VOL 48 ISSUE 7 JULY 1990

ON SALE JUNE 28th

AUGUST ISSUE ON SALE
JULY 26th

|29| **Ecuador.**

Cover Ecuador is an ideal place for the short wave listener. The equator passes through this country which is situated high up in the Andes. The SWM/HCJB DXpedition 91 will give you the chance to hear stations that you only read about in WRTH. As well as visiting HCJB's installations around Quito you and your partner will find many other interesting things to do. Cover transparency courtesy HCJB.

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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.The views expressed in letters published in this magazine are not necessarily those of Short Wave Magazine.

Dear Sir

It can fairly be claimed, I believe, that your magazine brings to its readers nothing but joy for within its pages are contained numerous items aimed at further stimulating the interests of radio listeners. Alas! this claim is open to question for the June issue, for having read the opening paragraphs of Alan Gardener's 'Scanning' (Scanning and crime) I feel that to own a scanner and to participate in the hobby of listening to all the voices that come flooding in from far and wide is now no longer the fascinating pastime that it was, for it's now ILLEGAL.

Now of course, I do understand the situation through which the criminal element could and do mis-use this facet of our hobby but I imagine there are thousands of retired folk like myself, who have discovered this wonderful hobby since their retirement and have 'fallen in love' with it because of its adaptability to their situation.

As I sit in my flat ten floors above the waters of Portsmouth Harbour a whole new world has opened up to me. I hear the voice of the Queen's Harbour Master controlling the shipping of one of the busiest ports in Europe beside keeping a fatherly eye on the myriad little ships using this port. Space does not permit the listing of all the sources of broadcasts to which I listen, but if you will consider for a moment my geographical location and visualise some of the radio traffic to which I have access you will appreciate the depth of my concern as I strive to come to terms with the reality of the law as it stands.

So what is to be done? Clearly with the growing interest in scanners and the advancement in their technical capabilities the hobby will flourish which means, presumably that many more will continue to break the law in persuit of the recreation. Perhaps it is time to review the whole policy of what constitutes 'illegal listening' (doubtless a hard term to define) or perhaps some sort of 'scanners permit' be introduced which would at least provide the authorities with a record of those participating.

To conclude, Mr Editor, you will have gathered that I am far from being at ease with this situation. I know, of course, that it has always been this way and as Alan remarks, we may have always condoned our listening on the grounds that what we heard was not passed on. This is now not good enough, I suggest and perhaps some endeavour ought to be made through the pages of your magazine to 'legalise' this most fascinating and ever-growing hobby!

I look forward to further correspondence on this matter.

With kind regards to you and your staff.

PERCY G. TANNAC
TRINITY GREEN
GOSPORT

Dear Sir

In reply to the letter of Mike Knell in March SWM, I feel that I must agree with his point's made in the letter. I think that along the same lines that many young people have been pressurized by their peer group to sacrifice the majority of their leisure time in order to become successful after leaving school or higher education.

People if they wish to join in with this hobby do not have the time or early commitment to construct their own equipment which was a major part of the hobby some time ago. The idea of speed and convenience plays a large part in society so if instant results are not obtained first time then the younger people will soon lose interest and move into another hobby which allows quicker results.

I must also say that the RSGB and other organisations are trying to remedy this unfortunate situation by introducing the novice licence for transmitting and also in the education of schools and groups in the use of telecommunications.

ALEX HILL (Age 17)
BICESTER
OXON

Dear Sir

I can confirm Mr C. Stapleton's remark in the April issue regarding burnt-out front end transistors in the ICF-2001D. I bought a 2001D in May last year. The front end died soon after I had rigged up and constructed an outdoor random wire aerial and independent earth. The dealer exchanged the set for another one without question. The second one went the same way soon after. Again, the dealer obliged. The third set is holding out - but for how long? To be fair, I had been switching from the outdoor aerial to the active antenna that was provided with the set - the AN-1 to compare results. And now here is the odd bit. If one switches the AN-1 on with the attenuator set to zero and the frequency range switch set to l.w./m.w./s.w., a very large voltage transient (nearly 9 volts) appears at the output socket and decays slowly. Switching off has the same effect, except that the polarity is reversed. This would normally be fed to the front end of the 2001D. Could this be the problem? My verdict on the 2001D? In pursuing my hobby of electronics and radio I have bought (or been sold) some lemons. However, the 2001D takes the biscuit - if that doesn't sound too Irish! For me, it's goodbye Sony!

L. McKAY
PURLEY
SURREY

Dear Sir

I just had to write to tell you about a one-valve receiver I have, plus two transistor amplifiers. I've been interested in s.w.l. for many years and built a 'Codar Clipper' kit up for my son who was about 12 years old in 1966. He eventually married, but kept the little radio safe in a shoe box until last year when I retired and he gave it to me. I had to make up a battery for it to run on, six PP3s in series for h.t. plus a 1.5 volt cell for l.t. current, fitted a new 1/4in jack socket and on/off switch to it and plugged in the 13th ex-RN phones which cost 2s.6d. (12.5p) WWII surplus, it worked a treat. Then last week came 'JOY', I picked up Radio Australia's broadcast to S E Asia on 13.740 in the afternoon at 1630GMT. The frequency I checked out on my Yaesu 7700. So as you often say in SWM there's a lot of satisfaction in building something yourself and having such results. By the way, the aerial used was a length of wire attached to the protective chicken wire I used on the carport roof to protect the pvc sheeting from damage should we get more storms like last January 25 and the earth is a metal fence post.

Now I'm retired I can listen daily, and of course spend more time reading my SWM after doing the various jobs around the house.

PATRICK CONNAR
TROWBRIDGE
WILTS

A WORD IN EDGEWAYS

Dear Sir

I have read the article in the December issue of SWM written by Mr John Palmer of Havant, who mentioned that he uses an Amstrad PCW 8256 for translating RTTY/Morse code and storing amateur radio frequencies.

I myself have a PCW 8256 and a Trio R2000 receiver and I am in need of information as to what software and hardware I need to use my equipment as listed above. Obviously, I also need to know where I can purchase these items and if possible, a price list.

In appreciation of your help.

P. CATON, MIDDLESBROUGH, CLEVELAND

Can any of our readers help Mr. Caton? This is typical of many of the letters we receive from readers. Sometimes we can answer the query off the top of our heads. Other times it would take too long to research the reply. ED.

Dear Sir

Although George Millmore read a letter by Peter Robinson in the April issue with interest, I read George Millmore's letter in the June edition with amazement.

I have no wish to enter the issue of Morse code in the RAE but do want to correct the completely erroneous impression that Morse as a communications mode is dead. Anyone who doubts the continued use of c.w. Morse transmissions should consult an authoritative source such as the Guide to Utility Stations *or the* Admirality List of Radio Signals *to name but two.*

As someone who conducts research into various radio communication systems I may have an unfair advantage over Mr Millmore but as an illustration here are a few documented facts.

1. From 4MHz to 5MHz there are in excess of 450 REGISTERED stations employing c.w. mode and the same density appears at regular intervals in the spectrum up to 27.017MHz.

2. Random c.w. examples show diverse use. Italian Navy stations on 4.6153MHz callsign IDR2, Polish Press Agency on 23.408MHz callsign SOY240B, Paris Interpool on 10.390MHz callsign FSB57, Tokyo Meteo on 7.515MHz callsign JMB2, Ministry of Foreign Affairs, German Democratic Republic on 14.818MHz with callsign Y7A60 and Kingston, Jamaica on 3.535MHz callsign 6YI.

3. Some of the Russian 'Aeroflot' airline routes use c.w., notably Cuban control stations.

There are all the coastal radio stations from approximately 400-520kHz who use Morse as well as other modes and most Navies use c.w. as well as the hi-tech methods.

There is a return to c.w. Morse as a reliable, low-cost means of communicating over all distances with uncomplicated equipment. Clandestine and routine military operations can establish radio links with ease under the arduous conditions often encountered.

I would agree that compared to some systems the speed of message sending is low but it is usually a first-time contact without for example, the awful burping repeats of the packet fanatics. The speed with which four or five figure encrypted groups can be sent when using the shortened figures Morse (eg: dit-dah for one) is very fast and efficient.

I have access to sophisticated software that 'reads' Morse but it can't follow a fading signal or a signal partially masked by QRM, a good operator continues to copy the message under conditions that the software won't accept.

Yes, during the last fifty years radio technology has progressed considerably but the last large-scale combined forces, land and sea exercise off the Scottish coast and on the UK mainland was a disaster as far as 'hi-tech' communications was concerned.

T. BERNASCONE
MIDDLESBOROUGH
CLEVELAND

Dear Sir

I read in the Seen and Heard column of your May issue that s.s.b. is to eventually replace the a.m. transmissions of short wave broadcasting stations. While I applaud anything that would relieve the congestion in the broadcast bands, I feel any improvement will be quite temporary as long as stations can increase power at will. Most interference is man made noise, usually from another transmitter, so with s.s.b. we may simply be increasing the overall noise level

Medium wave reception in Europe after dark, particularly in winter, is really terrible, with local stations being completely swamped by high powered stations hundreds of miles away! Perhaps we should adopt the American practice of reducing power after dark, particularly if the transmission interferes with neighbouring stations.

ANDY CADIER
FOLKESTONE
KENT

WHAT'S NEW

Special Event Stations

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 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, with members from RSARS, RNARS and RAFARS propose to run a special event station from the Royal Signals Training Centre, Burniston Barracks, Scarborough during 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. operation 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.

GB50BOB: On July 8, this station will be on the air from the Science Museum Wroughton.

GB50BOB: This time this station will be on the air from RAF Swinderby over the weekend August 3/6.

GB50RAF: Again the Science Museum Wroughton will be on the air, this time using a different callsign on August 12.

GB4MR: This station will be active on Sunday July 22 for the duration of the McMichael Rally. The station will be active on all the h.f. bands, and all contacts will be sent a special QSL card. This year the station is being operated by members of the Berkshire Downs Repeater Group, who administer the 144MHz repeater GB3RD, the 430MHz repeater GB3BK and the 1296MHz repeater GB3RU. All the repeaters are located near Reading.

WHAT'S NEW

Power Unit

The Jim PSU -101 is a high-quality, regulated, 12V d.c. supply that will power a hand-held scanner while giving convenient desk top use. It also charges the scanner's internal NiCad batteries.

The PSU -101 is suitable for use with the following models:

Fairmate HP100E
Jupiter MVT5000E
AOR AR-1000
Bearcat 50XLT
Bearcat 55XLT

Made in the UK by SSE, the power supply is built to full UK safety standards and costs £26.

Nevada, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (0705) 662145.

East to West QRP Weekend

This event, sponsored jointly by the G-QRP Club and the Czech QRP group, will be the largest QRP event yet organised. It will take place from September 28 to 30.

It is open to all QRP operators in Europe and Asiatic Russia, whether members of a QRP Club or not. The objective is maximum QRP communication between stations in eastern Europe/Asiatic Russia and stations in western Europe.

Logs will be adjudicated by the Czech QRP group and merit awards will be produced and issued by the G-QRP Club. The leading UK entrant will also receive and El-Bug paddle donated by G4ZPY Paddle Keys.

Mods for the PRO-2004

Do you own a Realistic PRO-2004 and would like to improve its performance? You can now get details on a wide range of modifications you can do yourself to change the specification and performance of your scanner.

Changes such as continuous scanning, squelch control, turbo scan and many more are detailed. Also given are details of other kits and upgrades that are available.

Paul Beckett, 3 Pasture Close, Baldwins Gate, Newcastle, Staffs ST5 5DQ

WAB

The WAB presented over £5000 to the Guide Dog for the Blind Appeal at the Drayton Manor Rally. The dogs sponsored by the WAB will, once trained, be returned to the hobby for blind s.w.l.s or licensed amateurs.

On a different tack, someone walked off with their vital book of 'Numbers for Issue' on the Sunday at the NEC. Without it they are unable to complete their membership list in time for the AGM. If you bought a book from the WAB Stand at the NEC on Sunday 21st, please contact any of the Committee as soon as possible.

Via Computer

Radio Station HCJB, The Voice of the Andes, has announced plans to make its programme schedules and programme information available to computer users who have the appropriate equipment via a short telephone call.

Listeners who are equipped with a computer and modem may dial a computer Bulletin Board in London and request the HCJB programme information.

HCJB is also hoping that many new listeners might be contacted through this novel method of making programme information available.

The London telephone number to dial is 081-673 7294. After answering a few initial questions, users of the service should select the Kybernesis Service keying the letters KCH.

Plans are also in hand to make the information available in the United States through the CompuServe Information Service public forum area (GO ACCESS) in the near future.

Digital Wind Speed

The 'Windy' is a hand-held anemometer available from Incastec Associates Ltd. This compact instrument, running on a PP3 battery, gives an accurate digital readout of windspeed in knots or metres/sec (switchable) with comparison scales for Beaufort or km/h.

The 'Windy' retails at £75 including VAT. For further details, contact: **Incastec, 75/77 Christchurch Road, Ringwood, Hants BH24 1DH. Tel: (0425) 476211.**

Catalogues

Klippon now produce a full-colour guide to the selection of enclosures for various applications and environments.

The brochure provides tabulated information on the environments, finishes and advantages of using mild steel, stainless steel, die cast aluminium, cast iron, polyester (GRP), polycarbonate and ABS enclosures.

Copies are available free of charge. Klippon. Tel: (0795) 580999.

The latest catalogue from Mauritron Technical Services details the copies of workshop manuals they hold for all kinds of equipment of all ages. There is a section on amateur radio and CB as well as test equipment. Their catalogue is available free of charge. MTS 8 Cherry Tree Road, Chinnor, Oxon. Tel: (0844) 51694.

Another firm to offer catalogues free of charge are RF Engineering Ltd. They have recently been appointed UK distributor for Barker and Williamson Inc, for all kinds of equipment - antennas, transmatch, switches, etc. Other products on offer are air-wound inductors, chokes and cables to mention only a few. RF Engineering Ltd. Tel: (0706) 214118.

Johnsons Shortwave Radio have quite a large catalogue available to readers. It contains detailed descriptions of many of their products lines. Most radios have reviews where full details of all the functions can be ascertained. Johnsons Shortwave Radio, 43 Friar Street, Worcester WR1 2NA.

Hamlin has produced a new brochure on its latest range of l.c.d. modules which covers dot matrix and intelligent graphic types, in standard TN or Supertwist STN technology. Copies are available free of charge. Hamlin. Tel: (0379) 644411.

The Vintage Wireless Company Ltd have produced a short form component catalogue in lieu of newsheet No. 134. Their full illustrated catalogue will be available later. Vintage Wireless Company Ltd. Tel: (0272) 565472.

UK Agent for Key Research

Key Research Co, manufacturers of the search and store modules for the PRO-2004 and 2005 scanners mentioned in 'Scanning' last month, have appointed **B.S. Sutherland, 336 Charlton Road, Westbury-on-Trym, Bristol BS10 6JZ Tel: (0272) 500742**, as their UK agent.

TRADING POST

FOR SALE Sony 2001D system includes AN1 aerial. Mint condition, seven weeks old. Boxed original - PRO receiver, new £319.95 (ask Electronics) my price £225. Buyer collects. Keith Palmer. Tel: Potters Bar, Herts 46348.

FOR SALE Azden PCS 6000 2m transceiver, £300. Also Tokyo HC200 a.t.u., £80. Buyers must collect. C. Holloway. Tel: 071-987 2296 anytime or 071-240 1277 office hours ask for Charles.

WANTED National receiver NC-60, must be reasonable condition and also manual for receiver. Bill GM0KMG on 041-649 4345.

FOR SALE Thermion 13.8V 25A linear p.s.u., fan cooled, fully protected, twin metering, £35.00. 13.8V 15A linear p.s.u. current metering, £20.00. S. G. Brown headphones, £5.00. Over 200 valves new and used, £20.00. Crate of assorted components, transformers, etc, £8.00 the lot. G4FZG QTHR. Tel: Cheltenham 580329.

FOR SALE Panasonic RF3100L f.m., l.w., m.w., s.w. 1.6-30MHz digital readout, b.f.o., good condition, handbook, boxed, £50. Paul Chace. Tel: Chichester 776649.

FOR SALE Realistic PRO-2005 scanner, purchased 11-8-89, mint condition, box and manual, telescopic and listeners' guide. Demonstration given. Buyer collects, £280. Further details from Trev Williams. Tel: St. Albans 30590.

WANTED Denco coils, especially green series. G. Leese. Tel: Barnsley 288718.

FOR SALE Sony ICF-SW1S kit, cassette size radio, 150kHz to 30MHz and f.m. stereo. Includes active antenna, p.s.u., earphones, case, manuals, £100. Also ICF-7600DS, £70. Matthew Searle. Tel: Reading 815354.

EXCHANGE Lowe HF125 receiver plus key pad in mint condition. Also Microreader and other bits and pieces. Required AR1000 or Jupiter II scanner or case equivalent. L. Chatters. Tel: Bodmin, North Cornwall 850868.

FOR SALE Realistic PRO-34 scanner, six weeks old, boxed, etra, load coil telescope whip aerial, £140. J. Wingrove. Tel: 071-228 4835.

FOR SALE Medium wave 'sooper loop' high gain pre-amp. Trio R-1000, £200 mint condition. JVC TV 5 inch B/W with 12 volt car plug/lead, £12. Eight track tape recorder. Eight track f.m./a.m. player. OTO carriage extra. Wanted any PW mags pre 1975 (cheap/free) cost of postage arranged. Write to M. B. Evans, 120 Loughton Way, Buckhurst Hill, Essex IG9 6AR.

FOR SALE Signal R535 v.h.f./u.h.f. airband receiver, in original box, as new, complete with p.s.u., NiCads, charger, handbook and carrying case, £200 o.n.o. Mike Norris. Tel: Bolton 862866 evenings.

FOR SALE Realistic PRO-32 hand-held scanner, 200 channels, complete with NiCads and a.c. adaptor/ charger. Boxed with manual, v.g.c., £110. M. Woodcock. Tel: Abingdon 531918.

FOR SALE Realistic DX300 comms receiver, 0.30MHz, £70. Also s.e.m. h.f. converter, £30. M. Mayer. Tel: Nuneaton 327611.

FOR SALE Racal RA17L communications receiver, complete in Racal case in very clean condition, coverage 0.5 to 30MHz continuous, with two official handbooks, £150.00. K. Watmough G3WXB, Devonia Hotel, 74 Royal Parade, Eastbourne, Sussex. Tel: Eastbourne 20059.

FOR SALE Wavecom 4010 super-decoder, fitted with all four software modules (A, B, C and D) plus weather fax option, pristine condition, £850 o.n.o. Bill Hetherington. Tel: 091-482 1344.

FOR SALE Realistic PRO-32 scanner (with NiCads) in original packaging, £130. M. Loveridge. Tel: Kidderminster 747658.

FOR SALE Sony ICF-2001D receiver complete and in excellent condition, £180. Eddystone 730/1A receiver v.g.c., offers. B. Lacey. Tel: Barnsley 289324.

FOR SALE Eddystone '640' communications receiver circa 1947. Included: speaker, 's' meter, manual and diagrams. Best offer from enthusiast secured. Alan Tait. Tel: Exeter 841506.

