, you join RSGB or ISWL, and send a card via the Bureau system. You also obey your chosen Bureau's rules on envelopes for incoming cards. However, the rare ones, such as the DX-peditions, will usually expect you to QSL direct to the given QSL Manager address with possibly an s.a.e., or a stamped envelope (which involves getting the stamps of that country from the stamp-shop - UK ones won't do on an envelope to be posted in an overseas country!), and maybe in addition a dollar bill or two, or IRCs. In general, the US 'green stamp' is acceptable anywhere in the world except the communist countries, and for the latter you must send only IRCs. Thus if your man has a QSL Manager or QSL address in, say, Russia, then you use IRCs, even though the station itself might have been in USA! The key thing is to listen carefully and to be sure you get the QSL address details down when he gives them, and follow the instructions he gives to the letter. Particularly if he says don't put a callsign on the envelope - not all postal systems are perfect, and in some places it has become known that an envelope with call letters on the front or back may have money inside..... which means non-arrival of your report on one hand, and non-receipt of a return card on the other!

Simon Burgess (Stockport) has graduated to the ranks of the licensed amateurs nowadays as G7CPN, but he recalls with pleasure the s.w.l. column of some time back and the HPX Ladder we used to run; and he notes that lots of ex-HPX types disappeared when we scrubbed it; and indeed Simon indicates that even though he now operates two-metre Sideband, he would still like to compete with other s.w.l.s on the HPX Ladder. Anyone else feel similarly?

Next we come to **Mr R. C. Cole** (Cwmbran) who wants to know how to QSL to LY1WW and 4N7A. The LY station is from Lithuania so would go via Box 88 Moscow, while the other one is a YU in disguise, and his QSL should go to the Yugoslavian Bureau. Easiest way to deal with both is to join ISWL and/or RSGB and use the Bureau facilities they offer! Reader Cole is incidentally, is 76, a member of RNARS and ILA member number 001!

What's On

By the time you get this, we shall have seen another Western Sahara, S0 operation; the call we understand will be S01LYNX, with ten operators and QSLs to EA2JG. There may be extra stations with SO2, SO3 prefixes as well.

Keep an ear out for operation from Bhutan A5; Jim Smith is going there, and may well be operational as you get this possibly as A51JS; he also hopes that he will be able to leave Bhutan with amateur radio once more legalised.

On the other hand, Yementel, Aden, are said to have telexed ITU Geneva, that 70A, operated by an Italian amateur was illegal and not authorised. The telex goes on to name I1RBJ and state that he worked 424 stations. The Yemen telex continues by hinting that although they do not allow amateur radio, they are thinking about it. Whether this is genuine or not, we just wouldn't care to say in the absence of comment from I1RBJ. Since Yemen are taking over

SEEN & HEARD

administration of Abu Ail shortly, it follows that the A15 calls you (we hope!) heard just before this arrived were probably the last to this spot as a separate DXCC country.

I begin to wonder if the talk of a Spratly 1S, operation is just smoke without fire.... the latest news is that the JAs have dropped out, and that only RL8PYL, UL7PCZ and 3W3RR are going. I also have it that ZL1AMO is NOT intending a Spratly operation.

More Mail

E. H. Trowell (Minster) next; he sticks to the dots and dashes mainly, and this mode produced among the small fry such catches as ZL3GQ, J34LTA W2BA and VE3BCH on 3.5MHz, while 7MHz gave with OY7ML, WG9U, VP2EZD, J34LTA, WQ2K, K3ZO, K1AR and K5NA. On 10MHz - not many of you seem to listen here! - there were a couple of VKs, while on 14MHz there were KL7HF, G3KTC/MM, FM5CW, PY6BG, WL7E, K5NA, PY2DKB, and WA6JR. On 18MHz W6 was noted, on 21MHz K0GVB/C6A, on 24MHz VE7WO and on 28MHz XF1C, K7EF, N5TP, W8EGB and W6DU.

P. Boorman (Sittingbourne) remarks that all his antennas stayed up during the gales, although a trap needed attention later. Phil listens mainly to s.s.b., and this netted, on 7MHz, ES1RA/UM1M in Oblast 036, RA3QP, RW9FW, UM8MDX, plus a gaggle of European and UK stations noted during the daytime. On 14MHz, various Ws, Europeans, and W3HGV/F/MM for a bit of a let-down! 21MHz offered W3PHV, VK4KWB, ZL3RK and ZM2AUB. Phil's favourite 28MHz band stumped up with A92EV (QSL via Box 833 Bahrain), CT3FT (Madeira), JH1UAH, JR6UEE, KA0BBU, some more common W call areas, RH7Y/P/RA4PF for Oblast 046, TF3CW, UI8BDU, UW9UWB, UZ0AWS, VK2PJN, VK6ADP, VK6PAZ, VK6PWC, ZS6JR, 9H8B, 9K2IC. On 28MHz f.m. AC1T, NB4K, OE5EVM, VE3NGO were logged, while a solitary bit of c.w. came from W8POS. As for 18 and 24MHz, the comment is blunt: Nowt!

Working on the 24MHz band from the car is the specialty of **Rod Colvin** (Woodley); although this is at least partly a question of working hours, there is also the happy thought that when the winds blow, the antenna is locked in the boot! Using a quarter-wave vertical, all W Call areas were noted, plus 9H1P, UB5CEN, OY9JD, OE6HZ, VK6RO, YB0LXN, SV1ACK, ZB2IT, UL7JC, IT9ESW, 9J2WS, CE3GEI, CO6CG, LY2BBZ, ES1QD, Z21CS and ZD7CW.

Analysis

From **D. L. McLean** (Yeovil) we have the usual analytic letter. Don says he didn't find conditions in the month prior to writing (late January-late February) on 28MHz as good as they were in the equivalent period of 1988. The long-path morning openings were not conspicuous either on 21 or 28MHz, and the bands overall didn't give too well. North Americans were of course noted between noon and 2100. Down on 14MHz 1500-1700Z produced short path openings to VK-ZL-Asia. As for 7 and 3.5MHz these night-time bands have done quite well, which is usually a pointer to less than perfect propagation on the higher bands.

In fact, although one day recently saw the solar flux up as high as 384 - it's peak in this cycle - the continued lack-lustre conditions have caused some speculation that we might have passed the peak. On the other hand, it is fairly evident that some major restructuring is going on within the sun, so forecasting isn't too easy. Incidentally, if what I say provokes anyone into wanting to look at sunspots, DON'T. The proper way to do it is to focus the projected solar image on to a piece of card and then to look at this. To look at the sun directly whether with binoculars or telescope is to risk permanent blindness.

THE NEXT THREE DEADLINES ARE

May 14, June 11 & July 9

DECODE

Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS

My first letter this month comes from **Mr R.A. McKinnon** of Barnstable who uses a Tandy DX-440 receiver, Atari 520STFM computer and a PK-232 intelligent terminal unit. He notes that the PK-232 claims to be able to receive NAVTEX, but despite having monitored 518kHz has not heard any as yet. The question is simply what is NAVTEX and where does one find it? Well NAVTEX is a service operated by British Telecom International and provides navigational information for ships at sea, hence the name NAVTEX (**nav**igational **tex**t). In order for this information to be relevant to the ships crew, it's important that the information received covers the area in which the ship is sailing. The technique used to achieve this is to utilise a number of coastal radio stations sending their messages using a fixed format and each allocated separate time slots. In addition, the actual message content is classified into different categories, i.e. navigational warnings, weather warnings, etc. The ship's decoding equipment is able to use this well defined message structure so that the operator can choose to receive only particular types of message and can also define the area of interest.

You can see from this that the system is very useful for the sailor as he or she can easily see all the relevant navigational information for the area of interest without having to wade through a long printout of irrelevant information. From the short wave listeners point of view it is quite easy to monitor this service. The only frequency used is 518kHz and the mode is FEC (forward error correction) with a standard speed of 100 baud and a shift of 170Hz. This makes the transmission receivable by most stations equiped for ARQ or SITOR modes.

As I mentioned earlier, each station is allocated a time-slot which is supplemented by a single letter alphabetical station identifier. It's this station identifier that is used by the ships decoder to select messages for a particular area only. For the listener it's simply a waiting game, i.e. tune to 518kHz, select the right mode and wait for the messages. Of course with a simple decoder you will see all messages that are within range of your station. Some decoders, such as the FAX-1 for example, do allow you to select particular areas and message types. You will find that each transmission is prefixed with a four character group which identifies the station and message type. The first character gives the station while the second gives the message category which can be:

A: Navigational warnings.
B: Gale warnings.
C: Ice reports.
D: Distress alerts.
E: Weather forecasts.
Z: No message available.

The final two characters comprise the serial number with 00 used for urgent messages. The following list gives some of the European NAVTEX stations, the identifier and the transmission slots:

H - Harnosand 0000, 0400, 0800, 1200, 1600, 2000.
S - Niton 0018, 0418, 0818, 1218, 1618, 2018.
U - Tallinn 0030, 0430, 0830, 1230, 1630, 2030.
G - Cullercoats 0048, 0448, 0848, 1248, 1648, 2048.
F - Brest-le-Conquet 0118, 0518, 0918, 1318, 1718, 2118.
O - Portpatrick 0130, 0530, 0930, 1330, 1730, 2130.
L - Rogaland 0148, 0548, 0948, 1348, 1748, 2148.
T - Oostende 0248, 0648, 1048, 1448, 1848, 2248.

There are of course many other stations spread around the world, but I have only listed a few that should be receivable in the UK. For more information see the Klingenfuss *Guide to Utility Stations* and the *Radioteletype Code* manual, both of which are available from the *Short Wave Magazine* book service.

Radio Rallies

As usual I will be attending as many rallies as possible during the current season and I would be very pleased to meet readers for a chat. The schedule so far is listed here:

May 12 - VHF Convention Sandown Park.
May 20 - Harrogate.
June 10 - Elvaston Castle, Derby.
July 14 - Truro, Cornwall.
September 16 - BARTG, Sandown Park.
October 20/21 - Llandodno.
October 26/27 - Leicester.

If you do manage to make any of these rallies please look me up on the *Practical Wireless* and *Short Wave Magazine* stand. It's always worth visiting rallies if you can as there is usually a good selection of 'bargains' available, especially if you're interested in home construction.

Readers Letters

Robin Brown of Brompton-on-Swale is very fortunate in having a brother who is something of a software "whiz kid". Robin uses a Sony Pro-80 receiver and a BBC-B computer for most of his decoding. The software used is the RX4 from Technical Software plus a FAX and SSTV program written by his brother Kevin. The interface for the FAX program is simplicity itself and comprises and input direct from the audio stage of the receiver to the ULA in the BBC!

An additional useful feature is that pictures received on the BBC can be transfered to Robin's Atari ST for further enhancement. The next development is to build a demodulator for the Atari and eliminate the BBC and its associated inteference! Robin also comments on the difficulty in decoding many transmissions which appear to be RTTY signals. I'm afraid this is very common and you will often find that these are synchronous transmissions or perhaps bit shifted RTTY signals. The next question I can hear you asking is - what is bit shifted RTTY? You will have to be patient on this one, as I will cover this either in a later column or in a main article.

Next comes a plea for help from **Mr A. R. Batho** of Scunthorpe. He has recently purchased an ERA Microreader and an Amstrad DMP3250di printer and would like to connect the two together. The first point is that the printer must have a serial interface. I don't know the settings for this printer but the default settings of the Microreader are as follows: 4800 baud, 1 start bit, 8 data bits and 1 stop bit, no parity or handshake. With regard to the connections, all you need are two wires - one for the signal and one for ground. At the printer connect the signal to the receive data line. This same system can be used to send the output of the Microreader to a computer serial port where the information can either be displayed on the screen or stored on disk-providing of course you have suitable software for the serial port.

Paul Willmington of Portsmouth is a newcomer to utility listening and currently owns a IBM - PC and a Maplin TU-1000 terminal unit, in addition to a h.f. receiver. His problem is what else is required to be able to receive RTTY? The answer is some decoding software which converts the incoming 5 unit ITA No. 2 code into a format suitable for display on the screen. There are several sources of software available at present. BARTG [1] can supply a RTTY only program whilst G4BMK [2] has a more sophisticated program that can

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SEEN & HEARD

handle ARQ and FEC in addition to RTTY at a variety of speeds. It is also worth trying the Public Domain Software Library [3], though I believe they only have straightforward RTTY programs available.

Graham Atkinson of Douglas I.o.M. uses a Commodore C-64 computer and a PK-232 intelligent terminal unit for his decoding. He does however have a problem with the connections as the PK-232 uses a Y lead between the computer serial port, the PK-232 and the printer. The problem lies with the connection to the serial port of the C-64 as the Y lead has the wrong plug fitted. Not being familiar with the C-64 I'm not too sure what connector they use, but whatever it is you should be able to buy an adaptor to take a standard D connector. If the problem is simply that the C-64 has the correct type of plug but the wrong gender you can buy a very useful device called a Gender changer which as the name implies will reverse the gender. These gender changers generally cost in the region of £5.00 each. If anyone out there has experience of this particular problem perhaps they would like to let me know.

In a PS to his letter Graham asks what is ASCII and TDM. Well, a full explanation would warrant quite a bit of space but here's a brief summary. ASCII is an acronym for American Standard Code for Information Interchange and is simply a table of numbers which are used to represent letters of the alphabet. As you may be aware, computers are really only simple devices and can only deal with numbers consequently if we want them to handle letters we have to first convert the letters into numbers. In order to promote some standardisation it is obviously desirable for all computers to use the same table for the conversion hence the development of the ASCII code. So, a transmission that is said to be using ASCII is simply sending information that has been converted using the ASCII code.

The second question regarding TDM covers a slightly different aspect of communications. In our modern commercial world it is obviously important that maximum use is made of an expensive facility such as an international radio link. Any system that can increase its capacity will obviously be in great demand. TDM is an abbreviation of Time Division Multiplex and is a system where more than one communication channel can be passed over a single radio link, hence increasing its capacity. There are many techniques used, but the simplest type simply interleaves the two separate channels with the terminal equipment providing the separation. Using this technique each channel has its own time slot hence the term Time Division multiplex. Don't fret if you don't quite understand TDM from this description as it's a subject I will be revisiting, probably in my feature article on decoding.

USB - LSB - RTTY?

A confusing title for a confusing subject! Several readers have written with queries regarding what mode should be used to receive RTTY. The general answer is upper sideband, but the choice between upper and lower side band is of little consequence. All the change does is invert the tones and hence you will find you have to reverse the shift on your terminal unit. In fact if you have a terminal unit which does not have the facility to invert the data, changing sidebands does it for you! Another related question comes from those listeners who use receivers with a b.f.o.

In this case you will usually find a mark for u.s.b. reception or at least some advice in the manual of the required setting. If this information isn't available the normal position, at least on most sets that I've tried, is about 10 - 15 degrees right of centre. Readers often ask about the use of filters and here the best advice is to start off at the normal setting for s.s.b. reception and then select narrower filters if you are troubled by interference. Starting with a narrow filter just tends to make tuning difficult. Finally on this subject is the use of the RTTY mode which is provided on some receivers. Readers often write to say that this mode doesn't seem to work although reception using s.s.b. is fine. The reason for this is almost invariably down to standards. There are in fact two standards for RTTY tones and these are known as high tones and low tones. The low tones, i.e. 1275Hz and 1445Hz for 170Hz shift signals are primarily used in Europe whilst the high tones of 2125 and 2295Hz are used in the USA. Because the USA hold such a large stake in the consumer market the Japanese manufacturers tend to build for that market.

The result of all this is that a lot of the Japanese receivers and transceivers imported into the UK are set-up for high tones. If you know what you are doing it is usually possible to change this by adjusting the carrier insertion oscillator, but don't attempt it unless you really are competent!