FOR SALE Eddystone CE10 short wave receiver, 500kHz-30MHz with b.f.o. 9 volts with mains p.s.u., £65. **Want** 2m hand-held. Derek Garner, 26 Wordsworth Ave, Warrington, Cheshire. Tel: Warrington 55924.

WANTED Disabled enthusiast desires buying Xtal controlled receiver TM56B or SRII receiver with crystals, channels 0, 67, 16, 73, 8 and 14, must be in working order. Eric Allen. Tel: Berwick-Upon-Tweed 308717.

FOR SALE Yaesu FRG7, excellent condition, boxed, instruction manual, £100. Yaesu FRT-7700 antenna tuner, £35. Datong AD370 active antenna, £40. P. Haylings. Tel: Wells, Somerset 76045.

FOR SALE Bearcat 200XLT hand-held, purchased in October 1989, still with six months' warranty and boxed, £190 o.n.o. Realistic PRO-2021 scanner, 12 months old, £130 o.n.o. L. Harrison. Tel: Little Haywood, Staffs 882833 ask for Les.

FOR SALE Elliot 1mA f.s.d. moving coil chart recorder. Two chart speeds, 1 & 6 inches per hour; supplied with three rolls of paper and one bottle of red ink, £57. C. Clements. Tel: 0846 678205.

FOR SALE Philips D2999 communications receiver, one year old, immaculate condition, plus three years extra warranty, £250 no offers. Also Philips D2935 world receiver, three months old, £75. Mr Ireland. Tel: 061-626 3991.

FOR SALE AOR-2002 scanner, excellent condition, good working order, £350 o.n.o. R. West. Tel: North Walsham 406314.

FOR SALE Grundig international 650 receiver, mint condition and little used, 148-30000 Kc/s plus f.m. broadcast. Keypad/rotary frequency selection, full screen displays, 60 memories, exceptional audio quality, £325 o.n.o. Tony Edwards, 5 Greencourts, Winterton-On-Sea, Great Yarmouth, Norfolk. Tel: Great Yarmouth 393560.

FOR SALE Trio/Kenwood R-2000 communications receiver as new, with makers box and manual, very little used, £275. A. Dinwoodie, 9 Juniper Close, Ferndown, Dorset BH22 9UB. Tel: Bournemouth 891253.

FOR SALE Yaesu FT757GX mobile general coverage h.f. transceiver plus YD148 mike, £550 o.n.o. Also Yaesu FT208R synthesised handle 2m, offers. D. Greenspan. Tel: 081-653 2292.

FOR SALE Kenwood R-2000 communications receiver, hardly used, £360. Datong AD370 antenna, £30. Anoraks medium wave loop, £20. Diamond discone scanner antenna, £40. P&P extra. T. Roy, 16 Acacia Rd, Felling Gateshead, Tyne & Wear NE10 0DU. Tel: 091-477 3581 anytime.

FOR SALE Sony Air7 as new, boxed with all accessories and manual plus Sony protective carry case, hence perfect condition, £170 or o.n.o. Steve Hall, 23 Venners Close, Barnehurst, Kent DA7 6SF. Tel: Dartford 342399 evenings.

FOR SALE Jupiter 2 hand-held scanner, mint condition, case included, £250 o.n.o. R. Carter. Tel: Garston, Herts 672346.

FOR SALE ERA Mk2 Microreader, bought March 1990, still as new, current price £155, yours for £120. T. Hyder. Tel: Hythe 843347.

FOR SALE Heathkit SB313 receiver, nine bands covering 10, 15, 19, 20, 40, 41 and 75 to 80m, u.s.b., l.s.b., c.w. and a.m. Offers or **exchange** anything electronic or photographic, modern or old. Ray Milton. Tel: Folkestone, Kent 44783 evenings only.

FOR SALE Microwave module decoder for RTTY-ASCII, £100. Also 12 inch monitor (green), £80 + Yaesu FRT-7700 a.t.u., £40. All in mint working condition, buyer collects, willing to negotiate any reasonable offer. T. Powell. Tel: Shropshire 622368 after 6pm.

FOR SALE Jupiter MVT-5000 with charger NiCads case, military airband antenna, mint condition in original box, £225. Also Bremi BRS-27 power supply, £15. I. Smith, 13 Fern Gore Avenue, Accrington, Lancashire BB5 0NF. Tel: Accrington 31673.

FOR SALE Realistic PRO-34, 200 channel scanner with manual, £110. M. Harvey. Tel: Reading 752971 evenings and weekends.

FOR SALE Realistic PRO-2004 scanner a.m./f.m., coverage from 25 to 520MHz, 760 to 1300MHz, search and scan banks 300 channels. Handbook and manual, plus radio lists, £150 o.n.o. Will deliver. Andy Stulpa. Tel: St. Osyth, Essex 820937.

FOR SALE *Radcom* mags, 1967, 1969-77, 1980-88. Some bound volumes, £50 o.n.o. Buyer collects or could deliver. S. Fisher, 'Arkle', 31 Frith Avenue, Delamere, Northwich, Cheshire CW8 2JB. Tel: Sandiway 888277.

FOR SALE Yaesu FRG-7, 0-30MHz receiver, very good condition and trapped vertical antenna, both items together, £130. Also ERA microreader Mk2 as new, few hours use only, built in c.w. tutor, £120 o.v.n.o. Ian Hatton. Tel: Derby 834740.

FOR SALE Realistic PRO-2005 scanner, boxed, instructions, excellent condition, bargain, £200. M. Rutter. Tel: Wolverhampton 724510.

FOR SALE Pocom AFR-1000 auto, c.w.-baudot-tor RTTY decoder, as new, boxed. Nine inch video monitor. Mains power unit. Complete ready to plug into receiver, £315 o.n.o. the lot. Buyer collects. C. Head. Tel: Kingsbridge, Devon 531500.

FOR SALE Jupiter II hand-held scanner, 25-500MHz and 800-1300MHz, complete with leather case, boxed and mint as new. Only few months old, cost £299, will accept £245. G. Richardson. Tel: Peterborough 53657.

FOR SALE Drake SSR-1 communications receiver 0.5-30MHz a.m., s.s.b., c.w., modified external digital readout, £95. Buyer collects or pays carriage. Bill Fry. Tel: Maidenhead 26305.

SWM JULY 90 TP

Write out your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send itm together with your payment of £2.30, to Trading Post, Short Wave magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. You must send the flash from this page, or your subscription number as proof of purchase of the magazine. 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.

GRASSROOTS

Lorna Mower

Aylesbury Vale RS have a Quiz Night with TV celebrity quiz master on July 4. 1st & 3rd Wednesdays, 8pm at Hardwick Village Hall, Hardwick, 8pm. Geoff on Buckingham 817496 or Martyn on Milton Keynes 560026.

Widness & Runcorn ARC meet every 2nd Tuesday (twice monthly), 7.30pm at the Scout Hut, Castle Rd, Halton Castle, Runcorn. Dave Glover G1VJP on Newton-Le-Willows 225445.

South Bristol ARC have Pictorial History of WD & HO Wills by Fred Rice on July 4, a Bring & Buy on the 11th, a 2m Activity evening on the 18th and a Video of the Bristol Lundy Expedition G0DRX on the 25th. Wednesdays at the Whitchurch Folkhouse, Bridge Farm House, East Dundry Rd. Len Baker G4RZY on Whitchurch 832222.

West Kent ARS meet 1st & 3rd Fridays, 8pm at the Annexe of Albion Rd School, Tunbridge Wells. July 20 is SOS by Phil Sale. R. Taylor G3OHV on Crowborough 664960.

Bromley & District ARS meet 3rd Tuesdays, 7.30pm at The Victory Social Club, Kechill Gardens, Hayes. Geoffrey Milne G3UMI on 081-462 2689.

East Kent RS have an Operating night at Bishopstone on July 5 and a talk by Ken Smith on the 19th. 1st & 3rd Thursdays, 7.30pm at the Cabin Youth Centre, Kings Rd, Herne Bay. Brian Tutt G4ZZK on Herne Bay 366232.

Shefford & District ARS meet Thursdays, 8pm at the Church Hall, Ampthill Rd. June 30 is an Annual Barbecue, July 2 is an evening with Biggleswade Archery Club and the 12th is Pedestrian DF Hunt. Nigel G1JKF on Southampton 71149.

Chesham & District ARS have a Barbecue on June 30 and 'Electrostatics' by Chris G1XET on July 18. Wednesdays, 8pm at The Stable Loft, Bury Farm, Pednor Rd. Liz Cabban G0ETU on Chorley Wood 83911.

York ARS meet Fridays, 7.30pm at York City Social Club, Bootham Crescent. Keith Cass G3WVO at 4 Heworth Village, York YO3 0AF.

Horndean & District ARC have History of Computers by John Lansdown on July 5. 1st Thursdays, 7.30pm at Merchistoun Hall, London Rd. S. Swain, 35 Mavis Crescent, Havant, Hants PO9 2AE.

Mansfield ARS meet 1st Thursdays, 7.30pm at The Polish Catholic Club, off Windmill Lane, Woodhouse Rd. Mrs M. Lowe G7BQF on Mansfield 755288.

Spalding & District ARS meet Fridays, 7.30pm at the Riverside Leisure Centre, Albion Street. Dennis Hoult G4OO on Spalding 750382.

Trowbridge & District ARC have a Family Picnic at White Horse Hill, Westbury, 6.30pm. Ian G0GRI on Bratton 830383.

Loughton & District ARS meet alternate Fridays, 8pm at Debden Community Centre, Loughton Hall, Rectory Lane. June 29 is an RSGB Video night and July 13 is The Grid Dip Oscillator and its uses by G0LWF. Mike Pilsbury G4KCK on 081-504 4581.

Acton, Brentford & Chiswick ARC have a talk/demo of Home Brew Helical Antennas given by G2FHV on July 17. Tuesdays, 7.30pm at the Chiswick Town Hall, High Road. Details from P. Truitt at the above address.

Southgate ARC have Construction evenings on June 28/July 26 and a talk on Radio Data Service by G3LWA on July 12. Meet at 7.45pm in Holy Trinity Church Hall (Upper), Winchmore Hill, London N21. Brian Shelton on 081-360 2453.

Verulam ARC meet 2nd & 4th Tuesdays, 7.30pm at the RAF Association HQ, New Kent Rd, (off Malborough Rd), St. Albans. July 24 is a talk on Electromagnetism by Oliver Heavyside. Andy Ince G0BZS at Cottage No. 1, Rounton, 28 Nascot Wood Rd, Watford WD1 3SD.

Stourbridge & District ARS now have a new secretary, so all future correspondance should be addressed to Dennis Body G0HTJ at 53 Grove Rd, Wollescote, Stourbridge, West Midlands DY9 9AE. They meet 1st & 3rd Mondays at the Robin Woods Centre, Scotts Rd.

Bury St. Edmunds ARS have a talk on July 17 by Pat Gowen G3IOR on Satellites And Their Working. They meet 3rd Tuesdays, 7.30pm at the County Upper School, Beetons Way. Ian Capon G0KRL on Beyton 70527.

Stevenage & District ARS have a committee meeting at 82 Lingfield Rd on June 28, Planning Club v.h.f. station on July 3, HF Night on Air/Project evening on the 10th and Repair of Club Gear on the 24th. Ground Floor Lecture Room, 'D' Block, Ridgemond Training Enterprise, Ridgemond Park. Peter Daly G0GTE on Stevenage 724991.

Derby & District ARS have a Junk Sale on July 4. Wednesdays, 7.30pm at 119 Green Lane. Kevin Jones G4FPY on Derby 669157.

The 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. July 2 is a natter night. John Puttock G0BWV at 53 Alexandra Ave, Sutton, Surrey SM1 2PA..

Bredhurst Receiving & Transmitting Society have the following new postal address: c/o P.W.C.A., Parkwood Green, Wigmore, Gillingham, Kent ME8 9PN. Also the new contact number for their Chairman, Ken Godwin G1HTA, is Medway 271548.

North Ferriby United ARS meet Fridays, 8pm in the Football Club Social Room, Church Rd. Frank Lee G3YCC on Hull 650410.

Salop ARS meet Thursdays, 8pm at 'Ye Olde Bucks Head', Frankwell, Shrewsbury. Details from Fred Hall G3NSY on Shrewsbury 790457.

Delyn RC have a Visit to Chester Police Station on July 3 and a Barbecue on the 17th. They meet every other Tuesday, 8pm in the Daniel Owen Centre, Mold, Clwyd. S. Studdart on Deeside 819618.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. July 5 is HF propagation fundamentals G3MYM, the 12 is How jFets Work G3MYM and the 19th is Measuring jFet characteristics G3MYM. David Bailey G1MNM, QTHR or their Chairman G4JBH on Yeovil 28341.

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford. June 29/July 13 are nights on the air with Morse, July 1 is a Treasure Hunt, the 6th is a 2m DF contest (outdoors) and the 20th is Members Mini Lectures. Neil Blair G7ASZ on Coventry 523629.

Rugby ATS have a 144MHz direction finding competition round three on July 17. Tuesdays, 7.30pm at the Cricket Pavilion, outside Rugby Radio Station. Kevin Marriott G8TWH on Coventry 441590.

Norfolk ARC have CQ Stateside, night on the air on July 4, Mobile DF Hunt on the 11th, an informal & committee meeting on the 18th and Using Satellites demonstration by G3IOR on the 25th. Wednesdays, 7.30pm at The Norfolk Dumpling, The Livestock Market, Harford, Norwich. Steve Sewell G4VCE on Mulbarton 78258.

Cheshunt & District ARC have natter nights on July 4/18 and a Junk Sale on the 25th. Wednesdays, 8pm in the Church Room, Church Lane, Wormley. Roger Frisby G4OAA on Hoddesdon 464795.

Felixstowe & District ARS have a Ten-Pin Bowling evening on July 9 and a night on the air on the 23rd. Meetings in the Back Room of the Ferry Boat Inn, Felixstowe Ferry, 8pm. Paul Whiting G4YQC on Ipswich 642595 (daytime).

Mid-Warwickshire ARS have a 2m DF Foxhunt on July 10 and Scanners & Open evening G8XDL on the 24th. 2nd & 4th Tuesdays, 8pm at 61 Emscote Rd, (St. Johns Ambulance HQ). Mike Newell G1HGD on Kenilworth 513073.

Wimbledon & District ARS meet 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd. June 29 is CATS v WDARS quiz at home on June 29, Op-Amps on July 13 and a DF Hunt on the 22nd. Nick Lawlor G6AJY on 081-330 2703.

Keighley ARS have natter nights on July 3/10/24 and Packet Radio on the Air on the 17th. Meeting at 8pm, in the Clubroom, rear of Victoria Hall. Kathy on Bradford 496222.

Thornbury & District ARC have Message Handling for RAYNET by G1ABT on July 4 and HF activity/natter night on the 18th. United Reform Church, Chapel Street, 7.30pm. Tom Cromack G0FGI on Thornbury 411096.

Club Secretaries:
Send all details of your club's up-and-coming events to; 'Grassroots', Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP

RALLIES

*Short Wave Magazine and Practical Wireless in attendance.

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 Scholl, Truro. There will be the usual trade stands, Bring & Buy, a computer display/ demo and a weather satellite demo. There will be refreshments, and free parking. 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, entrance is £1. **Ron Bray G8VEH (QTHR). Tel: (0273) 415654 office hours, (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.

***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 cae. 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**.

August 12: The 1990 Derby Mobile Rally will take place once again at Lower Bemrose School, St Albans Road, Derby, just off the A511 Derby Ring Road. Gates open at 10.30am with all the usual attractions including the Giant Junk Sale. **Kevin Jones G4FPY, 20 Pinecroft Court, Oakwood, Derby DE2 2LL. Tel: (0332) 669157**..

August 19: The West Manchester Radio Clubs Red Rose Summer Rally will be held at the Bolton Sports and Exhibition Centre, Silverwell Street, Bolton.

August 26: The Three Cs Rally will be held at the Tiddenfoot Leisure Centre, Linslade, Leighton Buzzard, Beds. Entrance fee is £1, children free. **A Perkins. Tel: (0582) 33885**.

August 26: The Open Day of the Galashiels & District ARS will be held at the Focus Centre, Livingstone Place, Galashiels. There will be trade stands, a Bring & Buy, catering and all the usual activities. Talk-in on S22.

August 27: The Huntingdon Junk Sale & Auction will be held at the Medway Centre, Coneygear Road, Huntingdon, Cambs. The doors open from 10am to 4pm, food and drink will be available all day. **G1YVS. Tel: (0836) 611025 or (0487) 830212 (eves)**.

September 9: The Vange ARS will be moving the rally this year to The Laindon Community Centre, Aston Road, Laindon, Basildon, Essex. Doors open from 10am to 4.30pm wth admission at 50p. The rally will include many traders, a Bring & Buy, refreshments and free raffle. Talk-in on S22. **Doris Thompson. Tel: (0268) 552606**.

***September 9**: The Lincoln Hamfest will be held in the Exhibition Centre, Lincolnshire Showground. Gates open at 10.30am (10am for the disabled) and the rally closes at 5pm. All the usual trade stands will be there, along with the Real Ale Bar. There will be lots of attractions for the whole family too. Caravans welcome by prior arrangement. Talk-in on S22 by the West Lincs RAYNET Group. **Sue Middleton. Tel: (0522) 531788**.

***September 16**: The British Amateur Radio Teledata Group annual rally will be held at Sandown Park Exhibition Centre, this time in the larger Surrey Hall. **Peter Nicol G8VXY. Tel: 021-453 2676**.

September 16: The Bristol Radio Rally will be held in Brunel's Great Train Shed, Temple Meads Station, Bristol. All the usual traders will be there, a large Bring & Buy, food and refreshments as well as displays and demonstrations. **D.S. Farr. Tel: (0272) 839855**.

September 23: The Centre of England Amateur Radio Rally will be held at the National Motorcycle Museum, Bickenhill, near the NEC. There will be a Bring & Buy and over 60 trade stands, all housed in three large exhibition halls. Concessionary rates for all those who wish to visit the Motorcycle Museum and ample free parking. Doors open at 10.30am. **Frank Martin G4UMF. Tel: (0952) 598173**.

September 23: The Peterborough Mobile Rally will be held in the Wirrina Sports Stadium, Peterborough from 10am to 5pm. All the usual traders will be there, a Bring & Buy and tables may be hired on the day (space permitting). Talk-in is on S22 and SU22 by G3DQW. **Robert Maskill. Tel: (0836 542630)** any evening.

September 30: The 6th North Wakefield RC Rally will be held at Outwood Grange School, Potovens Lane, Outwood, near Wakefield. Admission is 50p at 11am - disabled 10.30am. Fully licensed bar with real ale, good selection of food from cafe, raffle, Bring & Buy, radio, computer and electronic traders and repeater groups. **Richard G4GCX on (0532) 622139**.

September 30: The Harlow & District ARS will be holding their Amateur Radio & Electronics Rally at the Harlow Sports Centre. The Main Hall will provide a large and varies selection of traders, both old and new to the event. The studio upstairs will be soley dedicated to the Bring & Buy, along with the many special interest groups. Catering and licensed lounge bar as usual. Entry is still £1 accompanied children free. **Alf G7FNY. Tel: (0279) 418392 (daytime)**.