Frequency List

Don't forget if you would like a copy of my frequency list just send three stamps to the address at the head of this column and I will do my best to return a list as quickly as possible. It's also appreciated if you can include a few of your own loggings so we can keep the list going. This month my thanks are due to the following for their contributions to the list: **Kevin Bates, Maurice Lloyd, Jan Nieuwenhuis, J. D. Pyle, Steve Poole, A.J. Hicks** and **Chris Norfolk**, to name but a few! The selection of stations shown here use the normal format of: Frequency, Mode, Speed, Shift, Callsign, Time and Notes.

0.083MHz, RTTY, 97, 85, UNID, 2200UTC, 1.5 min to 2 min cycle + RYs.

7.863MHz, RTTY, 50, -, BZJ21, 2128UTC, Wuhan Meteo.

8.4785MHz, CW,-,-,FUF, 2042UTC, FN Fort de France.

8.49MHz, CW,-,-, AQP5, 2032UTC, PN Karachi.

10.215MHz, RTTY, 50, -, HZN, 2149UTC, Jeddah Meteo.

10.25MHz, FAX, 120, 576, ?, 2055UTC, Madrid Meteo.

10.610MHz, RTTY, 50, -, SUA251, 2053UTC, MENA Cairo.

11.439MHz, RTTY, 50, -, 5NK, 2108UTC, Kano Air

14.932MHz, RTTY, 50, -, ?, 1005UTC, APS El Djaza'ir.

16.27MHz, FAX, 60, 288, 9VF207, 1819, KYODO, Singapore.

17.138MHz, RTTY, 50, -, URB2, 1000UTC, Klapeida R.

19.1711MHz, RTTY, 50, -, CNM85, 1605UTC, MAP Rabat.

19.335MHz, RTTY, 50, 425, ?, 1115UTC, Arabic.

19.7475MHz, RTTY, 50, -, 6VU79, 0936UTC, Dakar Meteo.

20.822MHz, RTTY, 50, -, 7A1, 0920UTC, TCH Emb. Baghdad.

(1) BARTG, Pat & John Beedie, Ffynnonlas, Salem, Llandeilo, Wales SA19 7NP.

(2) Grosvenor Software, 2 Beacon Close, Seaford, East Sussex BN25 2JZ.

(3) Public Domain Software Library, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL.

INFO IN ORBIT

Lawrence Harris
5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB

Many readers of *SWM* have quite sophisticated equipment set-up in their homes. One such listener who has assembled a considerable amount of hardware is **Colin Bates** of Marston Magna, near Yeovil. He has been an s.w.l. for about four years and currently uses a Kenwood R-2000 receiver and a VC10 converter for v.h.f. He has two antennas, a Revcone discone and a 54m long wire. Also used for his hobby is an AOR-2002 scanning receiver fed by a D-130N discone.

Colin can receive FAX pictures and decode them on his ICS FAX 1 but writes to ask about the various computer systems that are advertised for use with direct satellite reception. He mentions several advertisers in *SWM* and asks for advice on the purchase of suitable equipment.

It is not easy to give such advice without actually seeing demonstrations of each system. I use a home-made framestore plus a purchased computer system and each has its particular applications. In general terms the would-be purchaser of a computer system needs to decide on the facilities that would be useful for picture adjustment. A careful study of the various advertisements in *SWM* will reveal the software facilities offered by each manufacturer but there is nothing like actually seeing the systems in operation.

Hash

One other factor to consider is whether the computer generates much hash at the frequencies being used. I have one computer which can be used without problems while a satellite pass is being watched, but the actual computer that I bought to digitise the satellite data seems to act like a radio transmitter! I am experimenting with earthing systems to try to cut the interference to a tolerable level.

Colin noticed the wide variation in prices for equipment for decoding satellite data, ranging from £260 to some £1695 but of course the systems are all different with widely differing facilities and capabilities.

Doug Ellershaw G1KLZ of High Bentham has a Dragon 32 computer and has recently come across a WEFAX program. He sent me a tape to provide some METEOSAT recordings to test out his program and so I recorded three frames that evening. Each METEOSAT frame includes a label identifying the picture format and the time of the original scan. Hopefully Doug will be able to test out his program with the tape. I am not familiar with the Dragon 32 but I would expect the audio data to be fed into a decoder and that output to be fed into some form of serial interface.

Another reader **Chris Spray** of Cheltenham is very active in the field of satellite picture reception. He uses an Icom IC-R7000 which, until recently, was fed from a discone antenna. Chris has just completed the construction of a crossed dipole and says that the initial results show a definite improvement. He uses the Maplin decoder for picture generation on an expanded Acorn Electron and has considerably modified the software suggested by Maplin.

Chris has developed software for predicting satellite passes by combining some programs published in various magazines such as the quarterly one produced by the Remote Imaging Group. Chris' program creates a file for each satellite and then combines the files for display either on paper or on floppy disk.

A most interesting application of Chris's talents is revealed by his modification of some purchased software to allow him to directly control his receiver with the computer. Unfortunately this has hit a problem because of the computer generated r.f.i. of the type mentioned previously.

Chris is continuing to use his undoubted programming skills in modifying the software to enhance picture contrast. He comments that the benefit of having the computer to do the various jobs is because there is only so much space available on the bench!

Finally Chris sent a tape for me to record METEOSAT pictures for him

SEEN & HEARD

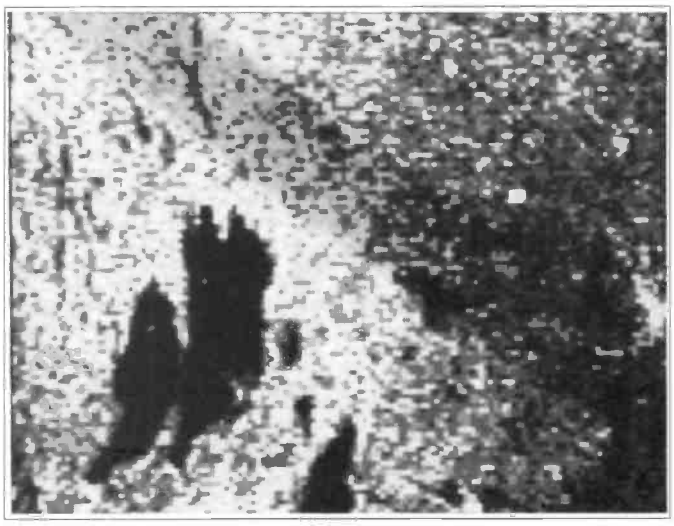

Fig. 1

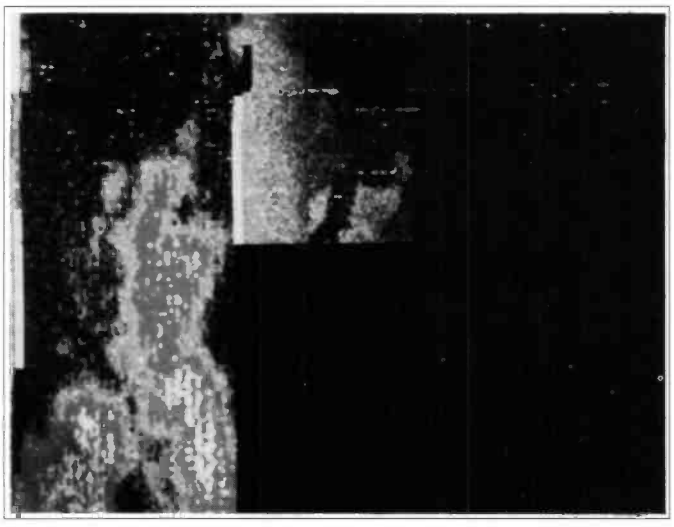

Fig. 2

to use to help align the decoder phase-locked loop. The tape was returned within a few days after I re-assembled the dish. Every time we have gales forecast I have been dismantling it just in case the winds were stronger than expected.

By chance I left either Chris's or Doug's tape in the cassette player when I was waiting to see if Okean-2 (see later paragraphs) would transmit. One morning it did transmit and so one of them will find an early transmission from that particular satellite on their tape. It was travelling south while passing over the Gulf of Bothnia.

Offers

As mentioned in previous months I will be happy to send any reader a recording of METEOSAT/NOAA satellite signals if a suitable cassette tape is enclosed with pre-paid postage. Several readers have requested such data and I hope that it has been used successfully to prove that decoding systems work even if you don't yet have a suitable antenna system.

Also available for an s.a.e. is a print-out of my list of Kepler elements for the polar orbiting satellites. I try to keep these as up-to-date as possible but occasionally an error might creep in.

OKEAN-2

Some months ago I mentioned that Geoffrey Falworth of Penwortham produces a list of expected satellite launches based on his studies of satellite lifetimes and rocket availability. Last November he wrote to tell me that a new Russian oceanographic satellite was expected to be launched towards the end of 1989.

The OKEAN-1 satellite has not been transmitting for some time as far I am aware and I understand that it does have problems so I was very pleased to receive a call telling me of the launch of OKEAN-2.

In early March I received orbital elements for this newly launched oceanographic satellite. It was launched on February 28 and after a wait of only a few days I picked up a transmission on March 8. In fact being a weekday I had to use my recording equipment so I set the timer to allow the cassette recorder to switch on for a few minutes either side of each possible pass. When I returned, the recorder had collected several minutes of data so I replayed it immediately.

The recording consisted of several sections, rather similar to the type of pictures sent by its predecessor OKEAN-1. The first section was completely black, the second section was a radar image and the remaining half of the picture was a visible-light frame of eastern Europe. Numbers were displayed with the pictures as is standard with many transmissions from the OKEAN series and these numbers can be decoded using information published in copies of the Remote Imaging Magazine.

Running the program and using the figure given in the telemetry produced the time 1122UTC which was the exact time predicted by the elements that I had received. This validated both the elements and the satellite signal.

Keplers for OKEAN-2

Here are the latest elements available for OKEAN-2 courtesy of Goddard Space Flight Centre.

Satellite: OKEAN-2 (1990-18A)
Epoch: 90067.11324253
Decay: 0.00002854
Inclination: 82.5281
RAAN: 190.7521
Eccentricity: 0.0018874
ArgP: 240.5761
Mean anomaly: 119.3567
Mean motion: 14.72673418
Orbit number: 119

Transmission frequency 137.40 MHz.

Russian METEORS

There has been a significant change in the operation of the Russian METEOR satellites during March. I last logged a transmission from 2/17 on February 11 and since that time I haven't heard or recorded any signals from it. Similarly 2/16 which also operated on 137.40MHz has been quiet. In an attempt to see whether I had simply missed the passes I have had the recording system set up on the frequency in my absence but only unidentified signals have been recorded.

I do believe that there is another satellite transmitting on this frequency but it requires a lot of time to monitor every transmission and then to work out a possible orbit.

So for the present we have just OKEAN-2 using this frequency. No doubt the other satellites will be reactivated in due course.

METEOR 2/18 continues normal transmissions on 137.30MHz and some very good pictures can be seen. If you examine the pictures at full resolution there is plenty to be seen, particularly around Greenland where the icebergs change with the change in the seasons. If ever there was a geography project for schools it is to actively monitor the advance and retreat of the ice in Greenland.

Another interesting meteorological phenomenon that I saw from 2/18 in late February was a cloud bank hanging over a part of the Mediterranean sea which was avoiding encroaching the land. Both North Africa and Spain were cloud free and so the effect was quite marked.

METEORS 3/2 and 3/3

For the last few weeks only METEOR 3/2 has been transmitting pictures. It remains on 137.85MHz and has been transmitting both visible and infra-red pictures of very good quality. The absence of 3/3 is probably temporary but we will have to see what happens. Only a month or so ago I commented that I didn't expect to see 3/2 back on again!

NOAAs

All three of the NOAA polar weather satellites continue regular good quality picture transmissions on 137.50 or 137.62MHz.

METEOSAT

Transmissions from METEOSAT 3 remain good though do check that you are pointing correctly at the satellite. The gales played havoc with my dish as I mentioned and whilst looking for the signal I came across another strong signal several degrees to the west which is evidently METEOSAT 4.

In an effort to see whether METEOSAT 4 was transmitting any wefax pictures I set up my computer and left it set up to trigger on any wefax tones and so store any picture that might be transmitted. After several days of monitoring I haven't recorded anything at all. I would be surprised if there were no wefax pictures at all so keep watching that signal!

GOES is still transmitting pictures though my equipment is seeing a low signal strength.

Other Satellites

The longer periods of sunlight now blessing the northern hemisphere have brought more satellites back into operation over the UK. At least that is the impression that I get listening to my scanner! Just this evening I have again logged the transmissions on 136.11MHz, 136.23MHz and some other possibles.

Geoffrey Falworth, mentioned previously, has kindly sent me some more elements to try to identify these transmission. Try listening out in the 136 to 138MHz band and see how many signals you can spot. My computer broadcasts on 137.02MHz so do allow for any unexpected frequencies that may only appear when you switch your home computer on!

New Equipment

I am always interested to know of new products for the satellite enthusiast and a recent letter from **Richard Wilmot GW3RRI** told me of the APT-1 weather satellite decoding module from Technical Software. This module converts the APT format used by weather satellites into the FAX format that many s.w.l.s have and so allows them to enter the field without major expenditure.

I haven't seen any results from this innovation but Richard describes several features that look appealing, particularly the provision for grey-scale enhancement.

Pictures

To celebrate the launch of OKEAN-2 I have included here two pictures from my collection of OKEAN-1 prints.

The first one, Fig. 1, is of Lake Vanern in Sweden taken in December 1988. I added artificial colour to the original print.

The second, Fig. 2, is of Scotland and shows the way that OKEAN can transmit more than one picture type within a frame. This picture includes part of the UK in the left section which is a microwave image, and a radar image of Scotland. At the time of scanning Scotland was under cloud cover.

I have run out of space now so until next month keep listening to the band and send in your reports.

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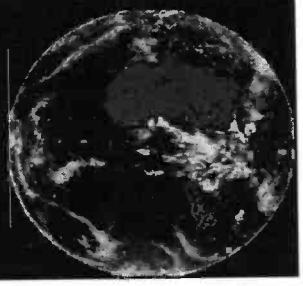

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SEEN & HEARD

BAND II.DX

Ron Ham
Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

Weather

During the month prior to March 13, I have recorded variations in atmospheric pressure ranging from 29.5in (998mb) on Feburary 26 and 28 to a super high of 30.9in (1046mb) on March 3, all on Fig. 1, mild and sunny days on Feburary 16 and March 2, temperatures on some days starting with a light frost (the lowest being 26°F) to daytime highs of between 50° and 62°F, a total rainfall of 5.60in for the month of February with thunder during a gale on the 25th and a beautiful lunar halo which lasted throughout the late evening of the 7th. The chart in Fig. 1 came from the barograph, installed in my upstairs office, indicating the pressure for the week including days 3 and 4. The ex-RAF altimeter in my car, at ground level, indicated 1050mb (30.95in) and a BBC weather programme reported a record high for March so far this century. My home is situated 322m a.s.l. so I assume that the sea level pressure could have hit the 31.0 inch mark.

Such variations have caused a number of short-life tropospheric disturbances which could easily have been missed had it not been for those familiar warning signs which suggest that, at least for a while, we check and tune through Band II more frequently. For instance, shortly before the high pressure of 30.7in (1039mb) began to decline at noon on February 22, Joan and I noticed those 'wispy' clouds building up in a clear sky and, as the fall continued, some very strong signals from French and German stations, popping up between 87.6 to 102MHz, were pounding from the loudspeaker of my 36 year old, ex-military, R216 v.h.f. communications receiver, Fig. 2.

The R216

Several readers have asked me about the availability and the workings of this elderly receiver and firstly I think it highly unlikely that any will be found on the surplus market today, however, should one turn up, it is important that you get the correct power supply unit and multi-way interconnecting lead that goes with it. The reason I emphasise this point is because the set uses a mixture of 14 directly and indirectly heated valves and a diode mixer. Therefore the power unit must correctly provide two separate and widely differing high tension and low tension supplies, plus a small voltage for the bias line and readers, **please remember that this power pack runs from the mains so great care must be taken when handling the high voltages therein and even more so with such aged equipment**. If you are in any doubt, ask a good radio engineer to check it. The R216, the v.h.f. companion to the R209, has a turret type wave-change switch (bottom right) to select one of the five bands, 19-30MHz, 30-46MHz, 46-68MHz, 68-101MHz and 101-157MHz and below the antenna socket (top right) is a crystal oscillator which provides 1 and 5MHz markers for dial calibration and is used in conjunction with the adjustable cursor (below dial right) on the dial glass. A roll-up type tuning scale is employed to spread the bandwidth of each range over a long length of film and the six 'pointer' knobs to the left of the scale-window are (top to bottom) for scale lamp brilliance, 30/120kHz bandwidth selection, b.f.o., c.w./a.m./f.m. selector and r.f. and a.f. gain controls. Although this set is very well made and among the best in its day the general performance and sensitivity cannot compare with the hi-tec receivers manufactured today. However, with a wideband antenna preamplifier and an outside beam or dipole, the R216, with its 4.86MHz i.f., is a most useful receiver for DXing in Bands I and II.

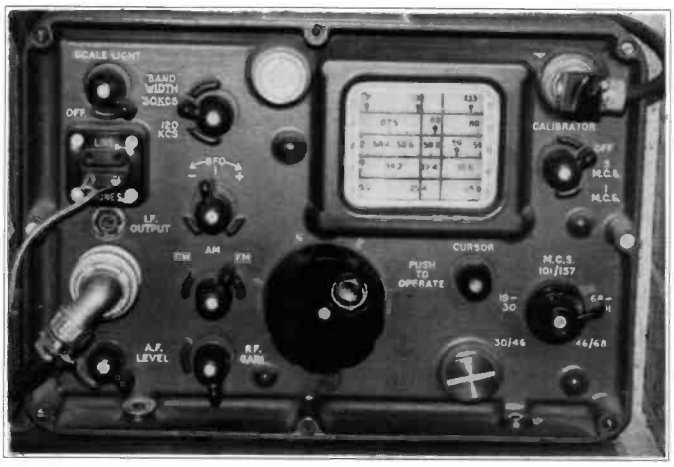

Fig. 2

Tropospheric

During the evening of February 22 and the afternoon of March 4, *PW* Editor **Rob Manion** (Dorset) heard French and Spanish stations in Band II and on the 4th he added the Canary Isles.

From his home in New Radnor, **Simon Hamer** received a multitude of stations between 87.5 and 106MHz during the good tropospheric conditions on February 18, 22 and 23 and March 7. On the 18th he logged signals from the Benelux countries, BBC Radios Scotland and Ulster, France, Ireland RTE-FM1 and the Irish Independent stations Capital Radio (Dublin, 104.4MHz), Century Radio (100.3 and 101.4MHz), Clare FM (96.4MHz), Classics 98FM (Dublin, 98MHz), County Sound (Cork, 103.7MHz), Horizon Radio (Bray, 94.9MHz) and South-East Radio (Wexford, 99.2MHz) and Manx Radio. Simon recently added Classics FM to his QSL collection and tells me that they use a 4kW transmitter at Three Rocks, Dublin. On days 22 and 23 he found Band II open toward Germany and Scandinavia and identified the American Forces Network (AFN on 98.7 and 102.3MHz), the British Forces Broadcasting Service (BFBS on 96.5 and 103MHz), Deutschlandfunk (100.3, 101.8 and 103.3MHz), Radio Hamburg (103.6MHz), Hessischer Rundfunk-1 (91 and 99MHz), HR-2 (96.7 and 99.6MHz) and HR-3 (99.7MHz), Norddeutscher Rundfunk-1 (91.1 and 98MHz), NDR-2 (87.6, 98.15 and 99.8MHz) and NDR-3 (94.4MHz), Suddeutscher Rundfunk-1 (97.8 and 98.8MHz) and SDR-3 (99.9MHz) and Westdeutscher Rundfunk-2 (99.2MHz) and WDR-3 (97MHz) from West-Germany and Danmark Radio-1 (88.1MHz), DR-2 (98.1 and 99MHz) and DR-3 (99.6MHz) from Denmark, Norsk Rikskringkasting-1 (99.7MHz) and NRK-2 (100MHz) and the Third-Programme (99.4MHz) plus Radios Gothen (101.9MHz), Gotland (100.2MHz) and Kristianstad (101.4MHz) on the forth FM network for local radio from Sweden. The more limited event on March 7, added BBC Radios Cumbria, Guernsey, Jersey, Newcastle, Ulster and Scotland, Manx Radio and ILR Clyde, Downtown, Forth and one of the recent additions, Jazz FM (102.2MHz).

Around 1100 on March 3, **George Garden** was parked in a lay-by on the coast just north of St. Cyrus and with his car-radio heard a weak and fading signal on 102.5MHz which turned out to be Radio Clyde and he also logged, "at full strength", BBC Radio Newcastle and from the IBA, Radios Borders and Tay. "I received BBC Radio Newcastle with the strongest signal from the more powerful and nearer transmitter at Chatton mixed 5.6kW and the weakest just only audible from the TX at Pontop Pike," said George. After seeing that lunar halo on the 7th, I kept an ear open on Band II and at 2300 heard BBC Radio Bristol, many co-channel 'warbles' and a few continental voices just above 100MHz. Another check at 0910 on the 8th revealed several strong French and German voices on several spots in the band, plus BBC Radios Bristol and Wales to the west and BBC Radio WM (Birmingham) and ILR Fox FM (Oxford) to my north.

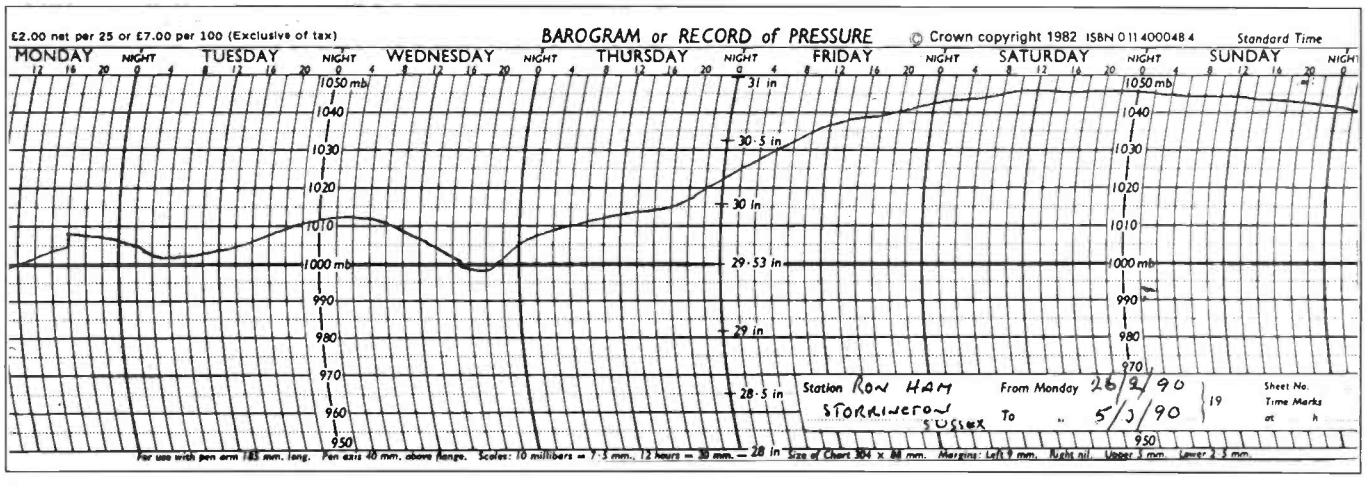

Fig. 1

SEEN & HEARD

TELEVISION

Ron Ham
Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

Although the month prior to March 10 was generally quiet on the DXTV bands **George Garden** (Edinburgh), **Simon Hamer** (New Radnor), **David Glenday** (Arbroath) and **John Woodcock** (Basingstoke) found some forms of activity due mainly to disturbances in the 'F2' region of the ionosphere, when those smeary unlockable pictures appear and a few interesting, but limited life, tropospheric openings. The longest and best of the latter occurred on February 22 and 23.

Band I

"The log really is pathetic, just a little 'F2' on Saturday 24th February," wrote David Glenday having seen pictures he could not identify on Ch. E2 (48.25MHz) from 0955 to 1020. Something unusual happened around 1030 on the 27th when John Woodcock heard a violin concerto in Band I but was unable to resolve the associated video, however, Simon Hamer had better luck because he was able to recognise the 'F2' reflected picture from Dubai at 1300 on the 11th but, at 0800 on the 12th, he found signals unidentifiable on Ch. E2 and those on Chs. R1 or C1 (both 49.75MHz), were probably of Russian or Chinese origin. Simon had mysterious signals again on Ch. E2 around 1300 on the 15th and 16th and similar on Chs. R1 and E3 (55.25MHz) at 0800 and 1300 respectively on the 17th. Unidentifiable test-patterns came up, maybe from Iran, on Ch. E2 and once more, possibly from Russia or China, on Chs. R1/C1 at 0800 on the 27th. Simon also received pictures from Czechoslovakia (CST) and Poland (TVP) via a random Sporadic E opening on the 9th.

Picture Archives

While Band I conditions are in the doldrums it's encouraging to look back at some of the signals which were received in India and the UK via Sporadic-E during 1989. **Lt. Col. Rana Roy** (Meerut) received pictures, on Ch. E2, from south-east Asia at 1940 on February 4, Fig. 1, Dubai at 1805 on May 29, Fig. 2 and Malaysia at 1850 on June 10, Fig. 3 and **David Hunt** (Brighton) saw an Italian weather forecast, Fig. 4 and a sub-titled film from Sweden, Fig. 5, somewhen between June and August. Signals from Italy can be found in Band I on Chs. Ia (53.75MHz) and Ib (62.25MHz) and with suitable equipment on Ic (82.25MHz). Readers with v.h.f. communications receivers like the ex-military S36 or R216, [see photo in Band II DX] or one of the variety of scanners, can look for the associated sound channels on 59.25, 67.75 and 87.75MHz respectively. Although, for early warning of Sporadic-E, I use an R216, fed by a rooftop dipole, to check for the vision pulses on Chs. E2 and R1, the sound on the Italian channels can often indicate the first signs of an opening by rapidly perking up above the receiver noise level. David Glenday caught a Russian caption on Ch. R2 (59.25MHz) at 1957 on August 9, Fig. 6, a test-card from Poland on Chs. R1 and R2, Fig. 7 and the TSS '0249' optical test-card from the USSR on Ch. R1, Fig. 8, at 1120 on November 1. The latter was late in the year because the annual Sporadic-E season is expected between April and September with the maximum number of events manifesting in June and July. Whatever the time of year it is always worth taking a quick look on Chs. E2/R1 during the morning for in, or out of 'season' Sporadic-E openings.. Tropospheric-openings produced a programme from Lahore in Band III for Rana Roy on February 1, Fig. 9, a weather report from France for David Hunt in mid-summer, Fig. 10 and a teletext transmission from West Germany on May 20, Fig. 11, for David Glenday.

Transmitter Gen

David Glenday wrote to Danmark Radio about the test-card marked 'DR Danmarks Radio' which he received last summer on the u.h.f. channel E41 and, in addition to their reply confirming that this signal came from Tommerup, they told him that the following UHF channels had been allocated to DR, E25 Svendborg, E29 Nibe, E31 Kobenhavn Vest and Thisted, E34 Nakskov, E37 Aabenraa, E41 Tommerup, E42 Vordingborg, E44 Hadsten, E46 Videbaek, E51 Jyderup, E53 Varde, E54 Hedensted, E57 Tolne and E59 Ro and Viborg. Many readers find the Teletext service is a good source for the latest transmitter information so, on March 10 I checked CEEFAX page 698 and learnt from the BBC's engineering information that new stations are due in service in early April from Haverfordwest (Dyfed) carrying BBC 1 and 2 on Chs. 52 and 66 and ITV and CH4 on Chs. 56 and 68 respectively, Long Compton (Warwickshire) with BBC 1 and 2 and ITV and CH4 on Chs. 22, 28, 25 and 32 and Penrhiwceiber (mid-Glamorgan) with BBC 1 and 2 on Chs. 57 and 63 and ITV and CH4 on Chs. 53 and 60. The antennas for the latter two are vertically polarised. Engineering Information from the IBA can also be found on ORACLE, ITV page 297 and CH4 page 697 and it's worth taking a look at their weather and shipping forecast pages.

Tropospheric

John Woodcock received pictures from France (CANAL+) in Band III at varying strengths between 1000 and 1530 on February 16, 19 and 24 and I saw programmes and adverts from this station, on system 'L' Ch. 5 with my YOKO TVC8M, when the high pressure was falling from 30.7in (1039mb) to 30.6in (1036mb) between 1800 and 1904 on the 22nd. Around this time I found weak pictures from Belgium and German transmitters on Chs. E8 and 9 and for a time around 2100, **Rob Mannion** (Dorset), the Editor of our sister magazine *Practical Wireless*, lost the u.h.f. signal from Rowridge (IOW) completely and commented about the high level of co-channel interference on other 'local' stations.

While parked on high ground at a coastal site south of Montrose at 1200 on March 3, George Garden received "strong grain free colour pictures" from the ITV transmitters for Border and Tyne Tees TV at Eymouth and Chatton on Chs. 23 and 49 respectively and next day, David Glenday found nothing more exotic than Emley Moor causing line-pairing on Tay Bridge and Bilsdale surging in over Eymouth occasionally. The already high pressure reached a record peak of 30.9in (1046mb) at midday on the 3rd, Fig. 12, [see Band II DX for full week's chart] and during the afternoon of the 4th there was a short opening and Rob again found co-channel interference on the u.h.f. band. Simon Hamer logged pictures from Belgium (RTBF1, Ch. E8) and France (CANAL+, Ch. L5) in Band III and Belgium (BRT1 and 2), France (TDF), Holland (NEDS1, 2 and 3) and Ireland (RTE1 and 2) in the u.h.f. bands on the 18th, Czechoslovakia (CST1, Chs. R6 and 10), Germany (ARD/HR1 and RTL PLUS, "now operating from Cologne" [*WRTVH*] both on Ch. E7, NDR1 on Ch. E10 and WDR1 on Chs. E9 and 11), Norway (NRK, Ch. E11), Poland (TVP on Ch. R8) and Sweden (SVT1, Chs. E6 and 9) in Band III and Czechoslovakia (CST2), Germany (ARD/HESSEN, NDR3, RTL PLUS, SAT1, WDR1, SSVC, WEST3 and ZDF) on their respective spots in Bands IV and V during a super opening on the 22nd, Austria (ORF1, Chs. E5 and 8), Germany (SWF1, Ch. E8) and Switzerland (+PTT/SRG1, Chs. E6 and 7) in Band III and Austria (ORF2), Germany (SWF3/BADN and ZDF) and

Fig. 1: S.E. Asia

Fig. 2: Dubai

Fig. 3: Malaysia

Fig. 4: Italy

Fig. 5: Sweden

Fig. 6: Russia

SEEN & HEARD

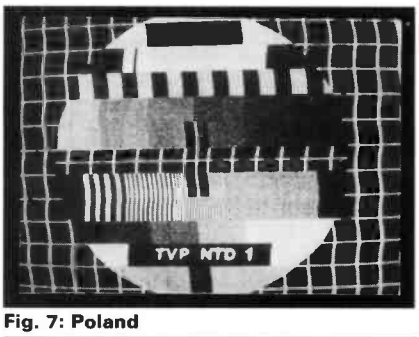

Fig. 7: Poland

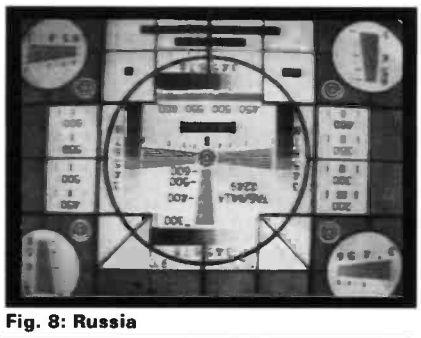

Fig. 8: Russia

Fig. 9: Lahore

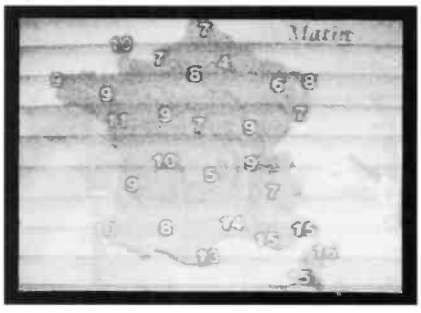

Fig. 10: France

Fig. 11: W. Germany

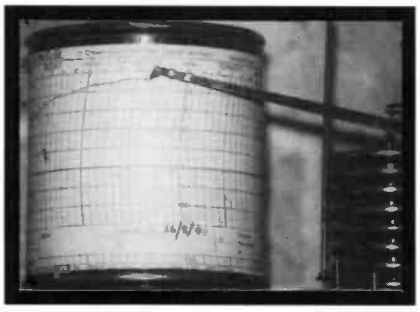

Fig. 12: 1046mb on Ron's barograph.