***October 7**: The Great Lumley Amateur Radio & Electronics Society will be holding their rally in the Community Centre, near Chester-le-Street, in Great Lumley. Doors open at 11am (10.30am for disabled). Barry G1JDP. Tel: 091-388 5936.

October 14: Computercations will be held again this year at Hillhead campsite on the Dartmouth road in Brixham, South Devon. **Bill Trezise. Tel: (0803) 522216**.

***October 20/21**: The 4th North Wales Radio Rally will be held at the Aberconwy Centre in Llandudno. Rally open as at 11am on both days and the entrance fee is £1 with OAPs 50p and children under 14 free. **Mr B Mee. Tel: (0745) 591704**.

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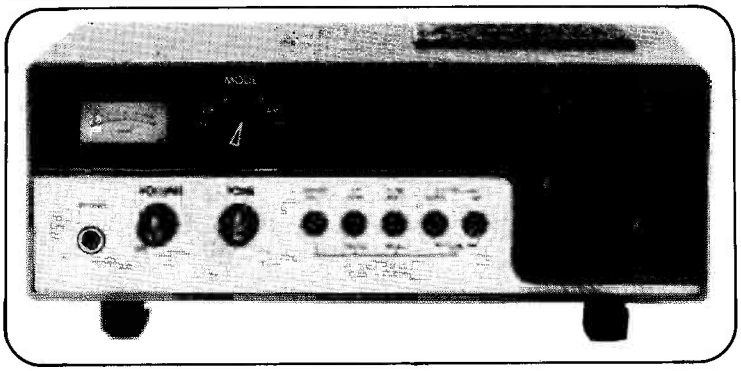

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S-225	Wharfedale speaker and lead	**£49.50**	**£3.00**

R-5000	Kenwood HF communications receiver. 100kHz to 30MHz	**£875.00**	**£8.00**

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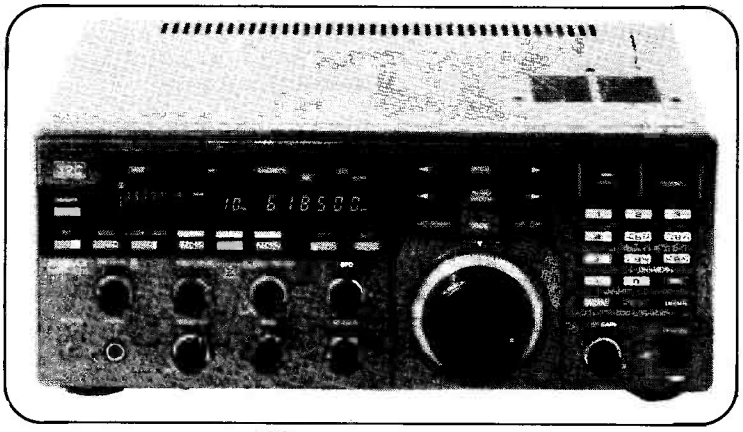

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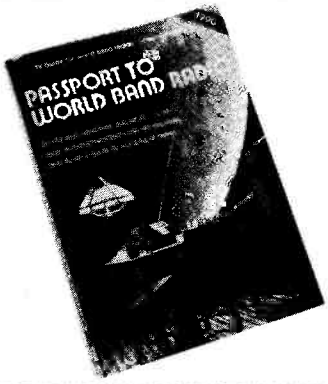
CMH532	RS232 interface unit	**£91.75**	**£1.50**
CFL231	300Hz CW filter	**£126.37**	**£1.00**
CFL232	500Hz CW filter	**£126.37**	**£1.00**
CFL233	1kHz RTTY filter	**£126.37**	**£1.00**
CFL218A	1.8kHz SSB filter	**£117.89**	**£1.00**
NVA88	Matching external loudspeaker	**£62.86**	**£2.50**



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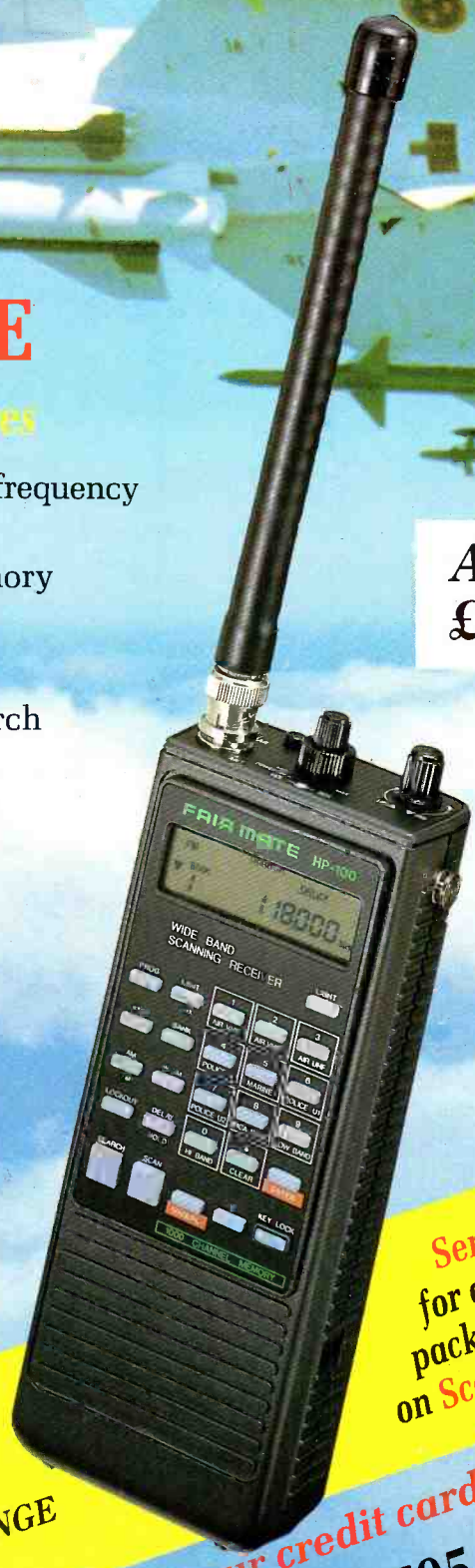

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ALTERNATIVES TO DENCO COILS

R. A. Penfold

This article provides a good starting point to enable coils to be wound with reasonable results. However, these notes on coil winding are for guidance only and you will almost certainly need to do a little 'fine tuning' of the coils to optimise results and get the frequency coverage right. The materials for accurate d.i.y. copies of Denco coils are not available and without special equipment you are unlikely to be able to make them anyway. However, the original Denco terminology and pin numbers have been used throughout the article to give correlation with the genuine coils.

Many projects specify Denco coils to make life easier for the constructor. Unfortunately they are no longer made and supplies seem to have long since dried up. This article outlines some alternatives to enable you to build those designs.

Construction

All coils in the Denco range were wound on unique 3/8in diameter, polystyrene formers with adjustable dust iron cores. However, ordinary 10mm (3/8in) formers should suffice for d.i.y. coils, but they must be fitted with adjustable cores. Maplin Type 450 Formers (LB18U) with Type 8 Cores (LB43W) are the ones used for this article.

The ends of the windings need anchor points. The bases of most formers do not have these as they are only designed to be bolted to a panel. If you require single band only operation, mounting the coil holder onto a p.c.b. fitted with pins to act as connection points for the ends of windings might be satisfactory. For plug-in band changing the coil former must be mounted on a suitable plug.

The most suitable is the Maplin Octal type (HL01B is the plug, HL00A the socket). These are large, but then they need to be to take a 10mm former. DIN plugs are too small, and most other types simply do not offer a suitable number of ways. Either invert the former, or carefully saw off the base so that it can be glued in place on the plug, using a good quality, gap-filling, adhesive, without covering any of the pins. A short rod fitted into the bottom of the former and the hole in the plug will stiffen the assembly, improving the chances of the two sections staying together in use.

An alternative is to drill small holes in the base section of the coil and then take the leadouts through these. This will keep everything nicely in place and there should be no difficulty in mounting the coils on a circuit board. To give plug-in band changing the leadouts can be wired to any plug with enough ways. You will need to mount the holder firmly onto the plug , of course.

The Denco Coils used a B9A (Noval) base with nine pins. Obviously an Octal base has only eight pins, so the original numbering used by Denco cannot be adhered to. Keep a record of which winding is connected to which pin, then there should be no problems.

Alternative Formers

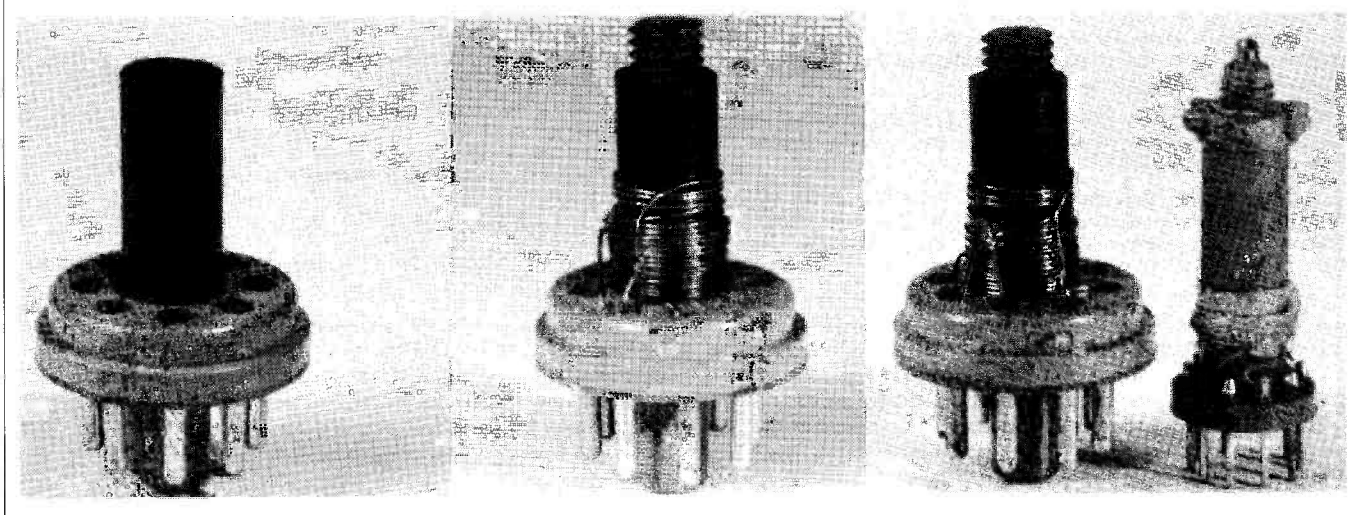
The coils could also be wound on miniature formers, such as the Maplin Type 722 formers, which have a six-pin base. These are not much use for plug-in band changing as matching holders are not available, but they are excellent for mounting on circuit boards. Being about half the diameter of Denco Coils, they need about three times as many turns as equivalent coils wound on 10mm formers.

Remember that the dust iron core is still required whichever type of former is used. **Only adjust the cores using proper trimming tools, otherwise you will almost certainly break the core inside the former.**

Range 5 Coils (10.5 to 31.5MHz)

The main (tuned) winding (pin 1 to pin 6) is about 6.5T of 20 s.w.g. (0.9mm) enamelled copper wire and should cover about 9mm along the length of the former. This is the same for all the r.f. and aerial coils, **Transistor** or **Dual Purpose**. The aerial/input coupling winding (pin 8 to pin 9) has 2T of 30 s.w.g. (0.32mm) enamelled copper wire wound over the top of the tuned winding. In fact, this coil fits in the slight gaps between the turns of the tuned winding. The output coupling winding (pin 5 to pin 7) is 1T of 30 s.w.g. (0.32mm) enamelled copper wire, wound on top of the other two coils.

The **Green Coils**, used in t.r.f. sets, have a feedback winding (pin 3 to pin 4) instead of the output winding (pin 5 to



The d.i.y. version of a 'Green' Range 4 (5 to 15MHz) coil wound on a 10mm former fitted onto an Octal plug. The photograph on the right shows the home-made coil alongside an original Denco coil from the 'Blue' Range.

ALTERNATIVES TO DENCO COILS

pin 7). This is wound below the tuned winding and has 4T of 30 s.w.g. enamelled copper wire.

The **Transistor Oscillator Coils** seem to operate on harmonics, and are not much different to the Range 4 Oscillator Coils. Follow the winding instructions for the Range 3 Oscillator Coils.

The **Dual Purpose Oscillator Coils** have approximately 5.5T of 20 s.w.g. enamelled copper wire as the tuned winding. The feedback winding is 2T of 30 s.w.g. (0.32mm) enamelled copper wire wound over the main winding, at the top of this coil.

Range 4 Coils (5 to 15MHz)

All windings are wound with 30 s.w.g. enamelled copper wire. The aerial and r.f. coils have 15.5T for the main winding. The output coupling winding is 2T wound over and at the bottom of the main winding. The aerial/input coupling winding is 4T wound above the main winding (i.e., not over it, but higher up the coil former).

The **Green Coils** have the tuned and aerial windings as above. The feedback winding is 8T of wire wound on top and in the middle of the main winding. Use 1T less on the main winding of an **Oscillator Coil**. The coupling windings on the **Transistor Oscillator Coils** are 4T of wire (pin 8 to pin 9), and 2T on the other winding, wound below the main winding. The coupling winding on a **Dual Purpose Oscillator Coil** is about 4T.

Range 3 Coils (1.67 to 5.3MHz)

All windings must be of thin, enamelled copper wire, about 32 or 34 s.w.g. (0.25 or 0.2mm). There are 42.5T on the main winding. The aerial/input coupling winding is 11T of wire, wound above the main winding. The output winding is 4T of wire wound on top and at the bottom end of the main winding. About 20T should suffice for the feedback winding of the **Green Coil**. The main winding on the **Transistor Oscillator Coil** has 32T, while the coupling winding (pin 8 to pin 9) has 11T. The other coupling winding has 3T. On a **Dual Purpose Oscillator Coil** about 7T should be satisfactory.

Winding Direction

In some cases, particularly the **Oscillator** and **Green Coils**, the direction in which the coils are wound is crucial. Always wind the coils in the same direction, starting with the lower pin number and finishing with the higher pin number. It does not matter whether you wind the coils clockwise or anticlockwise, provided all windings go the same way with no changes in direction midway through a winding.

Be prepared to experiment a little. You can increase the coverage in the l.f. direction by adding more turns to the main winding, or in the h.f. direction by removing turns from this winding.

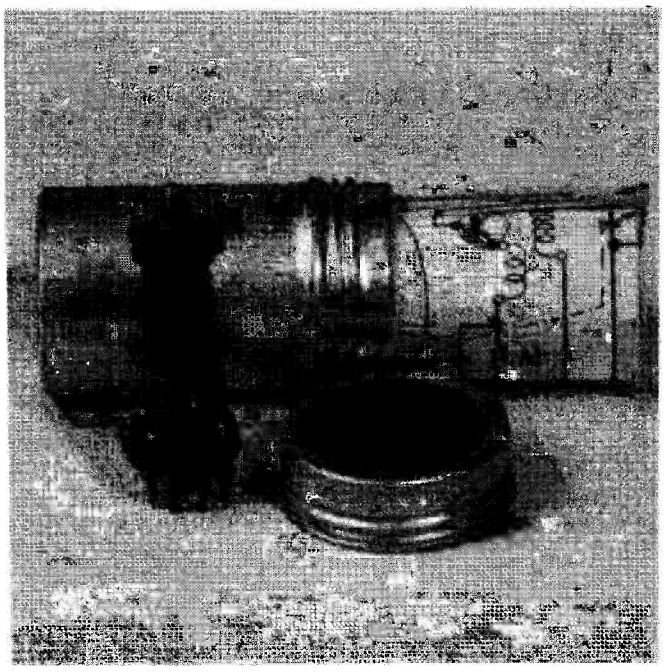
Spreading some glue on the former before you start winding the coils can help to keep everything in place on the finished unit, but is a bit messy. Using a generous amount of epoxy adhesive once everything is finished and you are satisfied with the results is perhaps a better bet.

Home-made coils are unlikely to be as accurate as ready-made ones, and it is probably best to have separate tuning controls for the aerial, r.f. and oscillator stages. This is less convenient than ganged tuning capacitors, but enables everything to be kept perfectly tuned, and makes careful alignment unnecessary. Alternatively, fit large aerial/r.f. trimmer capacitors (50pF or even 100pF variables across the aerial and r.f. tuned windings). Again, this will enable everything to be kept accurately tuned, and will avoid the need for accurate alignment. □

Abbreviations

d.i.y.	do it yourself
DIN	West German Standards Organisation
h.f.	high frequency
in	inch
l.f.	low frequency
mm	millimetres
p.c.b.	printed circuit board
pF	picofarads
r.f.	radio frequency
s.w.g.	standard wire gauge
T	turns
t.r.f.	tuned radio frequency

A selection of genuine Denco coils showing their construction. This shows how difficult it would be to copy the construction exactly. Litz wire is used extensively, wave wound as well!



The original Denco coils were supplied in an aluminium screw-top cannister of the type used for 35mm films. This was intended to be used as a screening can around the coil. Full instructions were also supplied with each coil.

BANDSCAN

Peter Laughton

Dayton Hamfest is held annually in the Hara Arena Exhibition Centre on the outskirts of the city. I can still hear the bustle of hand-held portables, people bargaining for software and generally having a good time. Outside you could wander along no less than eight miles of flea market stands. There were some real bargains to be found amongst some real rubbish - the skill was to spot the jewels in the junk. Inside, the equipment was mostly new.

I expected to see new receiving equipment from Icom of Japan. It didn't turn up at Dayton and people on the Icom stand said that design problems will mean a delay before the ICR-1 and ICR-100 are launched. The super-wide coverage receiver, the SR-1000, from Grove Enterprises of North Carolina was also conspicuous by its absence. Japan Radio Company showed off a new transceiver called the JST-135, otherwise the news from Dayton 1990 was in the fields of add-on units, computer software and especially digital technology.

Interest in amateur radio is currently stable in the US, although the lack of new blood is worrying many amateur radio organisations. Interest in scanning receivers and general short wave broadcast listening seems to be experiencing a boom. The newcomers are not so much the hobbyists, but people with a specific interest in trying to hear broadcasts from a particular part of the world. Fred Osterman is manager of Universal Radio in Reynoldsburg Ohio. Like many dealers at the show, he is convinced there's a growing short wave interest, thanks to the influx of the cheap entry level portables.

Ethiopian Clandestine

BBC Monitoring reports that a new clandestine station is broadcasting to Ethiopia. It calls itself the 'Voice of the Ethiopian People For Peace, Democracy and Freedom' and started broadcasting on April 21 from what is claimed was liberated territory of the Ethiopian People's Revolutionary Democratic Front. The station says its using frequencies in the 49, 44, 43, 40 and 31 metre bands and has broadcasts in the Amharic language between 0400 and 0500UTC, as well as 1500-1600 and 1900-2000. The BBC noted the 0400 broadcast on the out-of-band frequency of 7885kHz.