Switzerland (+PTT/TSS1) in the u.h.f. band on the 23rd and his haul for this time finaly ended on March 7 when he received pictures from Belgium, France, Germany and Spain (TVE1, Ch. E9) in all bands. Simon now has a QSL card from Services Sound and Vision Corporation (UK) (SSVC) in Germany confirming his reception of their signals on Ch. E48 on the 22nd. For those readers with rotatable v.h.f. and u.h.f. antennas it is worth tuning though both bands, in all directions, when there is a tropospheric opening just in case its effect has spread to many directions and increased the range of some or most u.h.f. transmitters. While the pressure was falling from 30.5in (1032mb) at midnight on the 12th to 30.3in (1026mb) to midday on the 13, another of these typical short-lived tropo-openings occurred giving some co-channel interference in Bands IV and V and for me, weak pictures from Canal+ on Ch. L5.

YOUR NEXT THREE DEADLINES ARE: MAY 14 & JUNE 11 & JULY 9

LONG MEDIUM & SHORT

Brian Oddy G3FEX
Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

At the last World Administrative Radio Conference (WARC) it was decided to adopt the single sideband (s.s.b) mode for s.w. transmissions in the future and receiver manufacturers were urged to commence the production of relatively inexpensive s.s.b. receivers by the end of 1990.

Some quite small s.s.b. receivers are now becoming available, for example the Panasonic RF B650, which tunes from 1.615 to 29.999MHz and can store 36 frequencies in its memory bank!

Long Wave DX

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC.

During a visit to Lecce, S.Italy **Carlo Rizzo** (York) was surprised to receive after dark BBC Radio 4 on 198kHz, which is shared by Burghead (50kW), Droitwich (500kW) and Westerglen (50kW). In Bridgwater, **Darren Beasley** decided to check the band after dark and he added five stations to his growing list of DX - see chart.

Since the fourth stage in the band plan was implemented on February 1 a number of changes in reception have been noted. In Derby **Roy Patrick** found the reception of Kalundburg, Denmark on the new frequency of 243kHz not as good as hitherto, but he found a marked improvement in the reception of Topolna, Czechoslovakia on 270kHz both during daylight and after dark. Reporting from Macclesfield, **Philip Rambaut** says "As regards my l.w. log, the interesting thing is the increase in signal strength of Minsk 279kHz". In contrast, **George Millmore** says that l.w. reception in Wootton, IOW is no different since the frequency changes.

The latest reports from DXers have again mentioned the 'splatter' from Atlantic 252 on adjacent channels - see LM&S in March issue. In Edinburgh, **Kenneth Buck** is wondering if frequencies higher than the usual 4kHz are being allowed to get into the transmitter. The splatter is mainly evident during musical items, which suggests that harmonics of the frequencies produced by cymbals and other musical instruments may be the cause. Further comments on this topic would be welcome from other listeners.

MW Transatlantic DX

At his new location in Grimsby, **Jim Willett** picked up the broadcasts from ten stations in Canada and the USA, four from the Caribbean area and Mexico, also one from S.America, quite an achievement, since he is now restricted to an antenna in the loft space. The earliest signals to reach him stemmed from WTOP in Washington DC 1500, CKLM in Lavel, Quebec 1570 and the Caribbean Beacon, Anguilla 1610, all rated as SIO 222 at 0050. At 0100 he heard CJYQ in St.John's, Newfoundland 930 at SIO 333 peaking to 433.

The broadcasts from WTOP have also been reaching **Dick Moon** in George, S.Africa, he rated their transmission as 32222. He also heard WLAC in Nashville, TN 1510, which rated as 22222 and two of the broadcasts from S.America: R.Sutatenza in Bogata, Colombia 810, rated as 32332 and R.Muhler in Sao Paulo, Brazil 1260, noted as 22222.

In Bristol, **Tim Shirley** found the conditions favoured Canada and he logged several interesting stations, see chart. Among them is CFYN in Sault Sainte Marie, ON 1050 which he heard at 0200, this station has not been mentioned before in this series, so his reception is subject to QSL.

Other MW DX

The sky wave signals from several of the low power stations in Spain and Portugal have been reaching our shores after dark. Among those noted was a 1kW transmission from RRE Evora, Portugal 927 and two 2kW transmissions from Spain: Alicante 1395 and Pamplona 1584, see chart.

Some of the high power transmissions from N.Africa also reached the UK via sky wave paths after dark. They stemmed from Djedeida, Tunisia 630 (600KW) and from four stations in Algeria: Ain Beida 531 (600KW), Les Trembles 549 (600KW), Algiers 891 (600/300KW) and Alger 981 (600/300KW).

MW Local Radio DX

George Millmore has informed me that a new ILR station is due to commence operation on the Isle of Wight, it may be radiating on 1242kHz by the time this issue of *SWM* arrives on the bookstalls. The studios of 'Isle of Wight Radio' are located in Newport and the transmitter site is Briddlesford Farm, Wootton. No doubt reception reports on their 0.5kW transmissions will be welcome from listeners on the IOW and from further a field too, see station addresses later.

Short Wave DX

During some days exceptionally high levels of solar activity have resulted in ionospheric disturbances and long distance transmissions have been rendered inaudible. From time to time prolonged fade-outs have occurred and reception of the broadcasts from many areas has then been seriously disrupted. During most days however, excellent conditions have prevailed in the h.f. bands.

When listening to the **25MHz**

SEEN & HEARD

(11m) broadcasts from Radio RSA in Johannesburg, S.Africa it is easy to forget that their signals have travelled over 8000km to reach the UK! In Newcastle-upon-Tyne, **Neil Wheatley** rated their 500kW transmission on 25.790 (Eng to UK and Ireland 1100-1200) as SIO 555 at 1100. Later, **Ted Agombar** (Norwich) tuned to their broadcast to the UK, Ireland, USA and Canada 25.790 (Eng 1400-1600) which he rated as 55545.

In Quebec, Canada **Alan Roberts** noted daily variations in the reception of Radio RSA's transmission, which ranged from 35434 to 15111. The propagation conditions were good during nineteen days of the month and Alan was able to hear the broadcasts from a total of eight stations, including the BBC via Daventry, UK which he rated as 35555 at best.

The broadcasts from the USSR may be about to recommence on 25.780, as **Kenneth Reece** (Prenton) has been hearing unscheduled transmissions during the morning. He noted English from 0655-1100, which rated as 44433; Swahili from 1100-1200 as 35444; also English from 1200-1300 as 34333.

Although long distance reception in the **21MHz (13m)** band has been disturbed by the effects of solar flares during some days, good reception has been noted at other times. The broadcasts from Radio Australia to Asia via Carnarvon 21.525 (Eng 0100-0630) have reached the UK quite well during some mornings. Whilst monitoring them on a daily basis, Kenneth Reece has noted variations in reception ranging from 34333 to inaudible around 0600. At 0630 they change to a new frequency: 21.775 (Eng to S.Asia 0630-1400). Variations in signal rating from 44433 to inaudible were noted by Kenneth around 0830. Quite often they put a potent signal into the UK until closedown!

Despite the effects of solar flares, generally good reception been noted during the broadcasts to Europe from Radio Japan via Moyabi, Gabon 21.690 (Sw, It, Fr, Eng, Jap 0530-0830), rated as 35543 at 0705 by **David Edwardson** in Wallsend; UAE Radio Dubai 21.605 (Ar, Eng 0615-1730), 44444 at 1030 by **Sheila Hughes** in Morden; Voice of Israel, Jerusalem 21.780 (Eng 1100-1130) - SIO 343 at 1105 by **Brian Hallett** in Burgess Hill; WCSN Scotts Corner, Maine 21.780 (Eng 1400-1600) 54555 at 1400 by **Ken Whayman** in Bexleyheath; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 35343 at 1518 by **Eddie McKeown** in Co.Down; WHRI Noblesville, USA 21.840 (Eng 1500-1700) 23333 at 1556 by **Andy Cadier** in Folkestone; WYFR via Okeechobee, Florida 21.615 (Eng, Ger, It 1600-1845) 55545 at 1615 by **John Nash** in Brighton; Radio Kuwait, Sulaibiyah 21.675 (Ar ?-1800) SIO 555 at 1400 by Neil Wheatley; Radio RSA Johannesburg, S.Africa 21.535 (Eng 1800-1900), heard at 1800 by **Julian Wood** in Elgin; also on 21.590 (Du to Nederlands 1800-1900) SIO 433 at 1800 by **Alf Gray** in Birmingham; Radio HCJB Quito, Ecuador 21.470 (Cz, Ger, Eng, Sw, Norw, Da, Fr 1800-2130) 44333 at 1920 by Ted Agombar; WYFR via Okeechobee, Florida 21.525 (Eng, Ar, Fr, Port, 1600-2100) 44444 at 2009 by **Alex Mackow** in Hornchurch.

Some of the 13m broadcasts to other areas were noted in the logs: Radio Finland via Pori 21.550 (Fin, Sw, Eng to S.E.Asia, Australia 0800-0925) rated as 54444 at 0910 by **Mark Selby** in Aldershot; BBC via Rampisham, UK 21.710 (Eng to N.Africa 0900-1745) 55555 at 0910 by **Rhoderick Illman** in Thumrait, Oman; Radio DW via Julich, W.Germany 21.650 (Eng to S.E.Asia, Pacific 0900-0950) 34333 at 0933 by **David Wratten** in Cambridge; RNE via Noblejas, Spain 21.570 (Sp to C.America 0930-1300) 44444 at 1022 by **Leo Barr** in Sunderland; RBI via Leipzig, GDR 21.465 (Eng, Ger to E.Asia 0845-1045 Sat, Sun) SIO 555 at 1035 by Darren Beasley; BRT via Wavre, Belgium 21.810 (Eng, Fr, Du to Africa 1000-1130) SIO 444 at 1110 by **John Coulter** in Winchester; RFI Paris 21.770 (Fr, Eng to S.E.Asia 1400-1600) 54344 at 1405 by **Chris Shorten** in Norwich; Radio DW via Cyclops, Malta 21.680 (Eng to S.Asia 1600-1650) SIO 222 at 1615 by Philip Rambaut; BBC via Ascension Island 21.660 (Eng to S.Africa 0700-1745) SIO 354 at 1645 by Kenneth Buck.

The **17MHz (16m)** broadcasts from Radio New Zealand Int. via their new 100KW transmitter at Rangitaiki on 17.680 (Eng to Pacific areas 1700-2110) have frequently reached the UK at remarkable stength! Reporting from Bungay, **Ron Pearce** says "The reception on my one transistor RX was on a par with Radio Australia". He rated their transmission as SIO 444 at 1830. In New Radnor, **Simon Hamer** has been hearing their broadcasts on a regular basis and he reports that reception is better on some nights than others, but quite often their signal is SIO 344 at 2100. Their early morning transmissions to E.Pacific areas on 17.680 (Eng to 0330-0610) have been monitored on a daily basis by Kenneth Reece. He noted variations in reception ranging from inaudible to 35433 at 0600. Later, they beam to W.Pacific areas on 17.680 (Eng 0630-0930) David Edwardson rated that broadcast as 34543 at 0805.

The broadcasts to S.Asia from Radio Australia via Carnarvon 17.715 (Eng 0100-0915) have also reached the UK well during some mornings. Listening at 0740, Chris Shorten rated them as 43343. The early morning transmission to S.Pacific areas from Radio Beijing, China 17.710 (Eng to S.Pacific 0830-1000) was noted as 34333 at 0830 by David Wratten. Some of the many broadcasts to other areas were logged: SRI via Schwarzenburg, Switzerland 17.670 (Eng to Australia, New Zealand 0745-1030), noted as 23232 at 0836 by Andy Cadier; RTM Tanger, Morocco 17.595 (Fr, Eng to Middle East 1400-1700) 53343 at 1550 by Mark Selby; VOA via Monrovia, Liberia 17.870 (Eng to C.Africa 1600-2200) 44333 at 1715 by Rhoderick Illman (Oman); RTV Algiers via Bouchaoui 17.745 (Eng, Sp to Africa 1900-2100) 33333 at 1930 by **Cliff Stapleton** in Torquay; VOA via Bethany, USA 17.800 (Eng to Africa 1600-2200) 44444 at 2030 by Sheila Hughes; RCI via Sackville, E.Canada 17.820 (Eng, Fr to Africa 1800-2200) SIO 344 at 2120 by Brian Hallett; WYFR via Okeechobee, Florida 17.610 (Eng, Ar, Fr, Port to W.Africa 1600-2245) 13121 at 2140 by Eddie McKeown; WHRI Noblesville, USA 17.830 (Eng to C.America 1800-0000) 23422 at 2312 by Leo Barr.

Also noted were some of the broadcasts to Europe: Radio Sophia, Bulgaria 17.825 (Eng 0730-0800), rated as SIO 444 at 0745 by **Francis**

Local Radio DX Chart

Freq kHz	Station	ILR BBC	Power (kW)	DXer
585	R.Solway	B	2.00	G,M,Q,V
603	Invicta Snd(Coast)	I	0.10	D,N,P,Q,T,W
603	R.Gloucester	B	0.10	D,G,J*,Q,S*,W
630	R.Bedfordshire	B	0.20	B*,D,N,D,P,Q,S*,T,W
630	R.Cornwall	B	2.00	G,N,Q
657	R.Clwyd	B	2.00	D,G,H,M,N,Q,W
666	DevonAir R	I	0.34	L,N,Q,W
666	R.York	B	0.80	H,L,V,W
729	BBC Essex	B	0.20	L,N,T,W
738	Hereford/Worcester	B	0.037	D,W
756	R.Cumbria	B	1.00	H,M,V
756	R.Shropshire	B	0.63	D,G,N,W
765	BBC Essex	B	0.50	L,N,P,T,W
774	R.Kent	B	0.70	L,N,O,P,R,T,W
774	R.Leeds	B	0.50	D,G,H,M
774	Severn Sound	I	0.14	N,Q,S*
792	Chiltern R	I	0.27	P,T,W
801	R.Devon	B	2.00	M*,N,W
819	Hereford/Worcester	B	0.037	W
828	2CR	I	0.27	D,N
828	R.WM	B	0.20	D
828	R.Aire	I	0.12	H
828	Chiltern R	I	0.20	P,T,W
837	R.Cumbria	B	1.50	E,G,H
837	R.Leicester	B	0.45	D,L,N,P,S*,W
855	R.Devon	B	1.00	F,K,N
855	R.Lancashire	B	1.50	D,G,H,I,V
855	R.Norfolk	B	1.50	H,L,P,T,W
873	R.Norfolk	B	0.30	A*,D,H,L,N,O,P,T,W
936	GWR (Brunel R.)	I	0.18	N,P,Q,W
945	R.Trent (GEM-AM)	I	0.20	D,G,P,S*,W
954	DevonAir R	I	0.32	N,P,W
954	R.Wyvern	I	0.16	G,W
990	R.Aberdeen	B	1.00	H,M*
990	Beacon R. (WABC)	I	0.09	D,Q*,W
990	R.Devon	B	1.00	M,N,P
990	Hallam R.(C.Gold)	I	0.25	M*,W
999	Red Rose R	I	0.80	G
999	R.Solent	B	1.00	L,N,P
999	R.Trent (GEM-AM)	I	0.25	J*,W
1026	R.Cambridgeshire	B	0.50	A*,L,P,T,W
1026	R.Jersey	B	1.00	F*,N,P,Q
1035	R.Kent	B	0.50	A*,L,P,T,W
1035	NorthSound R	I	0.78	H,I*,V
1035	R.Sheffield	B	1.00	D,G
1035	West Sound	I	0.32	M
1107	Moray Firth R	I	1.50	M*
1107	R.Northampton	B	0.50	D,M,N,P,W
1116	R.Derby	B	1.20	D,G,K,O,W
1116	R.Guernsey	B	0.50	F*,L,N,P,W
1152	R.Broadland	I	0.83	W
1152	R.Clyde (Clyde 2)	I	3.60	I*
1152	LBC (L.Talkback R)	I	23.50	L*,N,P,Q*
1152	Metro R. (GNR)	I	1.80	V
1152	Piccadilly R	I	1.50	E,G
1161	R.Bedfordshire	B	0.10	M*,S*,W
1161	R.Sussex	B	1.00	L*,N,P
1161	R.Tay	I	1.40	I*,M*
1161	Viking R.(Gold)	I	0.35	G,W
1170	R.Orwell	I	0.28	W
1170	Signal R	I	0.20	D,G
1170	TFM Radio (GNR)	I	0.32	H,V
1170	Ocean Sound	I	0.12	L,N,P
1242	Invicta Snd(Coast)	I	0.32	L*,N,P,W
1251	Saxon R	I	0.76	A,M*,P,R
1260	GWR (Brunel R.)	I	1.60	N,W
1260	Marcher Sound	I	0.64	G
1260	Leicester (GEM-AM)	I	0.29	D,W
1260	R.York	B	0.50	H
1278	Pennine R.(C.Gold)	I	0.43	E,H
1305	R.Hallam (C.Gold)	I	0.15	G,W
1305	Red Dragon R	I	0.20	L,M*,N,W
1323	R.Bristol	B	0.63	M
1323	Southern Sound	I	0.50	L,N,P,W
1332	Hereward R	I	0.60	M*,S*,T,W
1332	Wiltshire Sound	B	0.30	N,P
1359	Essex R.(Breeze)	I	0.28	P,T,W
1359	Mercia Snd(Xtra-AM)	I	0.27	W
1359	Red Dragon R	I	0.20	M*
1359	R.Solent	B	0.85	N
1368	R.Lincolnshire	B	2.00	O,W
1368	R.Sussex	B	0.50	L*,N,P,T
1368	Wiltshire Sound	B	0.10	N,W
1413	Sunrise R	I	?	P,T
1431	Essex R.(Breeze)	I	0.35	C*,L*,T,W
1431	Radio 210	I	0.14	N,P
1449	R.Cambridgeshire	B	0.15	N,W
1458	GLR	B	50.00	D,N,P,U,W
1458	GMR	B	5.00	D,E,G,M*
1458	R.Newcastle	B	2.00	I*,M*,V
1458	Radio WM	B	5.00	D,W
1476	County Sound(Gold)	I	0.50	L,N,P,W
1485	R.Humberside	B	1.00	H,W
1485	R.Merseyside	B	1.20	E*,G,M
1485	R.Oxford	B	0.50	W
1485	R.Sussex	B	1.00	N,P
1503	R.Stoke-on-Trent	B	1.00	G,M*,N,W
1521	R.Mercury	I	0.64	L,N,P,W
1521	R.Nottingham	B	0.50	W
1530	R.Essex	B	0.15	L,W
1530	Pennine R.(C.Gold)	I	0.74	G,I*,M*
1530	R.Wyvern	I	0.52	M*,N
1548	R.Bristol	B	5.00	M*,N
1548	Capital R. (Gold)	I	97.50	L*,N,P,W
1548	R.City	I	4.40	E*,F*
1548	R.Cleveland	B	1.00	H,V
1548	R.Forth (Max AM)	I	2.20	I*,M*
1548	R.Hallam	I	0.74	M*
1557	R.Lancashire	B	0.25	G
1557	Chiltern R	I	0.76	P,W
1557	Ocean Sound	I	0.50	N,P
1584	R.Nottingham	B	1.00	M*,W
1602	R.Kent	B	0.25	L,N,P,W

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

DXers:
A: Ted Agombar, Norwich.
B: Thomas Barnett, Slough.
C: Leo Barr, Sunderland.
D: Arthur ishop, near Buxton.
E: Scott Caldwell, Warrington.
F: Robin Clark, Plymouth.
G: Noel Dean, Wigan.
H: Adrian Don, Whitley Bay.
I: Peter Easton, Edinburgh.
J: Robin Harvey, Bourne.
K: Francis Hearne, Bristol.
L: Sheila Hughes, Morden.
M: Eddie McKeown, Co.Down.
N: George Millmore, Wootton, I.O.W.
O: Alex Radulovic, Burton-upon-Trent.
P: Mark Selby, Aldershot.
Q: Tim Shirley, Bristol.
R: Chris Shorten, Norwich.
S: Alan Smith, Northampton.
T: Phil Townsend, London.
U: Ted Walden-Vincent, Gt.Yarmouth.
V: Neil Wheatley, Newcastle-upon-Tyne.
W: David Wratten, Cambridge.

SEEN & HEARD

Hearne in Bristol; Radio Cairo, Egypt 17.670 (Ar 1300-1900) 44444 at 1301 by **Darran Taplin** in Brenchley; Radio Bucharest, Romania 17.850 (Eng 1300-1356) SIO 544 at 1310 by Neil Wheatley; RNE Spain 17.730 (Sp 1030-1900) SIO 444 at 1648 by John Coulter; WYFR via Okeechobee, Florida 17.750 (Eng 1700-1745) SIO 333 at 1700 by Darren Beasley; Radio Surinam Int via RNB Brazil 17.755 (Du, Eng 1700-1750) SIO 322 at 1700 by Philip Rambaut; RCI via Sackville, Canada 17.875 (Hung, Cz, Eng, Fr, Uk, Russ 1830-2100) 44434 at 1935 by Ted Agombar; Radio HCJB Quito, Ecuador 17.790 (Cz, Fr, Ger, Sw, Norw, Da, Eng, Sp 1800-2230) 33333 at 2118 by Alex Mackow.

In the **15MHz (19m)** band Radio Australia has adopted a new frequency: 15.465 (Eng to ? 2100-?) 43434 at 2120 by Cliff Stapleton. Their transmission to Asia via Carnarvon 15.245 (Eng 1500-1830) was rated as SIO 322 at 1505 by Philip Rambaut. Later, their broadcast in Chinese to C.Asia via Darwin 15.170 (2200-0000) was rated as 33322 at 2210 by **Jim Cash** in Swanwick.

Among the many broadcasts to Europe, generally good reception was noted from Radio Japan via Moyabi, Gabon 15.325 (Eng, Jap 0700-0900), rated as 34333 at 0706 by Kenneth Reece; Radio Sophia, Bulgaria 15.160 (Eng 0730-0800) SIO 444 at 0730 by Francis Hearne; ISBS Reykjavik, Iceland 15.770 (Ice 1215-1245) 45554 at 1215 by **John Parry** in Northwich; LJB Tripoli, Libya 15.415 (Ar 1745-0430) SIO 444 at 1800 by Neil Wheatley; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) SIO 444 at 1850 by Darren Beasley; Radio HCJB Quito, Ecuador 15.270 (Cz, Ger, Eng, Sw, Norw, Da, Fr 1800-2200) 43343 at 1910 by Chris Shorten; RCI via Sackville, Canada 15.325 (Eng, Ger, Pol, Hung, Russ, Uk 1545-2130) SIO 555 at 1950 by Kenneth Buck; VOA via Tangier, Morocco 15.205 (Eng 1700-2200) SIO 555 at 2000 by **Thomas Barnett** in Slough; WINB Red Lion, USA 15.185 (Eng 2003-2245) 25232 at 2045 by Eddie McKeown; WRNO New Orleans, USA 15.420 (Eng 1600-0000) 13232 at 2102 by Andy Cadier; WWCR Nashville, USA 15.690 (Eng 1700-0200) 35333 at 2000 by Roy Patrick; Radio Korea, Seoul 15.575 (Ar, It, Eng, Sp, Port, Ger 1645-2300) 24433 at 2244 by Leo Barr.

Many of the broadcasts to target areas outside Europe were also logged, including the Voice of Greece, Athens 15.630 (Gr, Eng to E.Asia 1000-1050), noted as 42131 at 1041 by Mark Selby; Radio Yugoslavia, Belgrade 15.325 (Eng to USA 1300-1330) 54545 at 1300 by **Alex Radulovic** in Burton-on-Trent; Radio DW via Wertachtal, W.Germany 15.595 (Eng to S.Asia 1600-1650) 54555 at 1600 by Ken Whayman; Radio Kuwait, Sulaibiyah 15.495 (Ar to N.Africa 0500-2300) SIO 233 at 1649 by **Ted Walden-Vincent** in Gt.Yarmouth; Radio Norway via Kvitsoey 15.265 (Eng to Middle East, Africa 1800-1900) 44343 at 1800 by Sheila Hughes; Africa No.1. Gabon 15.475 (Fr, Eng to W.Africa 1600-2100) 55344 at 1903 by **Robin Clark** in Plymouth; KUSW Salt Lake City, USA 15.650 (Eng to Canada 1500-2200) 24423 at 1907 by Darren Taplin; BBC via Ascension Island 15.400 (Eng to Africa 1615-2300) 55444 at 1920 by Ted Agombar; RCI via Sackville, E.Canada 15.150 (Fr, Eng to Africa 2100-2200) SIO 333 at 2120 by Brian Hallett; VOA via Greenville, USA 15.580 (Eng to Africa 1600-2200) 33333 at 2129 by Alex Mackow; Radio Denmark, Copenhagen via NRK 15.160 (Eng to W.Africa 2130-2145) SIO 455 at 2130 by Simon Hamer; WCSN Scotts Corner, Maine 15.300 (Eng to W.Africa 2200-0000) 22322 at 2211 by **Robin Harvey** in Bourne.

Some of the **13MHz (22m)** broadcasts to Europe were noted in the logs: Radio Korea, Seoul 13,670 (Eng 0800-0930), rated as 33232 at 0856 by Rhoderick Illman (Oman); WHRI Noblesville, USA 13.760 (Eng 1700-0000) 35433 at 1700 by Roy Patrick; Voice of the UAE in Abu Dhabi 13.605 (Ar 1600-2130) SIO 555 at 1710 by Kenneth Buck; RCI Montreal, Canada 13.650 (Uk, Fr, Eng, Pol, Russ, Ger 1500-1800) SIO 444 at 1728 by Philip Rambaut; Radio Kuwait, Sulaibiyah 13.610 (Eng 1800-2100) 44444 at 1915 by Darran Taplin; WCSN Scotts Corner, Maine 13.770 (Eng 2000-2200) 54444 at 2030 by Ken Whayman; Voice of the UAE in Abu Dhabi 13.605 (Eng 2200-0000) 45545 at 2232 by Robin Clark; ISBS Reykjavik, Iceland 13.855 (Ice 2300-2335) 34333 at 2300 by Alan Roberts (Quebec).

A few of the many broadcasts to other areas were also logged: KSDA Agat, Guam 13.720 (Eng, Ind to S.E.Asia 1000-1300), noted as 33333 at 1136 by Kenneth Reece; SRI via Sottens, Switzerland 13.635 (Eng, Fr, Ger to S.Asia 1315-1500) 55555 at 1345 by Chris Shorten; Radio Prague, Czechoslovakia 13.715 (Cz, Ar, Eng, Fr, Ger to Asia, Middle East 1400-2125) 54555 at 1530 by John Nash; Radio Pakistan, Islamabad 13.665 (Eng to Middle East 1600-1630) SIO 444 at 1630 by Darren Beasley; KVOH Rancho Simi, California 13.695 (Sp to Caribbean ?-?) 23333 at 2320 by Leo Barr; WSHB Cypress Creek, USA 13.760 (Eng to C.America, S.America 0000-0200) 45345 at 0000 by Eddie McKeown.

Quite a number of the **11MHz (25m)** broadcasts to Europe were noted in the reports. They stemmed from Radio Australia via Shepparton 11.910 (Eng 0400-0630), rated as 22332 at 0613 by Kenneth Reece; Radio Finland via Pori 11.755 (Fin, Ger, Sw, Eng 0515-2230) SIO 444 at 0745 by Francis Hearne; Vatican Radio, Rome 11.740 (It, Eng, Fr, Sp 0610-0830) 44553 at 0750 by John Parry; Voice of Israel, Jerusalem 11.585 (Eng, Fr 1100-1200) 34433 at 1100 by Sheila Hughes; RNE via Arganda, Spain 11.920 (Sp 1030-2230) SIO 444 at 1247 by John Coulter; Radio Bucharest, Romania 11.940 (Eng 1300-1356) 54344 at 1300 by Mark Selby; RNE Arganda, Spain 11.790 (Fr, Eng 1800-2200) 54444 at 1912 by David Wratten; Radio Damascus, Syria 12.085 (Ger, Fr, Eng 1800-2100) 54554 at 2001 by Jim Cash; AIR via Aligarh, India 11.620 (Eng, Hi 1845-2230) SIO 333 at 2120 by Alf Gray; Voice of Israel, Jerusalem 11.605 (Fr, Eng, Yi 2200-2325) 54544 at 2230 by Ken Whayman and as 43443 at 2200 by Dick Moon (S.Africa); Voice of the UAE in Abu Dhabi 11.985 (Eng 2200-0000) 23344 at 2210 by Robin Clark; VOFC via Okeechobee, Florida 11.805 (Chin, Fr, Ger, Eng 2000-2300) SIO 333 at 2245 by Darren Beasley; Radio Japan via Moyabi, Gabon 11.835 (Jap, Eng 2200-0000) 43434 at 2330 by Cliff Stapleton.

Some of the many broadcasts to other areas were also logged: Radio Tirana, Albania 11.835 (Eng to S.E.Asia 0800-0830), noted as 44333 at 0810 by Rhoderick Illman (Oman); Radio Prague, Czechoslovakia 11.685 (Eng, Cz to Australia, Pacific 0730-0930) SIO 443 at 0830 by Brian Hallett; Radio Australia via Shepparton 11.720 (Eng to C.Pacific area 0830-0930) 24543 at 0835 by David Edwardson; BBC via Kranji, Singapore 11.750 (Eng 0900-1615) SIO 322 at 1350 by **Alan Smith** in Northampton; Voice of the Mediterranean via Cyclops, Malta 1400-1600) 43544 at 1405 by Eddie McKeown; AWR Agat, Guam 11.980 (Eng to S.Asia 1600-1700) 33543 at 1600 by John Nash; Voice of Greece, Athens 11.645 (Gr, Eng to Africa 1800-1850) SIO 455 at 1840 by Kenneth Buck; Radio DW via Trincomalee, Sri Lanka Eng to S.E.Asia 2100-2150) SIO 344 at 2100 by Simon Hamer; Radio Kuwait, Sulaibiyah 11.990 (Ar to Middle East 1500-2300) SIO 223 at 2120 by Ted Walden-Vincent; RCI via Sackville, Canada 11.880 (Eng, Fr to Africa 2100-2200) 35433 at 2130 by Darran Taplin; Radio RSA Johannesburg, S.Africa 11.745 (Port, Sp to S.America 2200-0100), heard at 2220 by Scott Caldwell in Warrington; Radio HCJB Quito, Equador 11.775 (Eng to USA 0030-0700) 43233 at 0350 by Chris Shorten.