On The Move

In Melbourne, Australia, tension is mounting at Radio Australia over plans to move the station out of a purpose-built building completed just eight years ago. The parent body, the Australian Broadcasting Corporation, wants to combine RA with ABC domestic services

Peter Laughton was one of over 30000 people who descended on the city of Dayton, Ohio, USA at the end of April.

in a huge building to the south of the city. One of the former managers of Radio Australia, Peter Homfray, was quoted recently as saying that if the move goes ahead the ABC is sure to prune Radio Australia back to five languages. Meanwhile in London it has now been decided that the BBC World Service is to move out of the rented accommodation at Bush House on the Strand. In 1995, a new purpose-built building in White City, west London, will be the service's new home.

Returns To The Airwaves

Dr Adrian Peterson, formerly director of Adventist World Radio Asia, and now based in Indianapolis in the USA says that the media programme 'Radio Monitors International' is to be revived in July. The programme used to air on airtime bought from the Sri Lanka Broadcasting Corporation. Adrian tells us the new series should appear on the AWR short wave network, although a final schedule has still to be finalised. The programmes are being launched at a conference of Adventists being held in Indianapolis in July which is expecting some 50000 attendees.

Radio Earth, a programme production company based in the state of Illinois, not far from Chicago, which has hired airtime on several short wave stations, now intends to start broadcasts this month from Radio Peace International, in Costa Rica. The experimental transmissions are on Saturdays for half-an-hour starting at 23hrs UTC on 13660 and 21565kHz.

As I predicted the Czech external service, Radio Prague, resumed on Monday 7 May after a five week absence. Portuguese and Italian programmes have disappeared, and the station only announces other languages as being Czech/Slovak, French, German and Spanish. Some regular voices are missing and they call the station 'Radio Prague International'. However, in between programmes the interval signal drops the word 'international'. English to Europe appears at 1700-1727, 2000-2030 and 2100-2115UTC on 5930, 6055, 7345 and 11990kHz. Between 1830 and 1845 we noted them on using just 6055 and 7345kHz. How long Radio Prague can remain on the air is still an open question though. Finances are very tight at the station, now operating with just 40 per cent of the staff they had a year ago.

Cuban Jamming Increases

In Washington DC, officials at Radio Marti have announced that their programme is now being jammed by Cuban authorities 24 hours a day. The deliberate interference on 1180kHz has been gradually stepped up. Short wave coverage has been increased too. We note new 6.030MHz between 0600 and 0930UTC being used for Radio Marti.

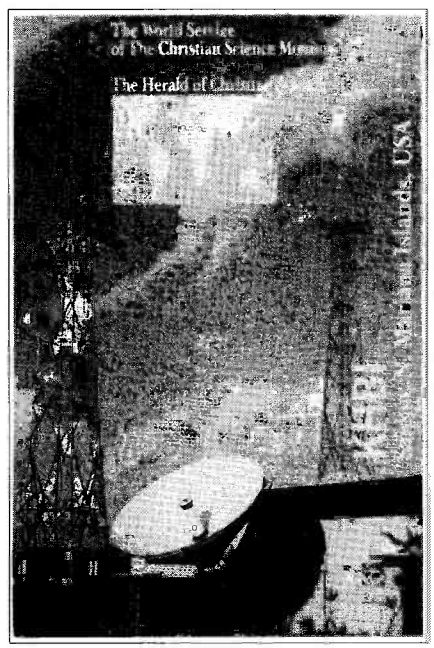
Christian Science QSLs

After a period of testing, the Christian Science Monitor transmitter stations are now verifying reception reports. They've printed up three QSL cards, depicting their three short wave transmitter sites. The cards are being sent out with the current programme schedule. If you want the card officially verified you have to return it to Boston for checking. Such a system is also used by Radio Canada International. For more details drop a line to World Service/Herald, Box 860, Boston MA 02123, USA.

Spanish Developments

The director of Spanish Foreign Radio, Omero Valencia, has been explaining to *SWM* why they suddenly started broadcasts in German and Russian on May 7. It seems they took the decision after an EBU meeting in Geneva. At the meeting, most of the EBU members said they were going to increase their output in German and Russian. Since REE didn't have broadcasts in these two languages, when the director came back from the meeting in Geneva, he simply ordered them on the air.

Spain has been trying to set up a new



One of three new cards from KHBI.

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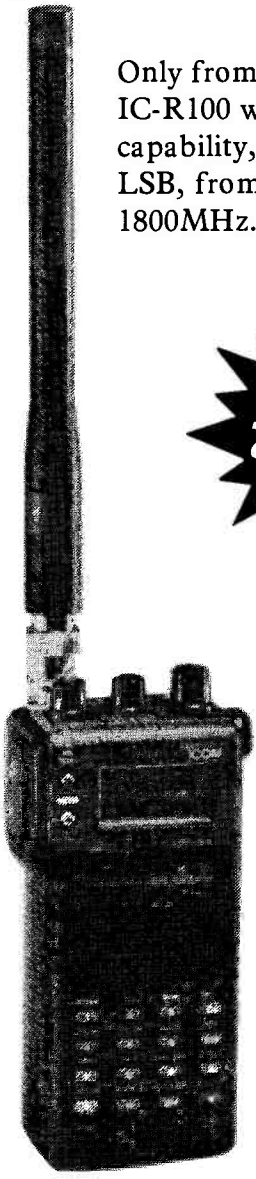

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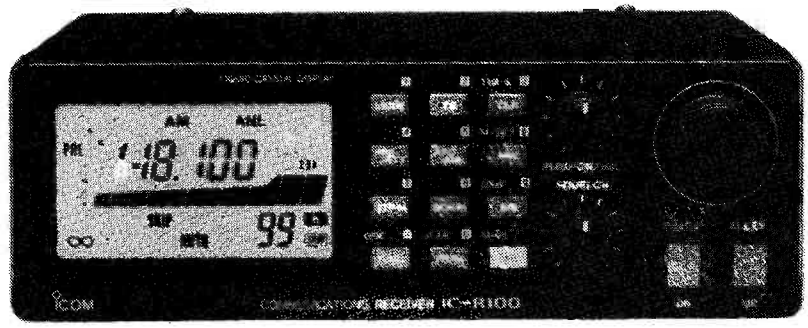

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AIRBAND

Godfrey Manning G4GLM

What's On HF?

In addition to last month's list, **Mohammed Momoniat** suggests 5652kHz is used by Shanwick at night. New York (presumably the Oceanic Control Area) uses 8846, 8855, 8864, 13306 and 13420kHz. Note that flights from Europe contact Gander and not New York over the west side of the Atlantic.

In 1978 I experienced the worst of the French air traffic control dispute. Instead of returning Menorca-Heathrow in two hours, it took overnight involving a stop-over at Madrid. The final sector, by DC-8, was expected to go over the so-called 'Spanish Track', routing over the Atlantic well to the west of French airspace in a suitably equipped aircraft. In the event we crossed the Brest peninsular! Was this the start of this dodge to beat the air traffic strike? Now **Tim Christian** (North Walsham, Norfolk) believes this has become a regular occurrence with aircraft flying along 8°W between Madrid and Prestwick. On the way they talk to Shanwick on 5598kHz, starting and finishing the journey on v.h.f. of course. I am reminded that increasing numbers of short-haul aircraft, such as the Boeing 757, are suitably equipped with inertial navigation systems for north Atlantic routings. Tim recommends US Department of Defence charts - they show communications frequencies.

Whereas most airlines have v.h.f. operations frequencies, few have their own h.f. facilities. Most share the large networks such as British Airways, Portishead, etc. A source close to Novair reveals that this airline has just started its own h.f. operational control based in Hangar six at Gatwick. The callsign is Novair London and the frequencies, with e.r.p.s, are as follows: 6556kHz/500W; 10021kHz/500W; 11363kHz/1500W. Coverage is Europe and north Atlantic out to 40°W. All u.s.b., of course. Frequencies 11363 and 10021 are shared with TAROM; 6556 is shared with Madras and Columbo a.t.c. I note with regret that Novair may be up for sale by its owner, Rank. Readers will be familiar with the way Novair began after the British Caledonian takeover.

Follow-Ups

In May **Roger Ryton** (Newbury, Berkshire) asked you to find the GIBSO on-request reporting point. No prizes, but **John Snell** (Newton Abbot, Devon), **Ronald Galliers** (Islington, London), and **Dick Ware** (Gillingham, Dorset) all combed their radio nav charts (or perhaps they'd flown there!) and came up with N50°45.1' W002°30.3' on airway R8, 45nm from Southampton v.o.r. on a bearing of 260°; this puts it over land just north of Portland. Dick Ware asks why it's called GIBSO.

If you get withdrawal symptoms between air shows, Godfrey recommends some good books and videos to help you out.

Also in May **David Hulme** (Manchester) wanted the u.h.f. frequency of London Mil North and Dick Ware puts forward 262.8MHz.

Back to Ronald Galliers' comments in March concerning the Daventry sector changing from 134.75 to 121.02MHz. **Graham Duke** (Newport, Gwent) tells us that this change was effective from 16/11/89. See also my review of Graham's book.

Help!

In return for the above information, I reward Ronald Galliers with the location of the WILLO on-request reporting point, over land between Gatwick and Shoreham. It's at N50°59.1' W000°11.4' on the intersection of the following radials (bearings from beacons): Midhurst 109° at 17nm distance; Biggin 207°; Mayfield 265°. It's an important point on one of the Gatwick Standard Terminal Arrival Route (STAR) holding patterns.

John Snell's request is for the address of Sandpiper antennas. I suggest searching the usual advertisements, but perhaps a helpful reader could write in with this information since John lost some bits of his antenna in the January gales.

Frequency & Operational News

Another large batch of frequency changes is listed in the CAA *General Aviation Safety Information Leaflet* 4/90. I thought some of these lower airspace radar services were already available, but they are mentioned again: Luton 129.55, Wattisham 135.20, Yeovilton 127.35MHz. Aerodrome changes: Birmingham Approach 131.325 replaces 120.5; Fenland Air/Ground 122.925 replaces 123.05; Woodvale 121.0 replaces 120.65MHz. At Lyneham, 118.425 is available in case of interference on 123.4MHz.

Next, navaids. Manchester v.o.r. (MCT 113.55MHz) suffers local f.m. radio interference on north-easterly radials. Bembridge (IW) n.d.b. has moved to 274.5 from 276.5kHz. The Woodley (WOD) n.d.b. has vacated 357kHz which is now occupied by nearby Heathrow (NE). WOD is now on 352kHz. A recipe for confusion unless pilots take care; WOD is just outside the Heathrow control zone and NE is just inside. Muddle them up and the consequences are obvious.

Derby (Burnaston) airfield has closed altogether. Pilots must not use this magazine as a substitute for NOTAMs.

Now a consideration when planning future equipment, as mentioned in the CAA *Aeronautical Information Circular (AIC)* 19/1990. It seems likely that from 1998 the channel spacing in the 118-137MHz com band will be halved to 12.5kHz. This is important for airlines and indeed anyone choosing new equipment now that has a lifetime in excess of 8 years.

We all hate departure flow control regulation, but it's here to stay. According to *AIC* 21/1990 there will eventually be two Euro flow management centres providing, hopefully, better coordination. Not that this will do anything to slow down the insatiable demand for more air travel; it will just lead to better-controlled delays.

Book Reviews

Thanks to Graham Duke for sending a review copy of the latest (3rd) edition of his book *Air Traffic Control* (Ian Allan, 112 pages, £3.95, ISBN 0-7110-1842-1, not presently available from the *SWM* Book Service). Graham is presumably a controller himself; the book doesn't say so but he uses Guild of Air Traffic Control Officers notepaper! The book describes civil control in UK and north Atlantic airspace, aided by plenty of illustrations. Although a small-sized softback it has extensive coverage of its subject, although small airfield control, services outside regulated airspace, and military zone penetration only get the briefest mentions.

It feels as though the book suffers from an all too familiar author's problem: where to start on an extensive subject. After the first few pages, though, there is better consistency although I do feel that re-arrangement into departure, en route, arrival, and more specialised areas would make the text flow better.

Some specific points would be worthy of elaboration in the next edition. Although it is shown just how important inertial navigation and instrument landing systems are in the context of the book, neither is properly explained. Taxiway block numbers are referred to at Heathrow again with no explanation at all. It is a pity that a north/south orientation of long wire antennas is insisted upon and that an a.t.u. isn't considered important; with a fixed-length h.f. antenna close to the ground, an a.t.u. matters more than direction! Finally, most

USING A SOLAR RADIO TELESCOPE

Ron Ham
Part 3

Ron continues his account of the extended observations of the sun's activity and the effect it had on radio communications.

What luck for me!, this was a case of being in the right place, at the right time and with the right equipment ready and working. During this storm solar bursts were also heard at 28MHz on days 2, 3 and 6 and at 50 and 70MHz on the 3rd and 6th, aurora manifested on the 4th and 6th, a radio blackout occurred on the 4th and Ionospheric disturbances were reported by World Service on the 5th, 9th and 10th.

I wrote the word "severe" against the noise-storm entries in my log for September 15, 16 and 18, 1974 and it was no surprise when an aurora, lasting several hours, manifested during the afternoon of the 15th.

At midday on October 13, 1974, after a 10-day period of solar activity, signals from an OSCAR satellite took on an auroral tone as it crossed the north pole and from about 1400 to 1715 there were many auroral reflected contacts made between amateurs in the UK and Finland, Ireland, Scandinavia and Scotland on 144MHz. During this aurora, tone-A signals from 12 broadcast Eastern-European broadcast stations were received in Sussex between 48 and 71MHz. The reflection area for most signals seemed to be due north, but, toward the end of the event they were peaking in the north-east which shows how the movement of auroral ionisation can be plotted by radio. Do remember that it is very important to include the time and peak beam headings when sending reports to the various auroral co-ordinators.

I have already stressed the value of monitoring the sound while the telescope is running and the following example will emphasise this point. At 0745 on August 22, 1976, I was beacon checking when suddenly, a strong burst of solar noise spread across the 28MHz band. I spent the rest of the day on exercise with 2464 (Storrington) Squadron, Air Training Corps and, as squadron signals instructor, I had a v.h.f. radio-telephone (Pye Cambridge) permanently installed in my car. Communications between stationary and mobile units on the South-Downs and back to our HQ were satisfactory. However, at 1158, I was unable to hear the reply to my call because the incoming signal was completely overpowered by a very high background noise. It was a good 10 minutes before our channel cleared and although I only had the Pye vertical rod antenna on my car, this sound was familiar and remembering that burst at 0745, I soon realised that it was coming from the sun. Of course, it was 'Sir's' lot to explain this event to the cadets in the radio class and to the RT operators at the following evening's parade. My first thought on arrival home after the exercise was to check the midday solar recordings and there, looking spectacular on the chart, was this massive burst, which had lasted for 16 minutes, at 95 and 136MHz. A colleague told me later that he also heard it for about 30 minutes on 28MHz, proving, that on this day, the solar radio noise was spreading over a wide chunk of the spectrum.

The noise storm from August 1 to 8, 1975, was severe on days 6 and 7 at 95 and 136MHz and bursts were heard at 50MHz on the 8th. I entered the word "severe" in my daily log during the November storm from the 17th to 22nd because, on these days, the recording pens, on both observational frequencies, were hitting the upper stops. In addition, some of the bursts within the storm were heard at 28MHz on days 18 and 20. Auroral reflected signals were reported on the 17th and 22nd and World Service announced that Ionospheric disturbances were affecting signals on their north-Atlantic route on days 23 and 24.

The rise in solar activity over the next 5 years began in 1976 with noise storms occurring in January, March, August, September, October, November and December of that year and January, February, March, April, June, September, October, November and December, 1977. During the September, 1977, event auroral openings were reported on days 13, 19, 22, 24 and 25, plus an ionospheric disturbance on the 24th.

1978 was a memorable year for Cmdr Henry Hatfield and myself because during a major noise storm on February 11 we both recorded a massive burst of radio noise, Fig. 3.1 and Henry, using his spectrohelioscope, actually saw and photographed the event taking place on the sun's surface. The sun was very active during the month, in fact, I recorded radio-waves, mainly noise storms, daily from the 2nd to the 26th with severe storm conditions on days 3 and 9 to 12 inclusive. February's weather is not always good for visual observations, but a clear spell on the 5th enabled Henry to count 27 sunspots. Unfortunately, rain

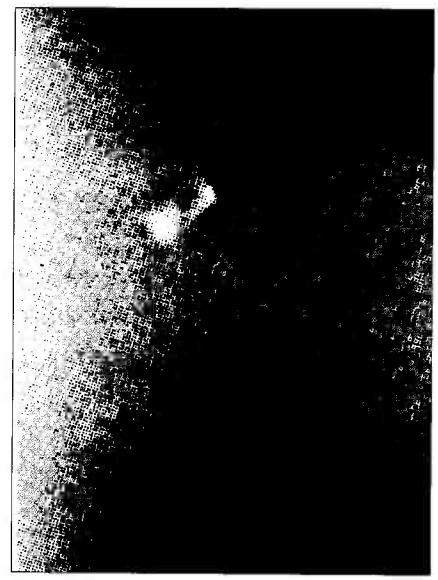

Fig. 3.2.

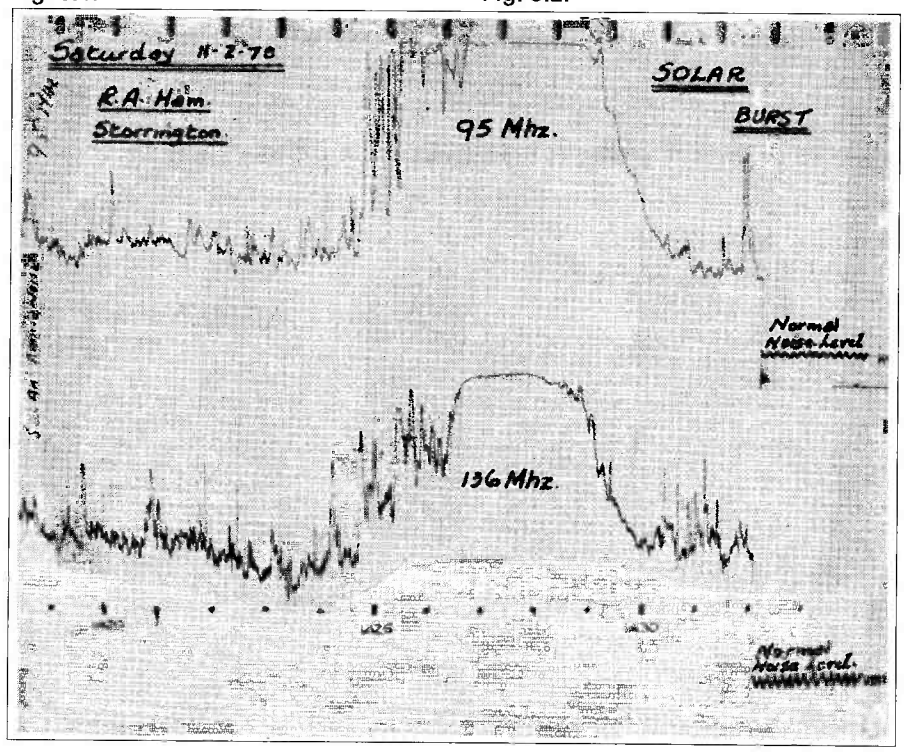

Fig. 3.1.