Some of the **9MHz (31m)** broadcasts noted in the logs stemmed from distant places: BBC via Antigua, W.Indies 9.640 (Eng to C.America 0545-0815), noted as 32433 at 0522 by Kenneth Reece; WMLK Bethal, USA 9.465 (Eng to Europe, Middle East 0400-0700) 24333 at 0540 by

LongWave DX Chart

Freq kHz	Station	Location	Power (W)	DXer
153	Bechar	Algeria	1000	P*
153	DLF Donebach	Germany (W)	500	A,B*,D,G*,H*,I,J,K,N,O*,Q,S
153	Brasov	Romania	1200	N*
162	Allouis	France	2000	A,B*,D,H*,I,J*,K,N,O*,Q,S
171	Medi 1-Nador	Morocco	2000	N*,Q
171	Kaliningrad	USSR	1000	D,H*,I,J,N
177	Oranienburg	Germany (E)	750	B*,D,G*,H*,J,K,N*,Q
183	Saarlouis	Germany (W)	2000	B*,D,F*,H*,I,J*,K,N,D,S
189	Motala	Sweden	300	C*,D,H*,N*
189	Tbilisi	USSR	500	K
198	BBC Droitwich	UK	500	A,B*,E*,F,H*,I,K,N,O*
198	BBC Westerglen	UK	50	D,J
207	DLF Munich	Germany (W)	500	B*,D,H*,K,N*,S
207	Azilal	Morocco	800	N*,Q
216	Roumoules	Monaco	1400	A,D,E*,H*,I,J,K,N,O,Q,S
216	Oslo	Norway	200	C*,D,N
225	Konstantinow	Poland	2000	A,D,E*,F*,G*,H*,I*,J,K,N,D*,P*,Q,S
234	Junglinster	Luxembourg	2000	A,B*,D,G*,H*,I,J,K,N,O*,Q,S
243	Kalundborg	Denmark	300	B*,D,G*,H*,I,J,L,N,S
252	Tipaza	Algeria	1500	C*,D*,E*,H*,I,K*,N*
252	Lahti	Finland	200	C*,D*
252	Atlantic 252	S.Ireland	500	A,B*,D,F,G*,H*,I,J,K,M,N,O*,Q,R,S
261	Burg (R.Volga)	Germany (E)	200	C*,G*,I,N*,S
261	Moscow	USSR	2000	D,E*,H*,K*,P*,Q
270	Topolna	Czechoslovakia	1500	D,E*,G*,H*,I,J,K,L,N,O*,S
279	Minsk	USSR	500	D,H*,J,K*,N*,P*

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

DXers:
A: Ted Agombar, Norwich.
B: Thomas Barnett, Slough.
C: Darren Beasley, Bridgwater.
D: Kenneth Buck, Edinburgh.
E: Jim Cash, Derby.
F: Robin Clark, Plymouth.
G: Sheila Hughes, Morden.
H: Alex Mackow, London.
I: George Millmore, Wootton, IOW.
J: Ike Odoom, Glasgow.
K: Fred Palliant, Storrington.
L: Roy Patrick, Derby.
M: Alex Radulovic, Burton-upon-Trent.
N: Philip Rambaut, Macclesfield.
O: Mark Selby, Aldershot.
P: Tim Shirley, Bristol.
Q: Alan Smith, Northampton.
R: John Stevens, Largs.
S: Phil Townsend, London.

Chris Shorten at his listening post in Norwich.

SEEN & HEARD

Medium Wave DX Chart

Freq kHz	Station	Country	Power (kW)	DXer
531	Ain Beida	Algeria	600	T*
531	Torshavn	Faroe Is	5	W*
531	Leipzig	Germany (E)	100	H,M*,P*
540	BRT-2 Wavre	Belgium	150/50	H,J*,L,M*,N,T,V,W*,X
549	Les Trembles	Algeria	600	T*
549	DLF Bayreuth	Germany (W)	200	H,J*,M*,P*,T*,W*,X*
558	Espoo	Finland	100	N
558	Valencia	Spain	20	M*
567	West Berlin	Germany (W)	100	T*
567	RTE-1 Tullamore	S.Ireland	500	D*,F,H,J,L,M*,N,P,W*,X
576	R.DDR Schwerin	Germany (E)	250	H
576	Stuttgart	Germany (W)	300	H,M*,N,P*,T*,W*
585	Orf Wien	Austria	600	W*
585	FIP Paris	France	8	N,X
585	RNE-1 Madrid	Spain	200	P*,T*,W*
585	BBC-R3 Dumfries	UK	2	H
594	HRF Frankfurt	Germany (W)	400	H,L,M*,T
594	Muge	Portugal	100	N,Q*,W*
603	Lyon	France	300	M*,W*
603	Sevilla	Spain	20	C*
603	BBC-R4 Newcastle	UK	2	H,N,P
612	RTE-2 Athlone	S.Ireland	100	F,H,J,M*,P,W*,X
621	RTBF-1 Wavre	Belgium	300	H,L,N,P*,T,W*,X
621	Barcelona	Spain	10	P
630	Vigra	Norway	100	K*,M*,N
630	Tunis-Djedeida	Tunisia	600	Y*
639	Liblice	Czechoslovakia	1500	H,M*
639	La Coruna	Spain	100	M*,W*,Y*
648	BBC Orfordness	UK	500	J*,L,M*,N,R*,T*
657	Burg	Germany (E)	250	H,T
657	Napoli	Italy	120	Y*
657	RCE-2 Madrid	Spain	20	W*,Y*
657	BBC-Wales Wrexham	UK	2	P,W*
666	Bodenseesender	Germany (W)	300/180	H,W*
666	Lisboa	Portugal	135	M*
675	Marseille	France	600	M*,W*
675	Hilversum-3 Lopic	Holland	120	H,K*,L,M*,N,T*,V,W*,X*
684	RIAS via Hof-Saale	Germany (E)	100	N
684	RNE-1 Sevilla	Spain	250	M*,N,W*
684	Beograd	Yugoslavia	2000	R*,Y*
702	Aachen/Flensburg	Germany (W)	5	T*,W*
702	Monte Carlo	Monaco	300	Y*
702	Zamora	Spain	5	W*
711	Rennes 1	France	300	H,N,T,X
711	Heidelberg	Germany (W)	5	W*
720	BBC-R4 Lisnagarvey	N.Ireland	10	F,H,P
720	BBC-R4 Lots Rd London	UK	0.5	N,W*
729	RTE-1 Cork	S.Ireland	10	M*,W*
729	Oviedo	Spain	50	K*,T*,W*
738	Paris	France	4	N
738	Poznan	Poland	300	K*,M*,T*
738	RNE-1 Barcelona	Spain	250	W*,Y*
747	Hilversum-2 Flevo	Holland	400	L,M*,N,P,T*,X
756	Brunswick	Germany (W)	800/200	H,M*,P,W*
765	Sottens	Switzerland	500	H,T*
774	BBC-R4 Enniskillen	N.Ireland	1	M*,P
774	RNE-1 San Sebastian	Spain	60	K*,W*
783	Burg	Germany (E)	1000	C*,H,K*,L,M*,P*,T*
792	Limoges	France	300	N
792	Sevilla	Spain	20	M*
792	BBC R.Ulster	UK	1	G,J*
801	BRF via Munich	Germany (W)	420	P*,T*
801	Castellon	Spain	5	M*
810	SER Madrid	Spain	20	P*,T*
810	BBC-Scot.Westergien	UK	100	F,G,H,J,L,M*,N,P,T*,W*,Y
819	Sud-Radio	Andorra	900	J*
837	Nancy	France	200	H,T*
837	R.Popular, Sevilla	Spain	10	T*,W*
846	Rome	Italy	540	N,S*,T*,W*
855	RAIS Berlin	Germany (W)	100	H,M*
855	Murcia	Spain	125	N,T*,W*
864	Santah	Egypt	500	W*
864	Paris	France	300	H,L,N,T
873	AFN Frankfurt	Germany (W)	150	H,I*,J*,M*,P*,T*
882	Wachenbrunn (SDDR)	Germany (E)	250	P*
882	BBC-Wales Washford	UK	70	G,H,K,M*,N,P,R,T,X
891	Algiers	Algeria	600/300	M*,N,W*,Y*
900	Yaounde	Cameroon	20	O*
900	Milan	Italy	600	M*,P*,S*,T*,W*
909	BBC-R2 Moorside Edge	UK	200	F
909	BBC-R2 Westerglen	UK	50	H*,P
918	R.Intercont. Madrid	Spain	20	T*,W*,Y*
918	R.Ljubljana	Yugoslavia	600/100	R*,T*
927	BRT-1 Wolvertem	Belgium	300	H*,L,N,T,W*
927	RRE Evora	Portugal	1	Q*
936	Radio Bremen	Germany (W)	100	H*,L,M*,T,W*
945	Toulouse	France	300	L,M*,T*
954	Dobrochov	Czechoslovakia	400	T*
963	Pori	Finland	600	C*,D*,J*,L,M*
963	Paris	France	8	N
972	NDR/WDR Hamburg	Germany (W)	300	H*,L,M*,N,T*

Freq kHz	Station	Country	Power (kW)	DXer
981	Alger	Algeria	600/300	J*,N,Q,Z*
981	Coimbra	Portugal	10	W*
990	BBC-Redmoss	UK	1	H*
999	Hoyerswerda	Germany (E)	20	W*
999	R.Popular, Madrid	Spain	20	W*
1008	Hilversum-5 Flevo	Holland	400	B,L,N,T,W*,X
1017	SWF Wolfsheim	Germany (W)	600	B,H*,L,M*,N,T*,W*
1035	Milan	Italy	50	M*,W*
1035	Prog.3 Lisbon	Portugal	120	W*
1044	DDR-1 Burg	Germany (E)	250	L,M*,T*
1053	BBC-R1 Burghead	UK	20	H*
1062	Kalundborg	Denmark	250	H*,K*,L*,M*,N
1071	Brest	France	20	N,T
1080	Katowice	Poland	1500	L*,M*,Y*
1089	BBC-R1 Westerglen	UK	50	H*
1098	Bratislava	Czechoslovakia	750	L*,U*
1098	Bologna	Italy	60	M*
1107	AFN via Munich	Germany (W)	40	M*
1107	BBC-R1 Wallasey	UK	0.5	G
1116	Bari	Italy	150	Y*
1125	La Louviere	Belgium	20	N,W*
1125	BBC Llandrindod Wells	UK	1	B,F,K
1125	Zagreb	Yugoslavia	200	M*
1134	Valencia	Spain	10	B,N,P*,W*
1134	Zadar	Yugoslavia	1200	H*,M*,N*,R*,W*
1143	Century R. Dublin	Ireland (S)	?	B,F,J,M*
1143	Kaliningrad	USSR	150	H*,K*,R*,T*,W*
1152	Lerida	Spain	10	W*
1161	Strasbourg (F.Int)	France	200	B,C*
1170	Bernburg	Germany (E)	20	M*
1179	Solvesborg	Sweden	600	A*,B,H*,K,L*,M*,N,R*,W*
1188	Kuurne	Belgium	5	B,N,T
1197	VOA via Munich	Germany (W)	300	H*,W*
1197	BBC-R3 Bournemouth	UK	0.5	N,T,W*
1197	BBC-R3 Enniskillen	N.Ireland	1.0	M*
1197	Minsk	USSR	50	U*,W*
1206	Bordeaux	France	100	Q,W*
1206	Wroclaw	Poland	200	K*,L*,M*,Y*
1215	BBC-R3 Moorside Edge	UK	100	F,M*
1215	BBC-R3 Westerglen	UK	50	H*
1224	COPE Madrid	Spain	20	W*
1233	Prague	Czechoslovakia	400	M*,P
1251	Huisberg	Netherlands	10	Q
1260	SER San Sebastian	Spain	10	K*
1260	Valencia	Spain	20	M*
1269	Neuminster	Germany (W)	600	B,C*,H*,L*,M*,T*,Y*,Z*
1278	Strasbourg	France	300	N
1278	RTE-2 Dublin/Cork	S.Ireland	10	B,F,M*,Z
1287	Litomysl/Liblice	Czechoslovakia	300/200	B,H*,K*,L*,M*,T*
1296	BBC Orfordness	UK	500	K,L*
1296	Baku	USSR	150	W*
1305	Marche	Belgium	10/5	L*,P*
1314	Kvitsoy	Norway	1200	H*,L*,M*,N,P*,T*,X
1314	Valladolid	Spain	10	W*
1323	R.Moscow via Leipzig	Germany (E)	150	C,P
1332	Pescara	Italy	25	Y*
1332	Rome	Italy	300	L*,W*,Y*
1341	BBC-Ulst.Lisnagarvey	N.Ireland	100	B,F,G,H*,N,P
1350	Nancy/Nice	France	100	J*,L*,N,P*,T*,W*
1359	RBI Berlin	Germany (E)	250/100	D*,K*,M*
1368	Manx Radio, Foxdale	IOM	20	F,G,H*,J,M*,P
1368	Venice	Italy	20	W*
1377	Lille	France	300	B,N,T,X,Z*
1377	Porto	Portugal	10	Q
1386	Kaunas	USSR	1000	H*,L*,U*
1395	R.Tirana via Lushnje	Albania	1000	J*,K*,M*,W*
1395	Alicante	Spain	2	W*
1404	Brest	France	20	B,N,T,Z*
1413	RCE Zaragoza	Spain	20	N,W*
1422	Heusweiler	Germany (W)	600	C,H*,L*,P*,T*,W*
1422	Saarbrucken	Germany (W)	1200/600	J*,N
1431	Dresden	Germany (E)	250	W*
1440	Marnach	Luxembourg	1200	E*,L*,M*,N,P,T*,W*,Y*
1449	BBC-R4 Redmoss	UK	2	H*,P
1467	Esfahan	Iran	200	W*
1467	TWR Monte Carlo	Monaco	1000/400	K*,L*,M*
1476	Wien-Bisamberg	Austria	600	L*,W*
1494	Leningrad	USSR	1000	H*,U*,W*
1503	Stargard	Poland	300	J*,K*,L*,M*,V*
1512	BRT Wolvertem	Belgium	600	C*,H*,K*,L*,N,Q*,T,V*,W*,Y*
1530	Vatican Radio, Rome	Italy	150/450	J*,K*,L*,W*,Y*
1539	DLF Mainflingen	Germany (W)	700	H*,J*,N,T
1539	Pec	Yugoslavia	10	W*
1557	Nice	France	300	J*
1557	R.Vilnius, Kaunas	USSR	75	L*
1566	Sarnen	Switzerland	300	L*
1575	RBI via Burg	Germany (E)	250	J*,L*
1575	Genoa	Italy	50	W*
1584	Pamplona	Spain	2	J*
1593	Langenberg	Germany (W)	400/800	C*,H*,J*,L*,M*,P*,T*,W*
1602	R.Onteniente	Spain	2	B

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

David Wratten; Radio HCJB Quito, Ecuador 9.610 (Cz, Sw, Norw, Da, Ger, Fr, Eng to Europe 0500-0830) 45554 at 0755 by John Parry; Radio Australia via Shepparton 9.580 (Eng to S.Pacific area 0800-2030) SIO 444 at 0750 by Simon Hamer; also 9.655 (Eng to S.Pacific, Europe 0700-1030) 43434 at 0930 by Cliff Stapleton; also 9.770 (Eng to S.Asia Eng 1000-1100) SIO 211 at 0950 by Philip Rambaut; WCSN Scotts Corner, Maine 9.840 (Eng to Europe 0800-1000) 45444 at 0900 by Ken Whayman; SLBC Colombo, Sri Lanka 9.720 (Eng 1200-1630) 24442 at 1511 by David Edwardson; Voice of Vietnam, Hanoi 9.840 (Eng to Europe 1600-1630) SIO 544 at 1623 by Darren Beasley; BBC via Kranji, Singapore 9.410 (Eng to S.Asia 1515-1830) 44444 at 1634 by John Nash; Radio Beijing, China 9.570 (Eng to Europe, S.E.Africa 1600-1755) 53333 at 1730 by Chris Shorten; ABC Brisbane, Australia 9.660 (Eng to N.E.Australia 1930-1402) SIO 333 at

DXers:
A: Ted Agombar, Norwich.
B: Darren Beasley, Bridgwater.
C: Scott Caldwell, Warrington.
D: Jim Cash, Swanwick.
E: Robin Clark, Plymouth.
F: Noel Dean, Wigan.
G: Adrian Don, Whitley Bay.
H: Peter Easton, Edinburgh.
I: Robin Harvey, Bourne.
J: Simon Holland, Douglas, IOM.
K: Sheila Hughes, Morden.
L: Alex Mackow, London.
M: Eddie McKeown, Co.Down.
N: George Millmore, Wootton IOW.
O: Dick Moon, George, S.Africa
P: Ike Odoom, Glasgow.
Q: Roy Patrick, Derby.
R: Alex Radulovic, Burton-upon-Trent.
S: Carlo Rizzo, York.
T: Mark Selby, Aldershot.
U: Tim Shirley, Bristol.
V: Chris Shorten, Norwich.
W: Alan Smith, Northampton.
X: Phil Townsend, London.
Y: Ted Walden-Vincent, Gt.Yarmouth.
Z: Neil Wheatley, Newcastle-upon-Tyne.

SEEN & HEARD

1935 by Alan Smith; Radio Pyongyang, N.Korea 9.325 (Eng, Fr, Russ, Kor, Sp, Ger 1300-2150) SIO 344 at 2001 by Kenneth Buck; AIR via Delhi, India 9.910 (Eng 2045-2230) 34433 at 2104 by Darran Taplin; RCI via Sackville, Canada 9.760 (Eng to Europe 2200-2300) SIO 544 at 2230 by Brian Hallett; AIR Delhi, India 9.535 (Eng to Asia 2245-0115) SIO 544 at 2315 by Ron Pearce.

While checking the **7MHz (41m)** band David Wratten picked-up the Voice of Nigeria, Lagos 7.255 (Eng, Fr, Ha to W.Africa) at 0505 (SINPO 43443); Eddie McKeown rated WYFR Okeechobee, Florida 7.355 (Eng to Europe 0700-0800) as 45454 at 0730; Roy Patrick noted WHRI Noblesville, USA 7.355 (Eng to USA, C.America 0800-1100) as 35333 at 0800; Jim Cash listened to Radio Australia via Carnarvon 7.205 (Eng to Europe, S.Asia 1430-2030) at 1624 (43323); Darran Taplin received Radio Korea, Seoul 7.550 (It, Fr, Kor, Ar, Ger, Eng, Sp to Middle East, E.Africa 1545-2345) at 2106 (33433); Alex Mackow heard AIR via Delhi 7.412 (Eng to Europe 1845-2230) at 2122 (33333); John Parry logged Cyprus BS, Limassol 7.180 (Gr to Europe 2215-2245) as 45554 at 2218; Robin Harvey tuned into Radio Yugoslavia, Belgrade 7.215 (Eng to Europe 2200-2245) at 2221 (32332); Ken Whayman heard Radio Vilnius, Lithuania 7.400 (Eng to USA 2300-2330) at 2300 (54555).

Many of the broadcasts in the 6MHz (49m) band are intended for listeners in Europe. They include Vatican Radio, Rome 6.248 (It, Eng, Fr, Sp 0700-0800) 13443 at 0740 by Andy Cadier; Radio Austria Int, Vienna 6.155 (Ger, Eng, Fr, Sp 0400-2300) SIO 333 at 0830 by Francis Hearne; Radio Nederlands via Flevo 5.955 (Du, Eng 1030-1225) 55555 at 1130 by Sheila Hughes; BBC via Daventry, UK

DXers:
A: Dick Moon, George, S.Africa.
B: Tim Shirley, Bristol.
C: Jim Willett, Grimsby.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
880	WCBS	New York, NY	0250	C
1000	WTAK	Huntsville, ALA	0345	C
1060	WAMT	Titusville, FL	0215	C
1110	WBT	Charlotte, NC	0200	C
1500	WTOP	Washington, D.C	0050	A,C
1510	WLAC	Nashville, TEN	?	A
		Canada		
550	CFNB	Fredericton, NB	0600	B
580	CFRA	Ottawa, ON	0330	C
590	VOCM	St.John's, NF	0300	C
620	CKCM	Grand Falls, NF	0310	C
930	CJYQ	St.John's, NF	0100	C
1050	CFYN	Sault St. Marie,ON	0200	B
1200	CFGO	Ottawa, ON	2300	B
1220	CHSC	St.Catharines, ON	0145	B
1570	CKLM	Lavel, PQ	0050	C
		C.America & Caribbean		
1010	XEXN	Ures Son, Mexico	0430	C
1210	R.Caraibes	Roseau, Dominica	0100	C
1570	Atlantic Beacon	Turks & Caicos Ils	0150	C
1610	Caribbean Beacon	The Valley,Anguilla	0005	C
		South America		
810	R.Sutatenza	Bogata, Columbia	?	B
1220	R.Globo	Rio, Brazil	0230	D
1260	RMuhler	Sao Paulo, Brazil	0000	B

Tropical Band Chart

Freq kHz	Station	Country	Time (UTC)	DXer
2.310	ABC Alice Springs	Australia	1900	H
2.325	ABC Tennant Creek	Australia	1900	H
2.340	Fuzhou	China	2127	E,G,R,S
2.380	R.Limeira	Brazil	2300	W
2.485	ABC Katherine	Australia	1900	H
2.560	Xinjiang	China	2300	E,G,S,W
3.200	Vos 1, Fuzhou	China	2130	W
3.205	R.Vale do Rio Maderia	Brazil	0000	S
3.220	CPBS 1, Beijing	China	2136	O
3.230	ELWA Monrovia	Liberia	1944	G,P
3.270	SWABC 1, Namibia	S.W.Africa	1914	P,Q
3.315	AIR Bhopal	India	0030	S
3.345	AIR Jammu	India	1900	W
3.365	GBC Radio 2	Ghana	2130	E,G,Q,W
3.905	AIR Delhi	India	1920	O,P
3.915	BBC Kranji	Singapore	2004	B,E,L,M
3.930	R.Capital	Transkei	2045	W
3.955	BBC Daventry	England	2100	D,E,F,M,R,V
3.960	RFE/RL Munich	W.Germany	2317	E,J
3.965	RFI Paris	France	2000	E,J,L,M,R,T
3.970	RFE Munich	W.Germany	2122	E,M
3.975	BBC Skelton	England	1925	D,E
3.980	VOA Munich	W.Germany	2115	D,E,L,M,T
3.985	R.Beijing, China	via SRI Berne	2130	E,F,G,I,J,L,M,R
3.985	SRI Berne	Switzerland	1830	D,E,K,M,R,T
3.990	VOA Monrovia	Liberia	0617	E
3.990	RFE Munich	W.Germany	2127	E,L,M
3.995	DW Cologne (Julich)	W.Germany	2005	A,D,E,J,L,M,R
4.000	Bofoussam	Cameroon	2300	W
4.035	PBS Xizang Lhasa	Tibet	0005	W
4.060	R.Moscow (Kharkov)	USSR	2132	E,J,L,M,R
4.080	R.Ulan Bator	Mongolia	2200	S,W
4.220	PBS Xinjiang	China	2318	E
4.460	R.Beijing	China	2143	O
4.500	Xinjiang	China	2303	E
4.545	Alma Ata	USSR	1700	O
4.635	R.Dushanbe Tadzhik	USSR	1845	P
4.735	Xinjiang	China	2323	E,G,J,R,U
4.740	R.Afghanistan	via USSR	1845	E,M,P
4.755	Sani Radio	Honduras	2350	W
4.760	Yunnan Kumming	China	0010	G
4.760	ELWA Monrovia	Liberia	2014	E,G
4.760	R.Frontera	Venezuela	0030	W
4.765	R.Moscow	via Cuba	0600	E,M
4.770	FRCN Kaduna	Nigeria	2100	E,G,M,W
4.775	RRI Jakarta	Indonesia	1618	G
4.785	R.Baku	USSR	2145	E,O,U
4.790	TWR Manzini	Swaziland	1757	E
4.795	R.Moscow (Kharkov)	USSR	2119	D,E,L,R
4.795	R.Peace & Progress	USSR	2200	C,E,J,S
4.800	AIR Hyderabad	India	0041	G
4.800	LNBS Lesotho	Maseru	1705	O
4.805	R.Nac.Amazonas	Brazil	2232	E
4.805	Voice of Kenya	Kenya	0100	W
4.810	R.Yerevan 2	USSR	2050	E,R
4.815	R.Beijing	China	1500	G
4.815	R.diff TV Burkina	Ouagadougou	2108	E,M,P
4.820	R.Moskva 4 (Khanty-M)	USSR	1645	R
4.825	V of Selva	Peru	?	N
4.825	R.Moskva 2 (Yakutsk)	USSR	2201	D,E,J
4.830	Gaborone	Botswana	1915	E,P
4.830	R.Tachira	Venezuela	0100	E
4.832	R.Reloj	Costa Rica	0700	G,U,W
4.835	RTM Bamako	Mali	1915	D,E,G,J,L,P,U
4.840	AIR Bombay	India	1655	O
4.845	ORTM Nouakchott	Mauritania	2100	E,M,P
4.850	R.Yaounde	Cameroon	2100	E,K,L,P,U
4.850	R.Tashkent 2	USSR	0025	J,M
4.855	R.Sana Yemem	Yemen	2030	S
4.860	AIR New Delhi	India	1432	K
4.860	R.Moskva 2 (Chita)	USSR	1655	R
4.860	R.Moscow (Starobelsk)	USSR	2116	D,E
4.865	PBS Lanzhou	China	2250	D,G,J
4.865	V of Cinaruco	Colombia	0132	E,G
4.870	R.Cotonou	Benin	1915	G,L,M,P,W
4.870	SLBC Colombo	Sri Lanka	?	N
4.875	R.Tbilisi	USSR	2047	E
4.880	SABC Radio 5	S.Africa	1915	C,E,I,P
4.885	R.Clube do Para	Brazil	0723	E
4.885	R.Beijing	China	1500	G
4.885	Voice of Kenya	Kenya	1850	P
4.890	ORTS Dakar	Senegal	0400	W
4.895	R.Moscow (Kalinin)	USSR	2156	D,E,R
4.900	V de la Rev.Conakry	Guinea	1915	P
4.905	R.Nat.N'djamena	Chad	1915	E,L,P,Q,U
4.915	R.Ghana, Accra	Ghana	2100	E,G,L,P,Q,W
4.915	Voice of Kenya	Kenya	1915	M,P,U
4.920	ABC Brisbane	Australia	1900	H
4.925	R.Nacional, Bata	Eq.Guinea	2157	L
4.930	R.Moskva 2(Ashkhabad)	USSR	2020	C,D,J,M,R
4.930	R.Moskva 2 (Tbilisi)	USSR	2159	E
4.935	Voice of Kenya	Kenya	1850	P,S
4.940	R.Kiev 2	USSR	2105	E,L,O,P,R
4.945	R.Caracol Neiva	Colombia	0609	E,O
4.958	R.Baku	USSR	2152	D,O
4.960	R.Federacion, Sucua	Ecuador	2125	U
4.960	R.Baku 2	USSR	2001	E,M
4.975	R.Timbre, Sao Luiz	Brazil	0200	W
4.975	PBS Fuzhou	China	1624	O
4.975	R.Uganda, Kampala	Uganda	1915	L,P
4.980	PBS Xinjiang	China	0016	G
4.980	Ecos del Torbes	Venezuela	2100	E,S
4.985	R.Brazil Central	Brazil	0400	E,G,I,W
4.990	FRCN Lagos	Nigeria	0604	D,E,G,M
4.990	R.Ancash, Huaraz	Peru	?	N
4.990	RMoscow (Yerevan)	USSR	2203	E,R
5.005	R.Nacional, Bata	Eq.Guinea	1932	E,P
5.005	R.Nepal, Kathmandu	Nepal	1650	G,O
5.010	SBC Singapore	Singapore	1441	K
5.015	R.Moskva 2Arkhangelsk	USSR	2156	E,O
5.020	La Voix du Sahel	Niger	0600	E,G,M
5.025	ABC Katherine	Australia	2130	H,O
5.025	R.Rebelde, Habana	Cuba	0030	E,W
5.030	R.Impacto	Costa Rica	0030	G
5.030	R.Catolica, Quito	Ecuador	0022	I
5.035	R.Bangui	C.Africa	2200	E,J,P
5.035	R.Alma Ata	USSR	2140	E,M,O
5.040	R.Tbilisi 1	USSR	1953	E,U
5.044	R.Impacto	Costa Rica	0539	E,M
5.045	R.Cultura do Para	Brazil	0720	O
5.047	R.Togo, Lome	Togo	1915	D,E,P
5.050	Voz de Yopal, Yopal	Colombia	0100	W
5.050	SBC Singapore	Singapore	1615	S
5.055	RFO Cayenne(Matoury)	French Guiana	0740	G
5.060	PBS Xinjiang	China	0047	M
5.075	R.Beijing	China	2159	E
5.075	Caracol Bogata	Colombia	0556	E,I,M,O,U
5.090	R.Pakistan Islamabad	Pakistan	0005	W
5.095	R.Sutatenza, Bogata	Colombia	0350	W
5.260	R.Alma Ata 2	USSR	1902	E,O
5.320	R.Beijing	China	2150	O,U
5.800	PBS Xinjiang	China	2326	D

DXers:
A: Thomas Barnett, Slough.
B: Leo Barr, Sunderland.
C: Darren Beasley, Bridgwater.
D: Andy Cadier, Folkestone.
E: Jim Cash, Swanwick.
F: Robin Clark, Plymouth.
G: David Edwardson, Wallsend.
H: Simon Hamer, New Radnor.
I: Robin Harvey, Bourne.
J: Sheila Hughes, Morden.
K: Rhoderick Illman, Thumrait, Oman.
L: Alex Mackow, Hornchurch.
M: Eddie McKeown, Co.Down.
N: Dick Moon, George, Rep. S. Africa.
O: John Nash, Brighton.
P: Fred Pallant, Storrington.
Q: Philip Rambaut, Macclesfield.
R: Mark Selby, Aldershot.
S: Tim Shirley, Bristol.
T: Chris Shorten, Norwich.
U: Alan Smith, Northampton.
V: Ted Walden-Vincent, Great Yarmouth.
W: Jim Willett, Grimsby.

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INDEX TO ADVERTISERS

SEEN & HEARD

5.975 (Eng 0730-1515) 55555 at 1100 by Ted Agombar; RFI via Allouis, France 6.175 (Fr, Eng 0500-2200) SIO 333 at 1600 by Ted Walden-Vincent; SRI via Sarnen, Switzerland 6.165 (Eng 1830-1900) SIO 333 at 1830 by Alf Gray; RCI Montreal via Daventry, UK 5.995 (Fr, Eng, Ger, Hung, Cz, Pol, Uk 1700-2300) SIO 333 at 2000 by Darren Beasley; Radio Korea, Seoul 6.480 (It, Fr, Kor, Ar, Port, Eng, Ger, Sp 1545-2345) 53333 at 2120 by Chris Shorten; Radio Prague, Czechoslovakia 6.055 (Ger, Fr, It, Eng, Cz 1700-2300) 53535 at 2210 by Robin Clark; Radio Finland via Pori 6.120 (Fin, Sw, Fr, Ger, Eng 0400-2325) SIO 222 at 2214 by Julian Wood; Radio Mediterranean via Cyclops, Malta 6.110 (Fr, Eng 2130-2330) 54545 at 2230 by Alex Radulovic; Radio Polonia, Warsaw 6.135 (Eng, Ger, Fr 1830-2355) 53434 at 2306 by Alex Mackow.

Station Addresses

BBC Radio Derby, 56 St.Helen's Street, Derby. DE1 3HY..