USING A SOLAR RADIO TELESCOPE

and snow prevented further observation until the 11th, so we had no idea what was causing the solar storm which had been raging since the 7th.

Our luck and the weather changed on the 11th. It was a bright, frosty and sunny day and Henry, with his spectrohelioscope, found that two large ugly looking spots and an active area between them was responsible for all the radio noise that we were recording. Now for the lucky bit, at 1420, Henry decided to photograph these two spots while the sky was clear, then, at 1425, a massive explosion occurred and manifested, for at least 5 minutes, well above the level of the prevailing noise storm which is clearly seen on my recording, prior to the big burst, in Fig. 3.1. What a unique opportunity this was! Henry, not only recorded the radio noise from this massive burst at 136MHz, he witnessed and photographed the explosion actually taking place at the left of the upper of the two "troublesome" sunspots Fig. 3.2. Soon after the land line between Sevenoaks and Storrington was buzzing with excitement as two solar radio astronomers compared notes.

The Discovery

By June 1973, my telescope had completed 5 years work and I was frequently called upon to give talks on the instrument and its results. However, in October 1973, I met Nell Corry G2YL when talking about solar activity to the Guildford and District Radio Society. Nell was their President and she told me that, in 1935, Denis Heightman G6DH heard a "hissing" sound above the background noise of his 28MHz receiver and suggested that this was caused by a solar event.

This was a unique opportunity for me. I had the chance of talking to the pioneers and hearing about their work first hand. Therefore, with the consent of Nell and Denis, I began to research their work from original material and, at the request of Patrick Moore and Henry Hatfield I reported my findings, by lecture, in March 1975 to a national meeting of the British Astronomical Association. Unfortunately Nell died before my research was complete but Denis attended the BAA meeting in London and saw my article entitled 'The Hissing Phenomenon' published in the June 1975 *BAA Journal*. Also, 'The Sun's Influence', *PW* November 1979, or reprinted in *Out Of Thin Air* available from the *SWM* Book Service at £1.80 plus 75p post & packing.

Briefly, contemporary radio enthusiasts found the short-waves very exciting because the majority of them had learnt, from experience, that signals transmitted on these bands were vulnerable to a variety of natural disturbances. Many of those who studied propagation were members of the RSGB's Research and Experimental section and were always ready to investigate something new.

Often during 1935, Denis, a prominent member of the 28MHz group, heard the "hissing" whilst operating on the 28MHz band and consistently observed that this noise only occurred during daylight hours and usually preceded some form of radio disturbance. In January 1936, Nell, another experienced radio operator became the author of the 28MHz report which was published monthly in the RSGB's *T & R Bulletin*.

Nell produced these reports until December 1939 which included her own work on the band and the gen about 28MHz happenings that she received from operators around the world. The information which she gathered was recorded daily in a set of five Diaries (1936-40 inc.) which Nell gave me before her death.

From her diaries and *Bulletin* reports, I found that at least 24 radio amateurs had reported hearing the "hissing" and furthermore it was not confined to 28MHz, because her entries on July 31, 1938 and June 25, 1939 revealed that Miss Barbara Dunn G6YL and Denis, respectively, heard the "hissing" at 56MHz.

Although very few radio enthusiasts were able to observe during the early war years, the "hissing" was reported again in February, March and November 1940 and in June and July 1941.

The important contribution that Denis made to our scientific knowledge was recognised by Dr. R.L. Smith-Rose when he was guest of honour, in 1956, at the fourth annual dinner of the London UHF group when, in his after-dinner speech, he mentioned that "radio astronomy is based on the 'hiss' phenomena, first observed by a British amateur, Denis Heightman, in 1935."

I found further evidence of all this in "Cosmic Notes", compiled by the Propagation Section of the RSGB's Radio Experimental Section, published in the July 1936 issue of the *T. & R. Bulletin*. This piece, covering the period March 14 to June 3, is a good example because it lists such items as "fade-outs" logged by G2NJ, G2XG and the magazine *Wireless World*, "hissing" heard by BRS25, G2YL, G5OJ and G6DH and solar activity, described as "Bright eruption on the Sun", by *Wireless World* and "Very vigorous eruptive prominences on the sun" (May 6), "Prominence near CM on sun" (May 25), and "Prominence of May 25 dying out" (May 26), observed by a Mr. A.M. Newbegin. From my research into the "hissing" phenomenon back in 1972 I believe that this is Mr. Algernon Montagu Newbegin, FRAS, an active astronomer, whose Sussex home and observatory was called 'STARWEEN'

Frequency Change

Although I updated the equipment in October 1978 and moved my observational frequency to a clear spot around 146MHz, this made no difference to the results and the "hissing" was often heard during 1979 when continuous noise storms were recorded for some period during each month except December. Aurora was reported at 1800 on January 4 and around 1915 on the 7th and an Ionospheric disturbance was announced by the World Service around 0630 on the 6th.

While the noise storm was in progress on February 12, I heard a burst at 0915 on 50MHz and, during the afternoon, Henry Hatfield had positive results on his newly installed equipment at 1296MHz. At 1309 on the 23rd a burst swept from 28-146MHz and in March a Sudden Ionospheric Disturbance (s.i.d.) occurred between 1035 and 1143 on the 9th when solar noise was recorded at 60 and 136MHz. Aurora manifested from 2200 to midnight on the 10th, h.f. blackouts were logged on the 23rd and 30th and World Service reported an Ionospheric disturbance at 0300 on the 29th.

The noise storm on March 30 was mainly between 28 and 30MHz. Aurora at 0100 on April 4 followed the noise storm on the 3rd when Henry counted 35 sunspots and saw an arched filament about a quarter of the sun's diameter in size. Solar bursts were heard at 50 and 70MHz during the noise storm from June 9 to 13 and Henry logged a slight increase in noise level at 1296MHz while the storm was in progress at 146MHz on July 4. Aurora was reported on August 13 and 29, a s.i.d. occurred on the 18th and World Service announced an Ionospheric disturbance on the 21st. Henry saw a flare on the east-limb and a group of seven spots just past central meridian on the 14th and a bright spray followed by an eruptive prominence on the 15th. He logged bursts at 28 and 1296MHz on the 14th and solar noise between 50 and 60MHz was reported at 1715 on the 29th. A bright loop prominence seen by Henry could have accounted for the s.i.d. and noise storm on September 14. I logged bursts at 50MHz during the storm on October 12 and the fact that Henry observed 'too many sunspots to count in many groups spread across the sun' was no doubt the reason for the storm between November 8 and 10.

Part 4

In Part 4 Ron concludes the story of his solar radio telescope. □

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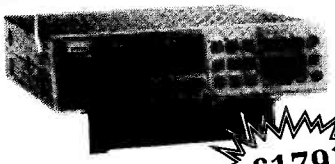

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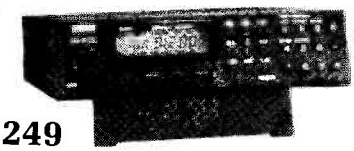

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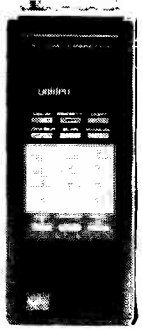

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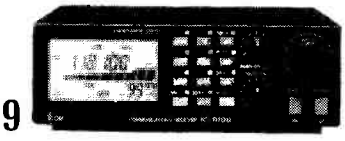

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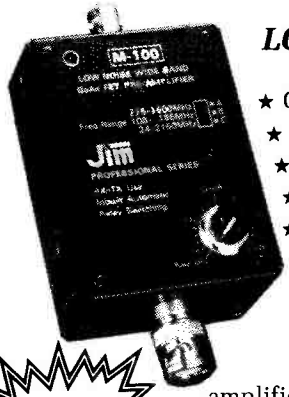

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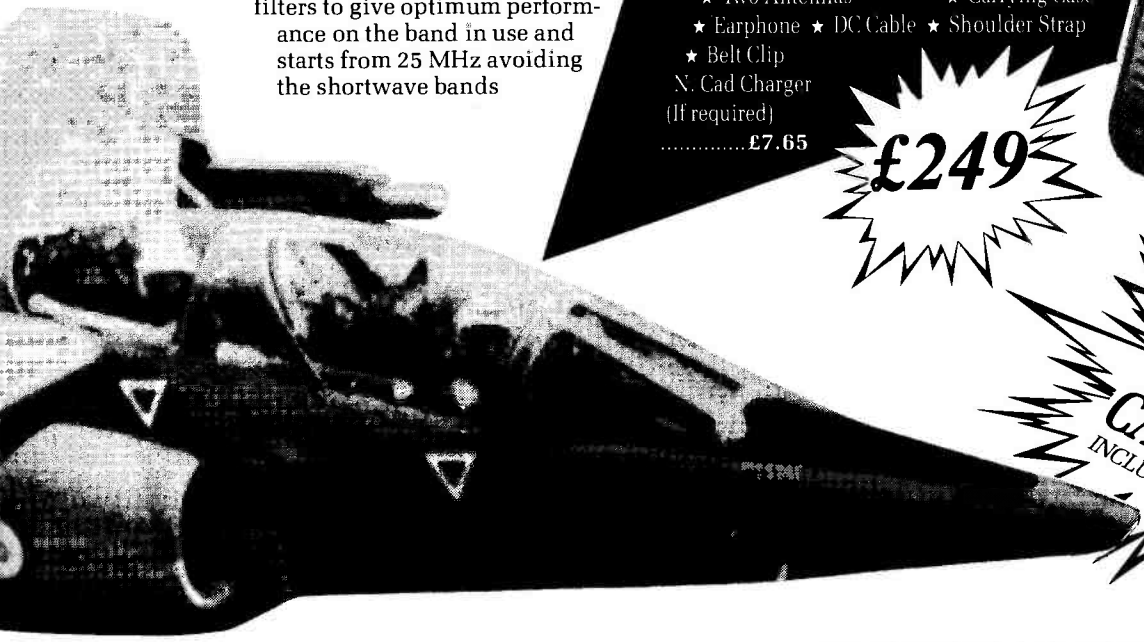

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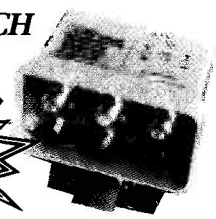

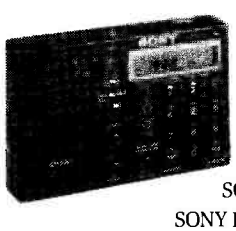

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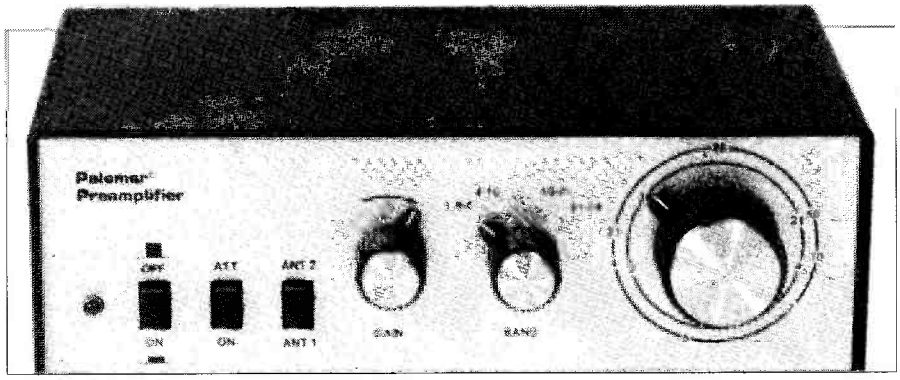
PALOMAR P-405 PRE-AMPLIFIER

Jack Aldridge



Over the years there have been many pre-amplifiers on the market but Palomar have gone one step further and made this one tunable from 1.5MHz through to 54MHz. This has many advantages not the least of which is the ability to protect both the pre-amplifier and the main receiver from strong out-of-band signals.

The P-405 pre-amplifier from Palomar Electronics has been designed to provide some added life to your receiver so should be received with interest by listeners.

Getting Started

The P-405 came with a two-page A4 sheet that contained all the operational information plus a full circuit diagram. Although this information was very brief, the essential points of its operation were adequately covered. It was also refreshing to see a full circuit diagram included.

The external connections were very straightforward with three SO-239 connectors on the rear panel for the two antenna connections and that to the receiver. An externally mounted PP-3 type battery supplies the power. This was perhaps slightly unusual but in practice a good technique as battery replacement was very simple. The battery was secured to the rear panel by a rectangular 'Terry' clip.

Facilities

Palomar have done their homework with the facilities provided on the P-405. Two antennas can be connected and selected via a push button on the front panel. This is very useful as the wide coverage of the P-405 would need to be supported by two antennas. The power switch uses another push button and this has been conveniently arranged so that when switched to OFF, the selected antenna connects directly to the receiver. Besides providing amplification, 20dB of attenuation is selectable via another front panel switch. This switch is arranged so that the attenuation is inserted despite the position of the main on/off switch so adding to the versatility of the P-405.

As the P-405 is a tunable pre-amplifer there were controls for setting the operating frequency. These comprised a four position band switch and a 32mm rotary tuning control with a dial and a 270 degree scale marked with the frequency. The band ranges used were 1.8 to 4.0MHz, 4 to 10MHz, 10 to 21MHz and finally 21 to 54MHz.

The only remaining item on the front panel was an l.e.d. that indicates the power is on. In fact with a total consumption of only 9.5mA I suspect that most was being drawn by the l.e.d.!

Under The Bonnet

The external finish and presentation of the P-405 was of a very high quality. It appeared to be well lacquered so it should maintain its looks over prolonged periods of use. This high quality was also in evidence with the covers removed, which was reassuring and made a pleasant change from some equipment I have seen.

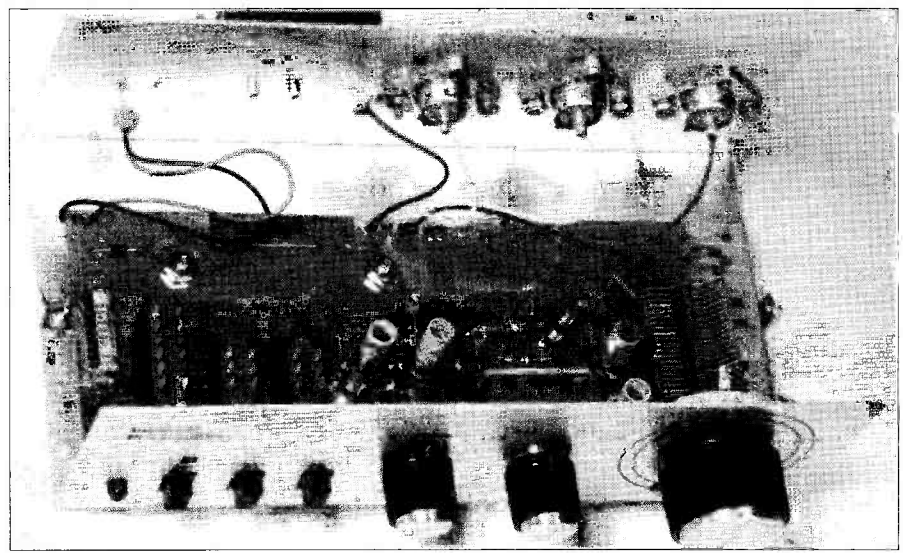
The printed circuit board was double-sided glass fibre that was tinned, printed with the component designations and covered with a protective lacquer. One interesting point concerned the size of the printed circuit board. As the box size is determined primarily by front panel controls it is quite common to find that within the box is a very small board. This is not so with the P-405 as the board has been expanded to occupy the full width of the case.

This may seem a strange point to note, but the result of this larger board is that the components are wider spaced and so the connection between the front panel controls and the amplifier are kept much neater. This makes it much easier to manufacture a unit with a predictable and repeatable performance than if hard wiring techniques were used. The additional advantage for the user is that servicing is very much easier and well within the capabilities of a skilled amateur.

Circuitry

The two antenna sockets are fed to the tuned circuits via an antenna selection switch and the switchable attenuator. The coupling to the tuned circuits was via a low impedance winding on each of the four tuning coils and the band switch. The variable tuning was achieved with a 140pF variable capacitor that was directly coupled to the front panel.

Limited overload protection was supplied by a pair of back-to-back diodes connected effectively across the tuned circuits. The amplification was provided by a 40673 dual insulated gate m.o.s.f.e.t. This device has been around for several years and is often used very successfully in this role. The variable gain control operates by adjusting the bias to gate 2



PALOMAR P-405 PRE-AMPLIFIER

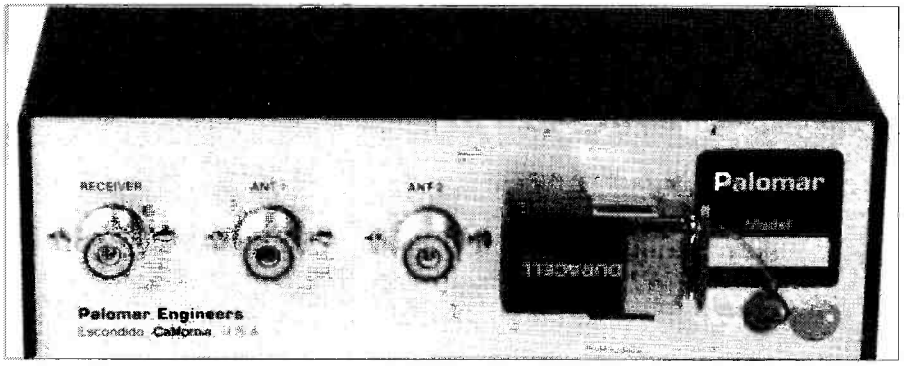
of the 40673. A certain degree of protection from signals applied by the inadvertent connection of a transmitter are provided by a second pair of back-to-back diodes that are connected across the toroidal output transformer.

As the main supply was from a 9V battery the only processing was provided by an electrolytic capacitor for smoothing and to reduce the source impedance and a few small value capacitors to provide r.f. decoupling. Overall, it is a very simple but effective design.

In Use

The use of SO-239 connectors made the inclusion of the pre-amplifier into my system very simple as these are in use for all my h.f. antenna connections. Most of the air tests were performed using my Icom IC-720A and a nest of dipoles.

I started with a look around the amateur bands and found the general performance to be very good and met my expectations. The operation of the tuning control was critical as the point of maximum gain was very sharp. The tuning scale markings proved to be slightly confusing at first due to the markings appearing both above and below the dial. Unfortunately there was no explanation of this in the manual. A little logic revealed that the two l.f. bands were marked below the dial while the h.f. bands were marked above the dial.



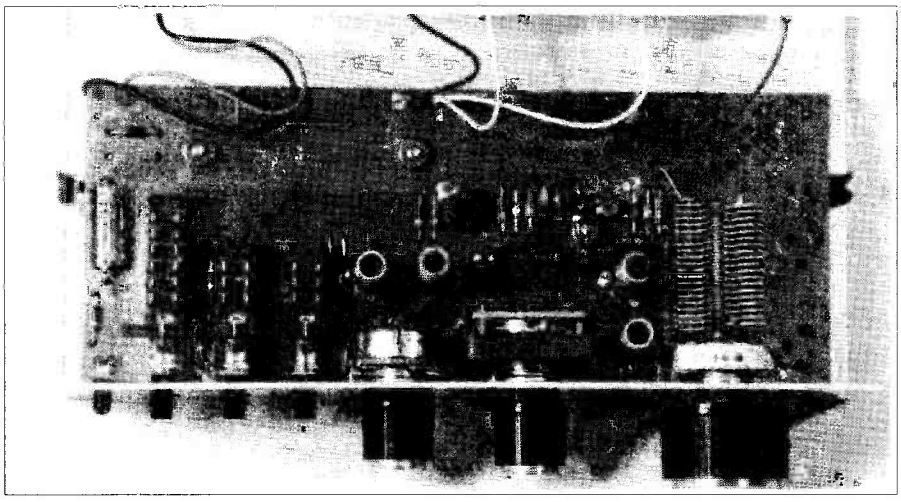
With the basic performance established I set about some simple performance measurements. The first test was to establish the gain of the pre-amplifier. This turned out to meet the specification producing 20dB of gain throughout its operating range. I next measured the adjustment range of the variable gain control on the front panel. The review model gave a useful range of about 10dB, which was slightly less than the specified 15dB. This control meant that the total unit gain could be varied from 10dB through to 20dB.

The next step was to move on to the performance of the attenuator. This was specified as 20dB but I had noticed that during the on air tests it appeared to be giving somewhat less than 20dB. This was easily explained by the configuration of the attenuator that was of the T type as opposed to the more normal Pi type for this application. The reason for the apparent variation on attenuation is that this type of attenuator only gives its design attenuation when operated at its correct impedance. Most antenna systems used by listeners tend to exhibit impedances that vary widely with frequency so will result in varying losses from this type of attenuator. When I tested the attenuation using an accurate 50Ω signal source the expected 20dB was obtained. It is important to keep a sense of proportion with regard to the attenuator performance as it is rarely used to insert precise levels of attenuation but rather to lower the level of an incoming signal to reduce overload problems in the receiver. For this function the attenuator proved to be perfectly adequate.

By combining the attenuation and gain control facilities you could achieve an overall adjustment range of -20dB to +20dB that was very useful.

I use the P-405 to receive several different types of signals throughout the range of the unit. These signals varied from straight forward broadcast stations through to complex utility modes. Throughout these tests the P-405 performed extremely well and was very useful. I've always had my doubts about the real usefulness of h.f. pre-amplifiers, but the P-405 has convinced me that this type of tunable and variable gain unit can be worthwhile.

Although my receiver did not suffer problems with image and other spurious signals the P-405 could help to reduce this in some receivers particularly the simpler types.



Summary

I found the P-405 to be a very well designed and useful pre-amplifier. I'm sure many readers will find a use for such a unit. It was also refreshing to see such high quality both in terms of construction and performance, a feature that is often lacking in the accessory market.

So finally I can confidently recommend the P-405 as representing good value for money.

The Palomar P-405 can be obtained from **Bredhurst Electronics, High Street, Handcross, West Sussex**, price £119.95. My thanks to them for the loan of the review unit. □

Specification:

Frequency Range	1.8 to 54MHz in four bands 1.8 to 4MHz 4 to 10MHz 10 to 21MHz 21 to 54MHz	Variation	15dB
		Power	9V PP-3 type battery
		Size	70mm high 210mm wide 130mm deep
Gain	20dB with 50Ω input and output	Weight	0.5kg

SCANNING

Alan Gardener

Product News

Rather a nice looking pre-amplifier is now being stocked by Lowe Electronics. Called the LNA-3000 the unit is intended for masthead mounting as the circuit is housed inside a substantial weather proof case complete with mounting clamp. The advantage of masthead mounting is that the amplifier has a chance to boost really weak signals before they are subjected to any further loss in the coaxial cable connecting the antenna to the receiver. The unit can be powered from any 12-15V d.c. source, either by means of a separate power cable or via the coaxial cable with the addition of the DCC-12N interface unit mounted at the receiver end. The electrical performance of the amplifier is good with a gain of 13dB and a specified frequency range of 50-3000MHz (±1dB). This makes it ideal for use with scanners capable of reception above 1GHz.

The two most important parameters to be considered when looking at pre-amplifers are the noise figure and the intermodulation performance. The noise figure indicates how well the amplifier can boost incoming signals without adding additional noise.

The LNA-3000 offers a typical noise figure of 1.8dB over the range 50-500MHz, 1.8dB at 1GHz, 2.5dB at 2GHz and 3.4dB at 3GHz. These are very good figures for such a wide band design and should be of particular interest to anyone with an eye on the 1.6GHz weather/navigation satellite band.

This month Alan looks at a new pre-amplifier and explains some of the important parameters. He describes a simple d.i.y. stand for a popular hand-held and a mod for the Tandy PRO-2022.

The intermodulation performance indicates how well the circuit behaves in the presence of strong signals.

This is of particular importance if the amplifier is going to be used in an area where there are likely to be several transmitters operating within a few miles of the receive antenna - city centres are a typical example.

If an amplifier is not particularly linear signals entering the circuit mix with each other and produce additional spurious signals at other unwanted frequencies. With very poor designs this can result in the wanted signals being masked by spurious signals actually making reception worse with the pre-amp in circuit - especially when many strong signals are present.

Intermodulation performance is generally measured by injecting just two signals into the circuit to be tested. Although in real life the amplifier may well be subjected to more than two signals at once this technique does give a good repeatable measure of the circuit performance. The output of the amplifier under test is monitored by means of a specially designed receiver or spectrum analyser. The level of input signals are increased until a spurious signal is produced which is a combination of the two test signal frequencies.

The permutations that normally produce the most troublesome signals are $(2 \times f_1) - f_2$ or $(2 \times f_2) - f_1$. Both of these are termed 3rd order products. It should be noted that the spurious signals increase in level at a much greater rate than the wanted signals so there is a point at which the unwanted signal levels become the same as the wanted signals.

By plotting a graph with the input signal level on one axis and the output signal level on the other it is possible to determine the point at which this occurs - generally referred to as the 3rd order intercept point. This figure can then be used to determine the level of spurious signals which will be produced for any given set of input signals.

One word of warning though - the figure can be quoted at either the input or output of a device. Manufacturers generally quote the figure at the output but in most cases it is more useful to know the figure at the input as this is where the signals will be entering the circuit. To obtain this figure subtract the gain of the unit from the output 3rd order figure.

Most average quality scanning receivers have a 3rd order intercept point of around -20dBm. As long as any additional pre-amplifier has an input 3rd order intercept point much greater than this figure then any spurious signals will be generated inside the receiver rather than the pre-amp.

However, be careful as the receiver's 3rd order intercept point will be lowered by an amount proportional to the gain of the pre-amplifier. This will worsen its strong signal handling performance. For this reason you should not use more gain ahead of a receiver than is absolutely necessary.

The LNA-3000 has a 3rd order intercept point of +22dBm measured at the output. Taking the amplifier gain of 13dB into account this gives an input 3rd order intercept of +9dBm - a good figure which should ensure freedom from pre-amplifier overload problems except under the most arduous of conditions. It also makes the LNA-3000 ideal for use as a distribution amplifier. If you have more

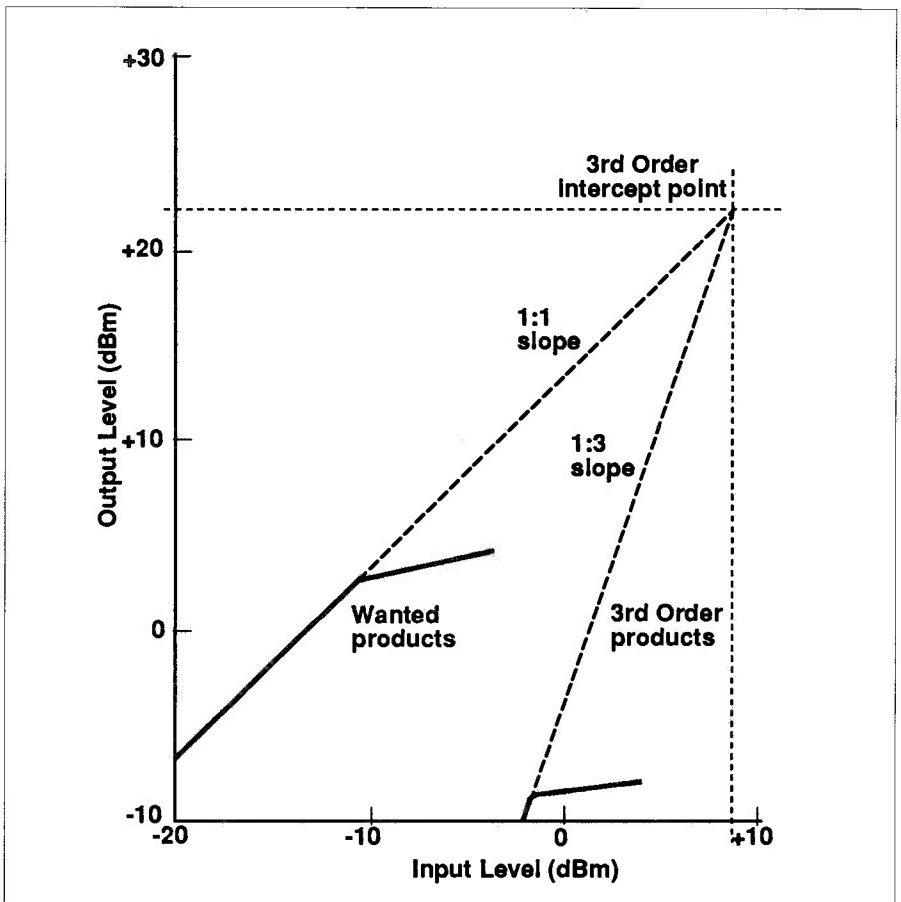


Fig. 1: Graph showing the derivation of the 3rd order intercept point.

than one scanner but only one antenna, you could connect it to the input of the LNA-3000 and feed the output via a low-loss TV antenna splitter to the receivers.

Most of the good quality splitters work well up to the 1GHz region and provide a reasonable degree of isolation between the two output ports. The lower cost resistive ones do work but you lose twice as much signal through them so it's worth paying a bit more.

It is very difficult to achieve wide bandwidth, low noise and good intermodulation performance so it is perhaps not surprising that the LNA-3000 sells at around £112 - however if you are particularly interested in frequencies around or above 1GHz it may well prove a useful addition to your monitoring post.

If you would like more information contact: Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: Matlock (0629) 580800.

AOR AR-3000

A few lucky AR-3000 owners (yes there are some!) have told me that the latest models have only one antenna socket on the rear of the receiver in place of the two found on earlier examples (one for up to 30MHz and the other for beyond 30MHz). No serial numbers above 2000 have so far been reported so it looks as if there may still be a few production difficulties.

However, the new circuit board layouts look a lot more professional than some of the earlier versions I have seen so perhaps dealers may soon be able to clear their waiting lists.

There are a couple of other points concerning the receiver. If you intend to use the AR-3000 on h.f. with anything more efficient than the wire antenna supplied ensure that you switch the r.f. stage out of circuit.

To do this open the receiver and look at the top circuit board - take care of the loudspeaker leads when you do this. You should find two small slide switches mounted next to each other. Make a note of the original positions and slide each of them to the opposite position.

You will now find that the strong signal handling performance is much improved when the receiver is used with full sized or resonant antennas. Leave the amplifier in circuit if you only intend to use small whip antennas. Note that the switches only effect the h.f. range up to 30MHz, the v.h.f./u.h.f performance remains unaltered.

If you need to reset the microprocessor controller for any reason there is a small push button mounted on the controller p.c.b. **Warning: Pressing this button erases all the memory contents - only use it as a last resort.**

There is also a small slide switch hidden on this same board. Operating it seems to do very little so its use remains unknown - any ideas anyone?

Icom ICR-1

The general belief is that a few examples of this desirable hand-held scanner may appear in early September. However the model which is currently available in Japan has not had a particularly encouraging review in the Japanese amateur radio press. I suspect that a few changes may have to be made to improve its signal handling performance before the model becomes more generally available.

I don't find this too surprising as the original specification seemed incredible in terms of both size and performance and I am sure that several litres of midnight oil have already been burnt in the competing manufacturers' design departments.

Until then I am continuing to save pennies in my cardboard cutout ICR-1 money box!

AOR AR-1000
Fairmate HP-100

This hand-held is becoming very popular with readers, especially those interested in the airbands. **K. Naylor** of Oxfordshire

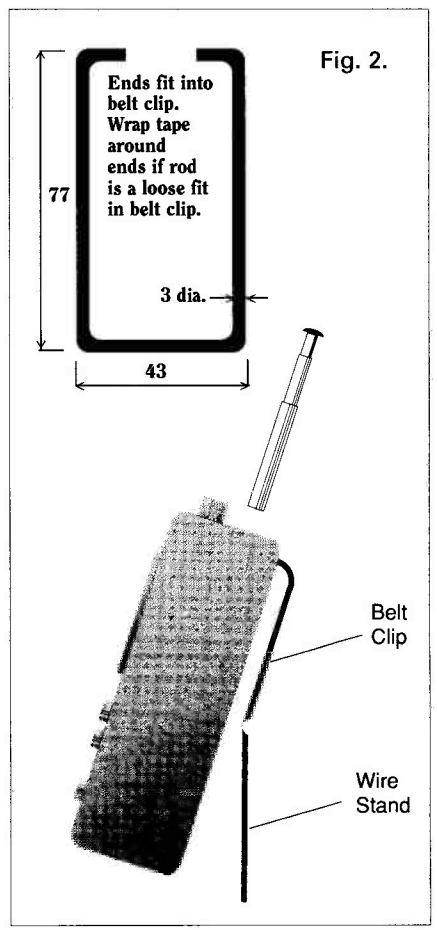


Fig. 2.

is pleased with his AR-1000 but found it a bit unstable mechanically when he tried to stand it upright on a table whilst using a telescopic whip antenna. To get around this problem he has devised a very simple but effective fold down stand for use with the receiver.

Like all the best ideas this one is very cheap and easy to implement. All that is required is around 300mm of stiff wire such as that used for coat hangers, a short length of 3mm welding or brazing rod would be ideal. This is formed into the shape shown in **Fig. 2** and the two loose ends are inserted into the tubular section forming the bottom of the supplied belt clip. If the fit is a bit on the loose side you can wrap a small amount of tape around the rod in order to build up it's diameter a little.

You should now have a handy stand for your favourite scanner which you can adjust to give the correct operating angle. If you want to experiment with the angle you may have to change the supplied dimensions a little but they do give a good starting point.

My thanks to K. Naylor for this very practical suggestion.

Tandy PRO-2022

Ray Milton of Kent has been busy examining the circuit of his Tandy PRO-2022 scanner and has come up with a useful modification which provides manually selectable a.m. on the four most popular bands.

He discovered that the selection of each frequency band is made by means of a transistor driver stage. The driver for the 108-136MHz a.m. aircraft band also provided an additional feed to another stage in order to switch from f.m. to a.m.

By fitting a switch and a few additional diodes it is possible to simulate this switching action on any of the other ranges except the highest, 806-960MHz, as this uses a different polarity switching signal. However, as Ray points out it is very unlikely that you would want to select a.m. on this band.

As is customary with all modifications of this type here is the statutory health warning - **please be sure of you own abilities before you start work and also be warned that any changes to the receiver are more than likely to invalidate any warranty in force on the equipment.**

Disconnect the power and open the case. You need to be able to get to the underside of the main circuit board so be careful not to disturb any interconnecting leads too much.

Locate the surface mounted transistors near to the mains transformer (see **Fig. 3**) and carefully solder three new diodes as shown making sure that they do not short against any other

SCANNING

sections of the circuit board. A piece of insulation tape under the diodes may be advisable. Connect all three diode cathodes (the end with the band) together and run some thin insulated cable from this point to the new switch.

You may want to mount the switch at the rear of the receiver to avoid having to drill the moulded plastics front panel. The next stage is to add another diode in place of link JW48.

By fitting this diode you will retain the existing automatic selection of a.m. on the v.h.f. aircraft band. If you don't want automatic operation just remove the link and fit the diode into the position marked D4 in the diagram.

Connect a 39kΩ resistor between JW47 and JW48 and finally run a lead from the junction of the resistor and JW48 to the other contact of the new switch. Operating the switch so that the contacts are in the closed position should select a.m.

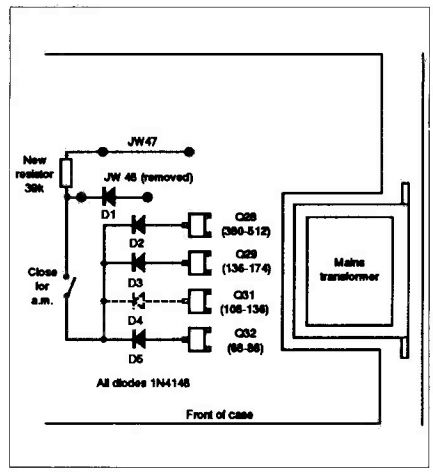


Fig. 3.

Give the modification a quick test before you screw the case back together.

There you have it - quite a simple modification which I am sure will be appreciated by existing owners as it should greatly improve the versatility of the receiver on the v.h.f. bands. My thanks to Roy for passing on these details.

If you have any interesting modifications, hints or tips that you would like to share with the rest of us why not drop me a line at PO BOX 1000, Eastleigh, Hants SO5 5HB.

Until next month - Good listening. □

AIRBAND

14☛

aeronautical messages are transmissions and very few are broadcasts but the book confuses this fine detail.

I liked the real-life transcripts of air-ground dialogue. These are the best way to illustrate the text and make the book come to life. Appropriately placed illustrations help, too. This is not just a textbook on air traffic control; there's plenty of helpful advice about receivers, antennas, and other information for the s.w.l. At the end is a frequency list for airways control.

To the technically-minded enthusiast who has noticed that air traffic control exists and now wants to know more details I commend this book which is good value for money. I suspect that the true first-timer will need to re-read certain sections of the book after gaining experience, but that's what learning is all about. It might even appeal to a p.p.l. student who wants to know how the big aircraft behave!

I couldn't resist adding *Rescue* by **Paul Beaver** and **Paul Berriff** (Patrick Stephens, 192 pages, profusely illustrated mainly in colour, £9.99, ISBN 1-85260-291-0) to my library. Those who watched the accompanying television series (made in association with Scottish Television) will have sensed the life and conditions of rescue helicopter crew. There was no formal technical information; viewers had to contend with 'needles split' in checklists, 'winch to pilot' during rescues, engine failure planning, 'quarter-mil topos' for navigation, and much more, without any explanation. If you already knew about flying then you could apply your knowledge, otherwise the finer points would be lost on you.

Make no mistake, the book is written along the same lines. You won't learn to fly helicopters by reading it but the atmosphere is there. This is not drama, this is real life and makes a true impression on an audience now hardened by seeing misfortune and violence acted out every day in the media. The success of the book is that it can bring this message home without fading in to the background of routine excitement to which the average television viewer has become accustomed.

This column's readers will especially like the transcriptions of air/ground and between-crew dialogue; also, there is a summary of the main distress and rescue radio frequencies and helicopter base locations. Don't get this book as a technical exercise. Read it for the experience, and then think just what the rescue crews really do in each day's work.