ILR Isle of Wight Radio, Dodner Lane, Newport, I.O.W.

Voice of Greece, 402 Messoghion Street, GR-15342 Aghia Paraskevi Attikis, Greece.

VOIRI, External Service, P.O.Box 19395-1774, Tehran, Islamic Rep. of Iran.

Radio Zambia, External Service, Broadcasting House, P.O.Box 50015, Lusaka, Zambia.

Radio WMLK, Assemblies of Yahweb, Bethal, PA 19507, USA.

Equipment Used

Ted Agombar: Grundig Yacht Boy 700 + 20m random wire.
Thomas Barnett: Kenwood R-2000 + random wire.
Leo Barr: Matsui MR-4099 + internal antenna.
Darren Beasley: Philips D-2935 + Hexagon loop or a.t.u. + 10m random wire.
Arthur Bishop: Armstrong 9-valve superhet + ferrite rod.
Kenneth Buck: Lowe HF-225 + random wire or home-built t.r.f. set + loop.
Andy Cadier: Saisho SW-500 + 40m random wire or Datong active antenna.
Scott Caldwell: Saisho 2000 + random wire.
Jim Cash: Sony ICF-2001D + AN-1 active antenna.
Robin Clark: Saisho SW-5000.
Philip Clements: Saisho SW-5000 + internal antenna.
John Coulter: Yaesu FRG-7 + random wire.
Noel Dean: Kenwood R-5000 + Datong active mini-dipole.
Adrian Don: Philips 752 digital car radio + whip antenna on car.
Peter Easton: Kenwood R-5000 + ERA BP34 audio filter + Datong AD370.
David Edwardson: Trio R-600 + trap dipole 22m long.
Alf Gray: Codar CR70 + Codar a.t.u. + Ex-Army rod antenna.
Brian Hallett: Trio R-2000 + 10m random wire.
Simon Hamer: Lafayette HE30 + 'Sooper Loop' or Grundig S1400 + 19m wire.
Ian Harling: Panasonic DR-26 + internal ferrite rod.
Robin Harvey: Matsui MR-4099 + SW loop.
Francis Hearne: Sharp GFA3 cassette radio + random wire.
Simon Holland: Sangean ATS-803A portable + built-in whip.
Sheila Hughes: Panasonic DR-48 + 15m inverted L or Sony ICF-7600DS.
Rhoderick Illman: Sony IC- 7600DS + 23m random wire.
Alex Mackow: Sony ICF-2001D portable.
Eddie McKeown: Tatung TMR-7602 portable.
George Millmore: Tatung TMR-7602 portable + random wire.
Dick Moon: Icom R-70
John Nash: Kenwood R-5000 + random wire.
Ike Odoom: Philips D-2935 portable.
Fred Pallant: Trio R-2000 + random wire in loft.
John Parry: Realistic DX-400 + 33m random wire.
Roy Patrick: Lowe HF-125 + 20m wire.
Ron Pearce: Home-built single transistor straight RX.
Philip Rambaut: Int.Marine Radio R-700M + random wire.
Kenneth Reece: Icom R-9000 or Kenwood R-5000 + delta loop.
Carlo Rizzo: Sharp QT-95.
Alan Roberts: Home-built 'Epsom' superhet + 19m or 31m dipole.
Mark Selby: Realistic DX-440 or Panasonic RFB-40 + a.t.u. + 60m random wire.
Tim Shirley: Trio R-600 + random wire.
Chris Shorten: Matsui MR-4099 portable.
Alan Smith: Matsui MR-4099 + Mizuho KX-3 a.t.u. + folded dipole.
Cliff Stapleton: Trio R-1000 + dipoles in loft.
John Stevens: Hammarlund HQ 180 or Icom R-70 + random wire.
Darran Taplin: Eddystone 680X + Global a.t.u. + 30m random wire.
Phil Townsend: Lowe SRX-30 + a.t.u. + random wire.
Ted Walden-Vincent: Grundig Satellit 1400SL.
Ken Whayman: Realistic DX-440 + Marconi "T" antenna or Vega 206 + whip.
Neil Wheatley: Sangean ATS-803 + built-in antenna.
Jim Willett: RCA AR-77 + X dipole in loft.
Julian Wood: Trio R-1000 + random wire.
David Wratten: Philips D-2999 + loop or Trio R-2000 + a.t.u. + 30m random wire.

Abbreviations

Ar	Arabic
Chin	Chinese
Cz	Czechoslovakian
Dan	Danish
Du	Dutch
Eng	English
Fin	Finnish
Fr	French
Ger	German
Gr	Greek
Ha	Hausa
Hung	Hungarian
Ice	Icelandic
Ind	Indonesian
It	Italian
Jap	Japanese
Kor	Korean
Norw	Norwegian
Pol	Polish
Port	Portuguese
Russ	Russian
Uk	Ukrainian
Yi	Yiddish

LW MARITIME RADIO BEACONS

Brian Oddy G3FEX
Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

The long wave maritime radio beacons around the coast of the UK and many other countries have attracted the attention of several listeners for the first time. Writing from Eastbourne, **Philip Clements** says "I sat down just to see how many of the more local beacons I could receive on my modest equipment and I was so surprised to hear more than just the odd one or two, that I sat for hours, cross referencing the Morse idents with *SWM* and logging the results!" Philip used a Saisho SW5000 receiver with its internal antenna to compile his list for the chart. It is worth noting that some of his entries were logged via sky wave paths after dark - a point often overlooked by those new to this aspect of our hobby.

Also in Eastbourne, **Ian Harling** says he decided to check the band for the first time after studying the chart in the Feb'90 *SWM*. Using a Panasonic DR26 portable with built-in ferrite rod antenna, he was pleased to receive the beacon signals from two light vessels in the Channel and from five sites along the coastline of the UK and France - see chart. During a visit to Calais he found that the beacon signal CS is radiated on 305.7kHz by

Long Wave Maritime Radio Beacon Chart

Freq kHz	Callsign	Station Name	Location	DXer
285.0	GY	Castle Breakwater	Channel Is	H*
287.3	CM	Cromer LH	Norfolk	H
287.3	DG	Douglas Pier LH	IDM	B
287.3	FN	Walney Island	off Lancs	H*
287.3	GR	Goeree	Holland	H*
287.3	PS	Point Lynas	Anglesey	B
289.6	FD	Fidra LH	F. of Forth	B
289.6	TN	Thyboron LH	Denmark	B
291.9	CP	St.Catherines Pt	IDW	D*
291.9	ER	Pointe de Ver LH	N.France	A*,F*
291.9	FG	Pointe de Barfleur	N.France	A*,D*
291.9	KD	Kinnairds Head LH	Aberdeen	B
291.9	NR	N.Ronaldsway LH	Orkney Is	B
291.9	OM	Stroma Pt LH	Caithness	B
291.9	RN	Reykjanes	Iceland	H
291.9	SB	Sumburgh Head	Shetland Is	B
294.2	AH	Altacarry Head LH	Antrim	B
294.2	DA	Pladda LH	Is of Arran	B
294.2	MW	Mew Island LH	off Co.Down	B
294.2	OR	Oigh Sgeir LH	off Is Rum	B
294.2	RN	Rinns of Islay	Is of Islay	B
296.5	BH	Blaavandshuk LH	Denmark	B
296.5	HM	Hanstholm	Denmark	B
296.5	LA	Lista LH	S.Norway	B
296.5	NK	Inchkeith	F. of Forth	B
298.8	AD	Ameland	Holland	G
298.8	BL	Butt of Lewis	Is of Lewis	B
298.8	MF	Muckle Flugga LH	Shetland Is	D*
298.8	QS	Casquets LH	Channel Is	E
298.8	SP	Start Point LH	S.Devon	E,H
301.1	CN	Cregneish	I.O.M	B
301.1	GE	Skarvoy Egersund	Norway	B
301.1	HO	Hirsholm Main LH	Denmark	B
301.1	NF	North Foreland LH	E.Kent	A*,C,D*,E,F*
301.1	PY	Point of Ayre LH	IOM	B
301.1	SR	Skerries LH	Anglesey	B
301.1	SU	South Rock LV	Co.Down	B
301.1	VS	Grosser Vogelsand	Germany	D*
301.1	WK	Wicklow Head Light	Co.Wicklow	B
303.4	FB	Flamborough Hd LH	E.Yorkshire	B
303.4	FP	Fife Ness Point	Fife	B
303.4	LT	Longstone LH	Berwick	B
303.4	SJ	Souter Light	Sunderland	B
305.7	CB	Corbiere	Jersey C.I	C,E
305.7	CS	Calais Main LH	N.France	C,F*
305.7	FS	Fall's LV	off Kent	C,D*,F*
305.7	OE	Ostende	Belgium	A*
308.0	BD	Barra Head LH	Is of Barra	B
308.0	GL	Eagle Island LH	W.Ireland	B
308.0	RR	Round Island LH	Nr Cornwall	B,D*
308.0	TY	Tory Island LH	N.Ireland	B
310.3	AL	Pointe d'Ailly LH	France	A*,C,D,F*
310.3	DU	Dungeness LH	S.Kent	A*,C,D
310.3	GD	Girdle Ness	Aberdeen	B
310.3	PH	Cap d'Alprech	France	C,D,F*
310.3	RY	Royal Sovereign LV	Eng. Chan	D,F*
312.5	BK	Baltiysk Rear LH	USSR	H*
312.6	FN	Feistein	Norway	B
312.6	GU	Geltungane	Norway	B
312.6	KH	Kish Bank	E.Ireland	B,H*
312.6	MA	Marstein	Norway	B
312.6	NB	Nab Tower LH	off Sussex	C,D*
312.6	RB	Cherbourg	France	C,D,E
312.6	UT	Utsira	Norway	B
312.6	VR	Utvaer	Norway	B
318.5	SY	Soerve	USSR	H
319.0	LEC	Stavanger	Norway	B,D
414.0	FK	Frederikshavn Bkw	Denmark	H*

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

DXers:
A: Thomas Barnett, Slough.
B: Kenneth Buck, Edinburgh.
C: Andy Cadier, Folkestone.
D: Philip Clements, Eastbourne.
E: John Coulter, Winchester.
F: Ian Harling, Eastbourne.
G: Philip Rambaut, Macclesfield.
H: Tim Shirley, Bristol.

SEEN & HEARD

the main lighthouse, which is on land. He says "I was able to stand next to it and obviously the signal was extremely strong!" He also took the opportunity to search the band for other beacons while there, but they were all very weak, so perhaps the high level of radiation from CS caused the automatic gain control (a.g.c.) in his receiver to render it temporarily insensitive.

Further along the coast in Folkestone, **Andy Cadier** logged several beacons during daylight. He says" I can hear quite a few more, but seem to experience difficulty in decoding weak Morse signals. Do you know how much power these beacons use?" Several other DXers raised that question and the answer is that it may be between 5 and 500 watts. Most seem to be around 30 watts. Depending upon the transmitter power and the associated antenna system the reliable range of the beacon at sea may be in excess of 320km, or in a few cases as little as 8km. The reliable range is the all important factor as far as ship owners and yachtsmen are concerned, but it is of little interest to the DXer.

Another newcomer to this apsect of DXing is **Thomas Barnett** in Slough. He says "At first nothing, then with careful tuning and patience they began to come in" Using a Kenwood R2000 receiver with a random wire antenna he logged some interesting beacons for the chart. Some of the l.w. aircraft radiobeacons were also noted in his list, but they are outside the scope of this series. In general the maritime beacons have two letter callsigns and they operate between 285 and 312.6kHz, however just to confuse things there are a few maritime beacons with three letter callsigns - they operate slightly higher in frequency.

In Edinburgh, **Kenneth Buck** has been experimenting with a large l.w. loop antenna. He found that the two turn coupling coil to the receiver lowered the *Q* of the main loop, so he now uses a 2N3819 emitter follower to couple the loop to his Lowe HF225 receiver and the results are excellent. Following an initial check on the band in Bridgwater, **Darren Beasley** decided that his results were being limited by the internal antenna in his Philips D2935 receiver, so he is now busily constructing an antenna tuning unit (a.t.u.) so that his 12m random wire can be resonated in the band. Very few ready-made a.t.u.s are available for the l.w. band, but Cambridge Kits can supply one in kit form - see adverts in *SWM*.

Whilst the beacon charts in this series can be used as a guide when searching the band, it should be noted that they only detail the radiobeacons actually logged by contributors during the three months prior to publication. The first chart was published in the November'88 *SWM* and one has been published each quarter since then. Some charts are more extensive than others, since they depend on the contributions I receive from readers, but a very extensive list was published in the May'89 issue. If required, back issues are available from the *SWM* Office in Poole at £1.65 post paid.

Another way of finding out more about the beacons is to study a copy of *Reed's Nautical Almanac* - it may be available for reference purposes only at your local Public library. The 1990 edition may be available through your local bookseller, but it can also be purchased direct from Thomas Reed, 178-185 High Street West, Sunderland, Tyne and Wear. (Tel 091-567 5211). It is worth noting that back issues are available from them at considerably reduced prices.

AIRBAND

☞ 20

455.4875MHz f.m. in order to control the access of operations vehicles to the runway. This is an important safety feature: vehicles have their own channel so as not to block the Tower's dialogue with aircraft; but liaison between vehicles and the controller is essential to avoid conflicts with aircraft. 455.6MHz f.m. is used by airport personnel.

The new Brookman's Park to Pole Hill (Daventry) sector, i.e. UB4, frequency is 121.025MHz (sometimes 133.7MHz at weekends), with backup on 135.425MHz. These replace 134.75MHz which suffered from unidentified interference. That should clear up this matter which I mentioned in previous issues. Thanks for the information to Steve Foster, J.D. Toseland, Dave Wright and Jim Wright.

More from Jim Wright: East Scottish sector will have a new frequency 119.875MHz to reduce the load on 124.5MHz. Biggin Hill has a new v.o.r./d.m.e. with a.t.i.s. on 115.25MHz.

Information Sources

Here's a suggestion from **Ken Gardiner** (Doncaster): "Would readers tell of books, lists and publications and also clubs that they have found useful." I will take it for granted that every reader has a good stock of titles from our own *SWM* Book Service (if not, why not?!) but I will happily print details of other publications and also of clubs here. Let's start with *UK Air Traffic Control (A Layman's Guide)* by David Graves (Airlife), recommended by Roger Ryton.

I can't, unfortunately, list all frequencies but only mention those that are new or changed or of other topical interest. My recommendation for a comprehensive list is one of the *Supplements* from Aerad, the RAF 1 AIDU or Jeppesen and in the last issue I gave the addresses for obtaining all these. The frequencies are, I repeat, **not** confidential; also, other lists tend to be culled from these main sources.

Some confusion has arisen regarding the sending of your letters to this column. Please address all correspondence to the magazine's editorial address (from now on a reminder to this effect will, hopefully, appear at the end of each month's column).

Items will be included in the next issue as space allows, but if you have something topical then the deadlines are given for your guidance at the end of each month's edition. For that really urgent special request, or to arrange visits to my Museum, you can ring me (weekday evenings) on 081-958 5113.

The next three deadlines (for topical information) are May 4, June 8 and June 29. All correspondence to the *SWM* offices in Poole please. □

Abbreviations

a.m.	amplitude modulation
a.t.i.s.	automatic terminal information service
a.t.u.	antenna tuning unit
BEA	British European Airways
c.w.	continuous wave
d.m.e.	distance measuring equipment
f.m.	frequency modulation
ft	feet
h.f.	high frequency
i.f.r.	instrument flight rules
kHz	kilohertz
MHz	megahertz
Mil	military
n.d.b.	non-directional beacon
nav.	navigation, navigational
s.s.b.	single sideband
TACAN	TACtical Air Navigation
u.h.f.	ultra high frequency
v.f.o.	variable frequency oscillator
v.f.r.	visual flight rules
v.h.f.	very high frequency
v.o.r.	very high frequency omni-directional radio range
VOLMET	VOLume METeorological report

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