Video Reviews (VHS - PAL)

Wings - The Jet Age (Visnews Ltd., Cumberland Avenue, London NW10 7EH. Tel: 081-965 7733. About 54 min. Around £11 by post). Lots of exciting film clips of all manners of aircraft. Like a rapid airshow spanning the years - but little else. I found the commentary rather silly; apart from telling you which aircraft type was in shot, not much information was imparted. Although supposedly a history, there is no methodical structure. Enjoy watching rareities such as a Trident automatic landing (seen from the cockpit) and the Avro 707 "mini Vulcan" in formation. But turn the sound off first.

Talking of Vulcans, *Delta 83* (30 mins, £16.20 by post) is from The Vulcan Association - but you'll have to join first! Well worth it at £9 for the current year, to keep XH558 (the last flying Vulcan) alive and displaying. The aircraft has its 30th birthday this year so it's catching me up fast! I make no apology for emphasising that, without further support, 1990 will be the last year in which a Vulcan flies. Back to the video. Featured are B1 Vulcans from Waddington. It gives a good idea of the atmosphere of a V-force base around 1960 but, again, is non-technical. The commentary and style of presentation match the period and now look dated but will I'm sure bring reminiscences back to anyone who was associated with these aircraft all those years ago. Join the Vulcan Association, 207 Weoley Castle Road, Weoley Castle, Birmingham B29 5QW. Mention *SWM* when sending your subscription.

The next three deadlines (for topical information) are June 29, August 3 and September 7. All correspondence to the *SWM* office please. □

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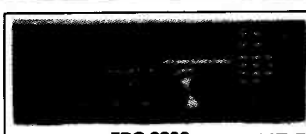

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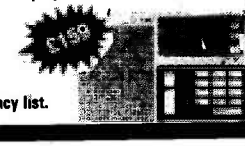

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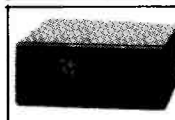

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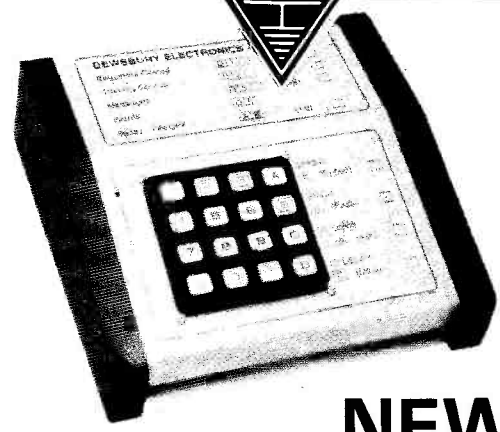

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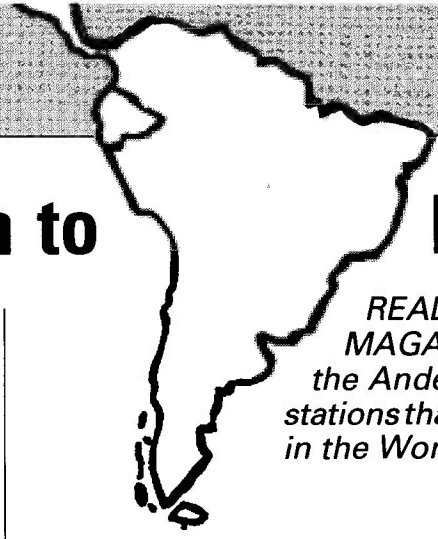

READER OFFER FROM SHORT WAVE MAGAZINE...Do you fancy a holiday in the Andes visiting and listening to radio stations that you have only ever come across in the World Radio and TV Handbook?

Short Wave Magazine and HCJB-UK are organising a two-week DXpedition to Ecuador. You will have the opportunity to visit HCJB's transmitters, studios and hydro-electric plant as well as some other radio stations in Ecuador. However, the two weeks holiday will not all be radio - you will have plenty of time for sight-seeing and visiting the contrasting sights of Ecuador, making this a holiday that you will not forget in a hurry.

Itinerary

Those readers participating in the *SWM*/ HCJB-UK Ecuador DXpedition will fly from London, Heathrow in May 1991 *en route* for Quito, capital city of Ecuador. The itinerary in Ecuador will include a tour of Quito, trips to the equator and the rain forests of the Amazon, visits to the Otavola Indian market and the San Antonio wood carvers. HCJB, the Voice of the Andes, has its headquarters in Quito, and we will be visiting the transmitter site, the studios as well as the hydro-electric plant across the Continental Divide. There will also be opportunities to visit other radio stations in Ecuador as well as taking sight-seeing tours and time for shopping.

Ecuador

Ecuador is a land of contrast, with lush green jungle and treeless mountain slopes, placid lakes and raging streams, quiet villages and busy cities. It is the home of the Panama Hat and produces bananas, balsa wood, cocoa and oil which it exports world-wide. Quito is only a few minutes drive from the equator and a short distance from the Continental Divide, at an altitude of 2800m, and temperatures range from around 5°C at night to 23°C at midday.

Tour Information

Cost will be about £1100 including Economy Class air fare London to Quito and return by regular scheduled flight, insurance, meals and accomodation in Ecuador and tour-arranged transportation. This price is subject to change due to currency fluctuations or increases in air fares. A deposit of £50.00 per person is required with the booking. This is part of the total cost of the tour, but is non-returnable if cancellation is made after thirty days before the tour starts.

Legal: A valid passport is needed but there are no visa requirements.

Medical: No compulsory injections or vaccinations are required, but you are advised to consult your doctor for recommendations. Remember, Quito is 2800m (9500ft) above sea level.

Clothing: Spring or autumn clothing is the most appropriate together with good walking shoes.

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AN EASILY-BUILT 16-30MHz CON

Bryan Robe

P

One of the few drawbacks of the R210 ex-MOD receiver is that its coverage stops at 16MHz. This easily constructed converter will extend this all the way to the top of the short wave spectrum at 30MHz.

The articles by Tom Harrison GM3NHQ in *Short Wave Magazine* on converting the R210 ex-MOD receiver accentuated its limited coverage - it is only capable of receiving signals between 2 and 16MHz. This, however, seems to be one of its few drawbacks, as the sensitivity and selectivity of this receiver, when in good working order, puts some of the more recent equipment to shame.

Sunspot Cycle

In view of this shortcoming, together with the fact that we are now at the peak of the current eleven-year sunspot cycle, it was decided to produce a simple but highly efficient converter which, when placed ahead of the R210 will extend its range from 16 to 30MHz.

This will give you reception of all of the upper half of the short wave spectrum, at present providing excellent worldwide coverage.

Circuit

There are three stages to the converter. A high pass filter, a crystal oscillator and a mixer. Fig 1.1 shows the block diagram of the converter. Fig 1.2 shows the circuit diagram. Signals from the antenna are fed to S1. This is an attenuator which preceeds the converter. It is arranged this way so that it may be used directly either directly ahead of the R210 or the converter, thus preventing overloading of the receiver if used with a large antenna. This is a facility not available on the R210. The signal then passes via S2. In the 'off' position this switch routes the signals directly to the R210, in the 'on' position routes the signals via the converter and also supplies the converter with a 9 to 12V supply.

In the interests of simplicity the feed from the converter and the bypass link are joined at the output socket. This saves having to use a more expensive 3-pole switch and has no effect on the performance of the converter.

Chebychev Filter

When the converter is in circuit the signals pass through a high pass filter. This is a seven-element Chebychev design which has an input and output impedance of 50Ω. This filter allows all signals through above 16MHz and attenuates those below. The lower the frequency the

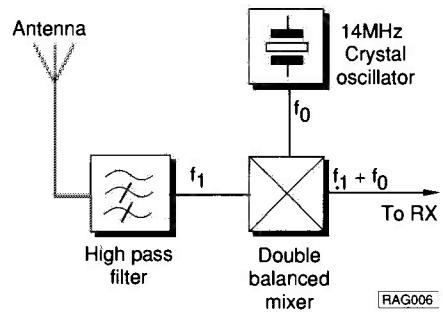


Fig. 1.1: Block diagram of the converter.

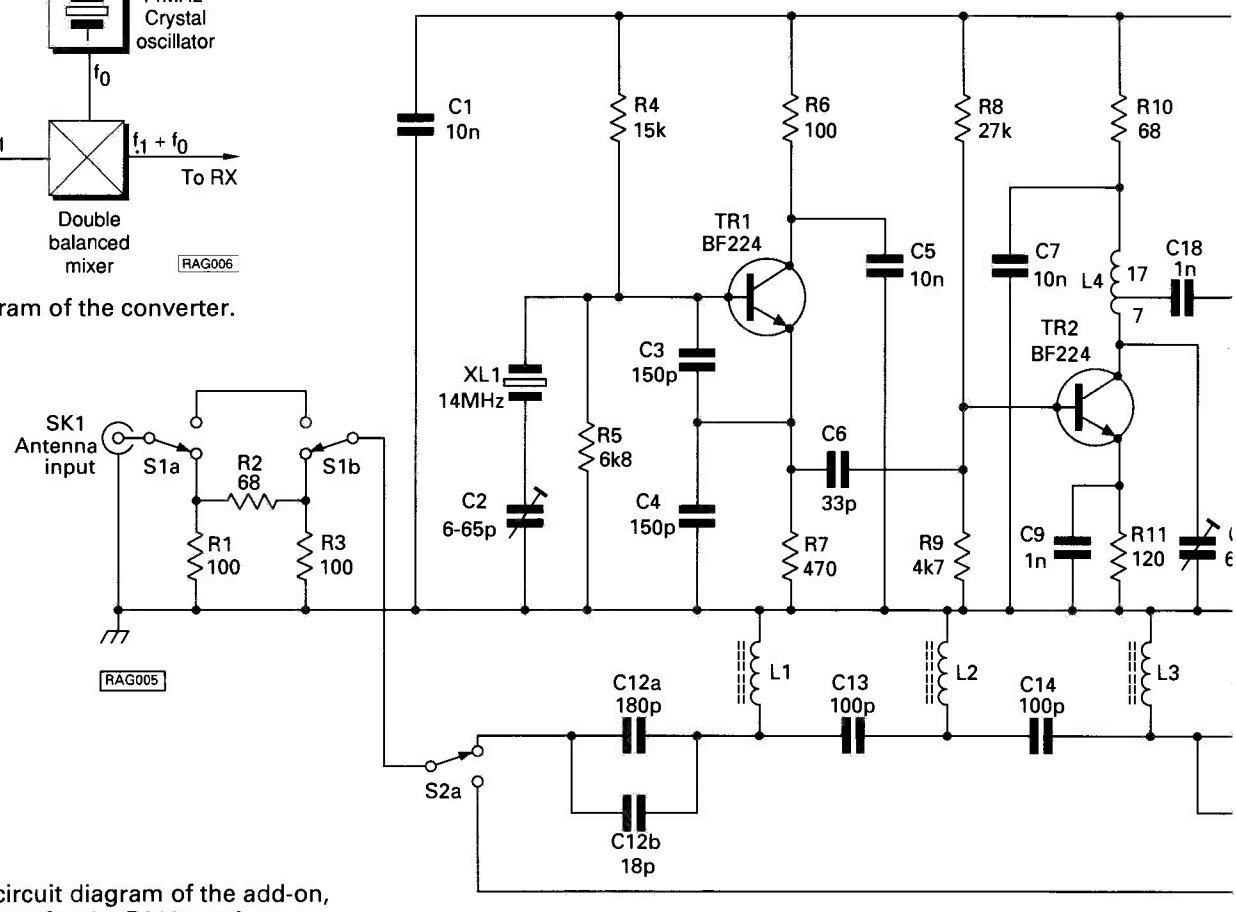


Fig. 1.2: Complete circuit diagram of the add-on, 16 to 30MHz converter for the R210 receiver.

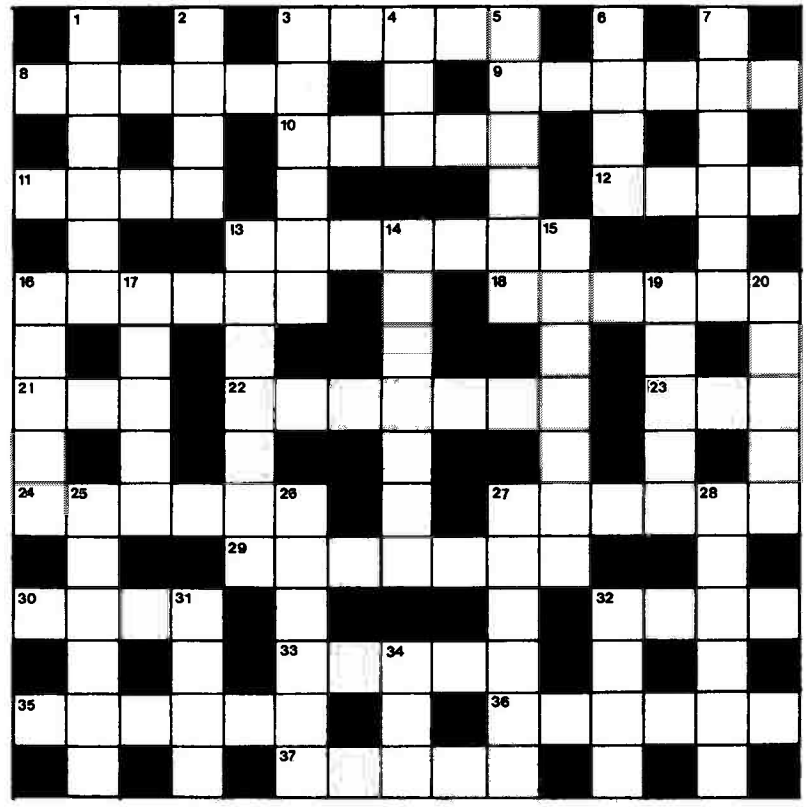
THIS MONTH'S BRAIN-TEASER

Across

3 Shortened blue stone colours Mercedes (5)
8 Las Vegas state in Portsmouth (6)
9 Presents acknowledgement of merit (6)
10 Avoid library fine, replace with new equipment (5)
11 Frequency of the proceedings, control (4)
12 High volume (4)
13 Profession summoning card (7)
16 American Indian tribe (6)
18 Hulled grain or fourpenny coin in plural (6)
21 Poorly (3)
22 One million tons (7)
23 Dirty small room for lion (3)
24 Top Floor or attic for impoverished poets (6)
27 Despicable or hateful (6)
29 Insignia, possibly royal (7)
30 Short plural amplifier (4)
32 Record lined up (4)
33 Good luck bracelet (5)
35 Citizens advice writing desk (6)
36 European consortium aeroplane (6)
37 Powerful tower (5)

Down

1 Recover expenditure (6)
2 Sea movement acknowledges short title (4)
3 Insects after egg (6)
4 Criticise universal Greek god (3)
5 Cutting wood (6)
6 Autumn tumble (4)
7 Do not alter your set? (6)
13 Music pot (7)
14 Italian pub dish (7)
15 Ford services regional television (7)
16 Getting old! (5)
17 More competent (5)
19 Sound sense (5)
20 Transmits outward message (5)
25 Protective clothing taken to extreme! (6)
26 Stormy drinking vessel (6)
27 Drilling rig worker (6)
28 Serviceable item comes in handy (6)
31 Walk up and down to change voltage (4)
32 Horse drawn carriage fires jingles (4)
34 Everyone or thing (3)



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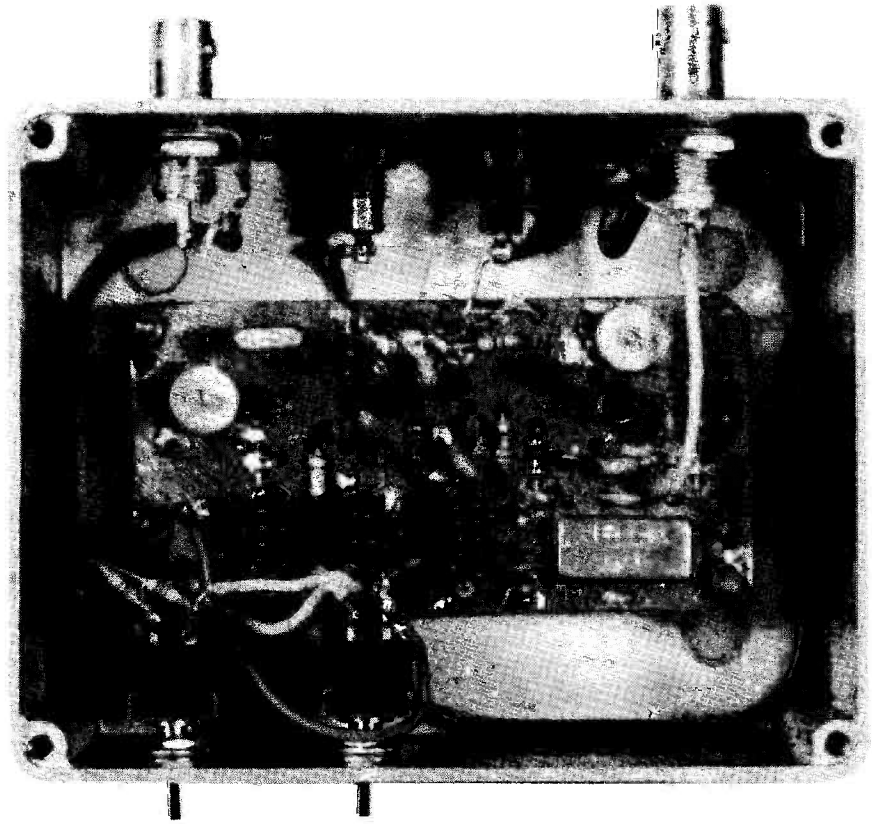

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The signal then passes directly to the r.f. input port of the Double Balanced Mixer, the ports of which are all terminated at 50Ω.

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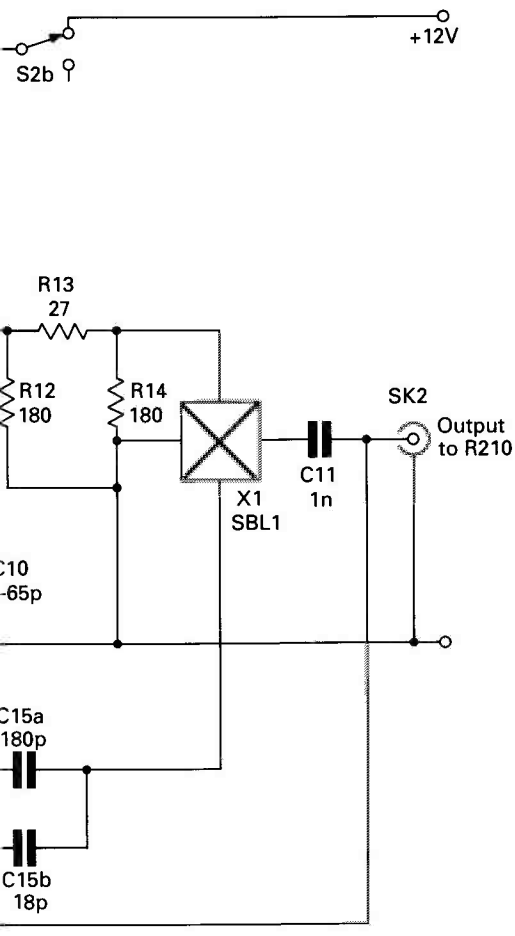
This 14MHz signal is then matched to the mixer by a resistive pad. The resultant output from the mixer is fed, via C11, to the antenna socket of the R210 Receiver.

Construction

The converter is built on a double-sided printed circuit board using the ground plane technique.

Part 2 will give the full details of the construction of the converter. To enable you to acquire the necessary components a complete parts list is given alongside the circuit diagram. □



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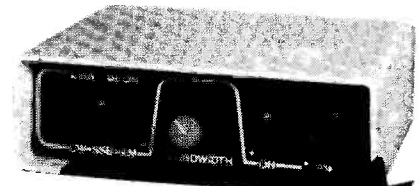

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DECODING THE DATA

Mike Richards G4WNC

Part 4

So far in this series I have concentrated on the very basic RTTY system of data communication. This month I will take a look at two of the slightly more sophisticated systems used by commercial operators.

In the last part we dealt with some of the causes of errors in a RTTY signal and ways of minimising their effects. However for the commercial operator who needs to be able to transmit important messages accurately, RTTY falls somewhat short of the requirements.

The problems of interference on a radio link cannot be avoided so what is needed is a way of detecting when the signal has suffered some corruption. This would need to be backed up by a method of repeating the lost information. Ideally this process should be fully automatic. An analagy for this process would be a conversation between two people in a busy street. Although both parties could hear each other perfectly for most of the time, if a noisy vehicle passes some detail may be lost in which case the listener says Pardon and the speaker repeats the relevant details. This is a simple example of repeat request and is automatic insomuch as you automatically say pardon without really thinking about it.

If we are going to adapt this process for a radio link it needs to simplified and broken down into its component parts. The main functions are:

1. Error detection.
2. Automatic request for a repeat.
3. Repeat errored data.

Teleprinter Over Radio

The most common system that fulfils this requirement is TOR which is an acronym of Teleprinter Over Radio. One commercial implementation of this system is SITOR.

So let's now examine each of the three stages to see just how the system works.

Error Detection

This is perhaps the most difficult part of the operation because we are asking a machine to be able to detect an error in data which is virtually random. The first compromise we have to accept is that the error detection system is by no means perfect.

The technique used for TOR signals relies on a special code to represent each character. You will remember that RTTY used the International Telegraph alphabet No 2 which was a five-bit code. Well TOR signals use the Moore code of which the full character set is shown in Table 4.1. This is a seven-bit code with one very special feature - every valid code is made up of four logic 1s or marks and three logic 0s or spaces.

It is this unique feature that provides the error detection. At the receiving end of the link the decoding equipment is set up to only accept characters that comprise four marks and three spaces. Any other combination is considered to be an error.

So there we have the basis of a simple error detection system. The next stage is to see how we can set about correcting the errors.

Automatic Repeat Request

This is where the term ARQ originates as is simply an acronym for Automatic Repeat reQuest. From our studies so far it is quite easy to see how an error is detected but the only way to correct the error is to ask for the lost information to be repeated. The problem here is that with a RTTY signal we would have to wait until the end of the transmission - not very practical. The system used with TOR is to split the message up into fixed length smaller units to reduce the time you have to wait before a repeat can be requested. The actual length used for TOR signals is three characters. In practice the system includes an additional feature called an acknowledgement so that after each three characters have been sent the transmitting station waits to receive either an acknowledgement or a repeat request from the distant station. This comprehensive checking system is required to cover situations where the repeat request may be effected by interference. The system is set up so that if the transmitting station does not receive either a repeat request or an acknowledgement, it will automatically repeat the last three characters.

From this you can see that the system operates to a fixed pattern which I have illustrated in Fig. 4.1.

This is not however the complete story as the Moore code includes a few special characters which are required to control the process. These special characters are known controls 1, 2 and 3, alpha and beta idles and repeat request. The idles are used when there is no data to be sent but the link is to be kept open. The reason for needing these characters is that the TOR system requires two stations to interact and this interaction must be kept going even if there are gaps in the message.

The control signals 1 and 2 are sent alternately as the acknowledgement from the receiving station. Control 3 is reserved for use when changing the direction of transmission - essential for the exchange of messages.

One other point I have yet to mention is the transmission speed. Anyone who is familiar with the UK Telex network will no doubt be aware that the standard transmission rate is 50 baud. As the TOR system was designed with the linking of mainland Telex links with ships, it was necessary to be able to transfer data at 50 baud. However as we have seen the TOR system requires the interaction of two stations which if both stations were using 50 baud would result in a much slower overall rate. The solution is quite simple and involves using 100 baud over the TOR link which, in the absence of errors, gives an overall rate of the required 50 baud.

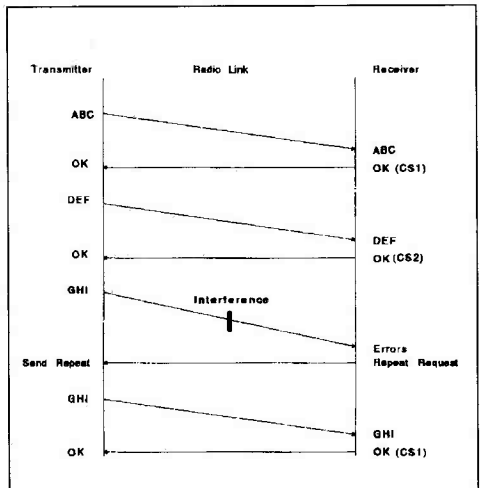

Fig. 4.1: TOR transmission system

Selcalls

One added bonus with the TOR system is that it supports the use of selcalls. This is a very powerful facility which is particularly useful for the commercial operator. A TOR selcall comprises four alphabetic characters which are programmed into the TOR equipment and act rather like a callsign. When the receiving equipment is in standby mode it will respond to any other station which transmits its unique selcall. A typical use of this would be the shore station that has Telex traffic for a ship. If the shore station puts out a call with the ship's callsign on an agreed calling frequency the ships equipment will automatically respond and receive the traffic. So it is quite feasable for messages to be sent reliably to a ship even while the radio officer is off duty.

DECODING THE DATA

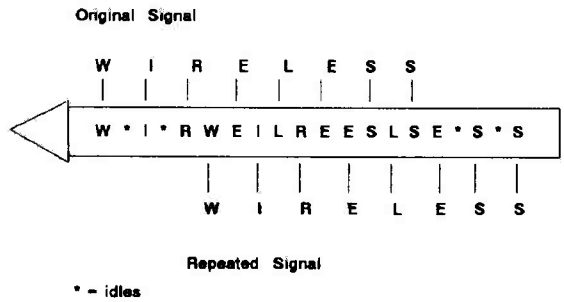

Fig. 4.2: FEC - Interleaving of direct and repeated signal

So there we have a very basic introduction to the operation of the TOR data system. Your next question is what is its prime use and how do I recognise it. There are two main uses for this mode, one is for ship to shore Telex communication and the other is amateur communications. Finding TOR signals is actually very easy as they have a very distinctive chirp-chirp sound.

A good place to start is on the 14MHz amateur band where signals can usually be found between 14.070MHz and 14.080MHz.

Broadcast Mode

So far I have covered the basic TOR system which is known as Mode A. As you may have guessed there is a Mode B which although it uses the same Moore code behaves in a rather different way.

The problem with the basic Mode A is that it is only possible to communicate between two stations whereas the radio medium is ideal for broadcasting messages to many. Mode B has been created to overcome this shortcoming. A more descriptive name for the mode is Forward Error Correction or FEC for short. The principle used in this system is to send all message characters twice but the repeated set is delayed by three characters. This is illustrated in Fig. 4.2.

The receiving equipment uses the same error detecting logic as with Mode A but if an error is detected in the original message the repeated information is checked and used if uncorrupted.

The secret of the error correction system is the time delay between the original and repeated information. The principle being that interference is usually of short duration so is unlikely to effect both the original and repeated signal. The effective speed is 50 baud, the same as with Mode A.

Summary

That just about completes this series covering the decoding of data. I have only covered the basic modes primarily in response to letters from readers of my 'Decode' column. I hope this has perhaps clarified a few points and even sparked off a new interest in the utility modes. For further reading there are a number of publications available from the *Short Wave Magazine* Book Sevice. For regular information on utility listening my 'Decode' column seems to satisfy the demand of a lot of listeners. □

Table 4.1

Binary	Letters	Figures
1000111	A	-
1110010	B	?
0011101	C	:
1010011	D	$
1010110	E	3
0011011	F	!
0110101	G	&
1101001	H	#
1001101	I	8
0010111	J	Bell
0011110	K	(
1100101	L	)
0111001	M	.
1011001	N	,
1110001	O	9
0001101	P	0
0001110	Q	1
1010101	R	4
1110100	S	'
1001110	T	5
0111100	U	7
0100111	V	;
0111010	W	2
0101011	X	/
1100011	Y	6
1111000	Z	+
1101100	Carriage return	
1011010	Line feed	
0110110	Letter shift	
1011100	Figure shift	
1101010	Space	
1100101	Blank	
1101010	Control 1	
1001101	Control 2	
0001111	Control 3	
0110011	Idle - alpha	
1100110	Idle - beta	
	Signal repetition	

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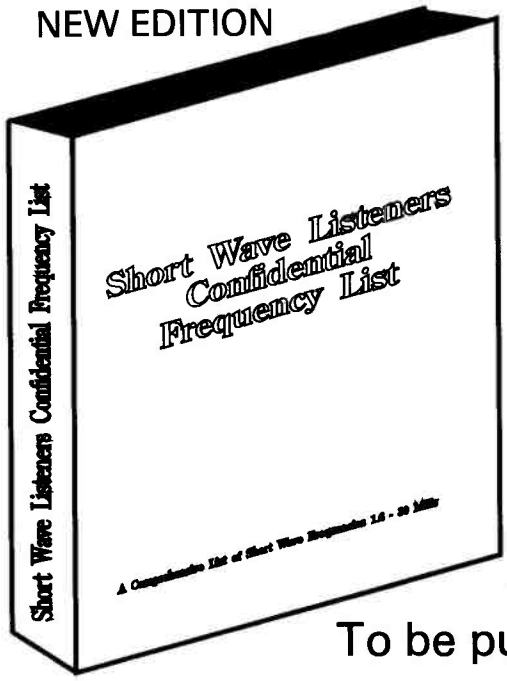

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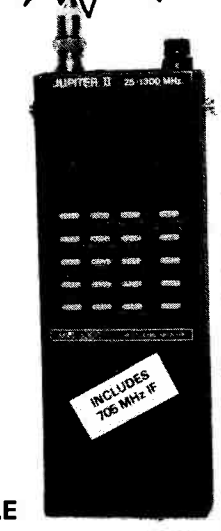

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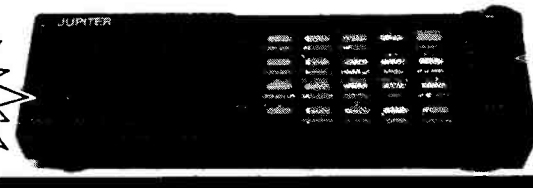

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CIRKIT SATELLITE RECEIVER KIT

Peter Rouse (GU1DKD)

The Cirkit v.h.f. receiver tunes the 137MHz weather satellite band and is designed to work with the decoder reviewed in the May 1989 issue of *SWM*. Peter Rouse now reviews the receiver.

The receiver is a 6-channel, crystal controlled, dual-conversion, superhet with i.f.s at 10.7MHz and 300kHz (50kHz bandwidth). There are two stages of r.f. amplificiation followed by a mixer and all these use 3SK88 dual-gate m.o.s.f.e.t.s. Two ceramic roofing filters are used at 10.7MHz and final i.f. amplification and demodulation is carried out by a Plessey SL6601 i.c. which tracks doppler shift and provides a squelch output facility which can be used (with external circuitry) to switch a tape recorder on and off. A small audio amplifier is included on-board and provision is made for line-powering a masthead preamplifier.

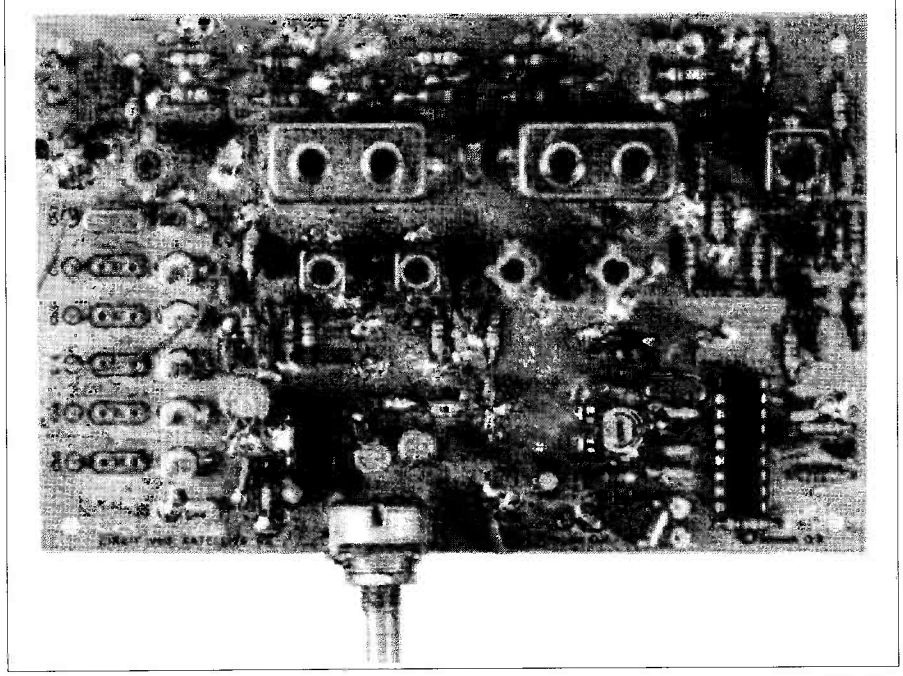
The kit comes with all components including ready wound coils and screening cans, a trimmer tool, loudspeaker, switches, sockets and a crystal for 137.62MHz (NOAA-11). The p.c.b. is double-sided and roller tinned. However, a case is not included nor is a power supply (12V).

Assembly

Ease of assembly, or the lack of it, in assembly falls into two categories. First, no attempt has been made at miniaturisation and so a reasonably well spaced component layout means that assembly is fairly straightforward. However, what is fiddly is trying to fit any component that is soldered to the ground plane. This is because the leads do not have holes through the board. It is perfectly good practice to use only the ground plane, but without holes the components tend to waggle around all over the place whilst you try and hold the board, the solder and iron all at the same time. At first, I thought that perhaps holes for these components may have conflicted with p.c.b. tracks underneath but a close examination revealed that this was rarely the case and as such is a pointless way of making the job more difficult. Even so, despite the reputed trickiness of constructing v.h.f. equipment, anyone who can solder reasonably well should be able to complete this project.

Alignment

This is where things got tricky and where I realised that the kit was perhaps only suitable for the more experienced constructor. The first difficulty came in peaking-up the crystal oscillator and multiplier stages. A look at the circuit diagram revealed that this should have been a fairly simple procedure but in practice a certain amount of re-trimming was necessary to get what appeared to be a reasonable level of first local oscillator signal. Ideally, a digital frequency meter is needed to trim the crystal exactly onto frequency and peaking of the multipliers is made easier if you have some form of r.f. meter. A d.f.m. will also be needed to adjust the oscillator frequency of the phased locked loop in the final i.f. circuit. Naturally there can be a certain amount of interaction between these two if adjustments are done solely with an off-air signal (what may seem best for one pass can be very different for another pass where the doppler shift is not the same and tuning errors will be compounded by the fact that the shift could start falling outside the passband of the i.f. filters).



Sensitivity

Having finally trimmed the oscillator and mulitipler stages, the receiver was hooked up to a signal generator and the r.f. and mixer stages peaked. Then, I noticed that sensitivity was not the 0.1µV for fully quieting claimed by Cirkit. No amount of re-trimming would improve the figure and so an examination was made of voltages in these stages. Here I discovered that the G2 voltages on the r.f. amplifier and m.o.s.f.e.t.s were considerably lower than those I would have expected. For the benefit of anyone who already owns, or is going to buy this kit I will now go into detail as, with the following component changes, the receiver will actually perform better than claimed.

(1) Remove, or do not fit, resistors R3, R5 and R8. These appear to have been included to dampen the *Q* of some tuned circuits but in fact this is not necessary and only worsens the noise figure slightly.

(2) Use 39kΩ resistors to replace R2 (4.7kΩ) and R7 (6.8kΩ).

With these changes made, the receiver performed well on the bench and my first off-air recordings confirmed that I was getting a noise-free signal slightly earlier than with my existing receiver.

Impressions

The receiver has been in use now for nearly a year and is used in conjunction with the Cirkit demodulator and a BBC-B computer. Results have been excellent and the combination of receiver, masthead amplifier and non-steerable Lindenblad antenna have given impressive results. Picture coverage from NOAA-11 extends Eastwards as far as Cyprus and Syria, Southwards to the tropic of Cancer and Northwards to just short of the North Pole (there have even been some tantalising but noisy glimpses of the East coast of Canada).

The receiver, demodulator and power supply are all housed in the same case which has switching options on the front panel and a meter to give some indication of the audio level being fed to the

CIRKIT SATELLITE RECEIVER KIT

demodulator. The grey level pre-set has been brought out to the front panel as I find contrast levels vary slightly between satellite types and it's useful to be able to make adjustments. A home-brew a.g.c. circuit is also included to take care of levels when the station is left unattended recording signals automatically.

Pin 6 of the SL6601 is the squelch output which is high under no-signal conditions and goes low when a signal is received (the threshold is set by an on-board pre-set resistor). I have developed a simple circuit which will switch a relay on and off and so actuate a tape recorder (It even works with a large variety of scanners) and this will be described in detail in the next article, with some more modifications for both the receiver and demodulator.

Conclusions

Although v.h.f. equipment kits have a notoriously high failure rate even amongst experienced constructors, this one should not present any great difficulties to the capable enthusiast who has access to a d.f.m.. Once it is working properly it performs extremely well (as good as and in some cases better than some commercially made units I have tried). Components are of good quality and the instructions adequate with a comprehensive list of test voltages.

Perhaps Cirkit could take a closer a look at the resistor values in the r.f. stages and consider drilling the board to take ground plane leads. I do not endorse products lightly but will simply say that as with the decoder, having had the receiver on loan I decided to buy it rather than send it back at the end of the test period.

Abbreviations

a.g.c.	automatic gain control
d.f.m.	digital frequency meter
i.c.	integrated circuit
i.f.	intermediate frequency
kHz	kilohertz
kΩ	kilohm
m.s.f.e.t.	metal oxide silicon field effect transistor
MHz	megahertz
p.c.b.	printed circuit board
Q	the 'goodness' of a tuned circuit
r.f.	radio frequency
V	volts
v.h.f.	very high frequency
µV	microvolt

More Modifications

In the next article we will see how further simple modifications will not only considerably reduce breakthrough from the national paging service on 138MHz but will also greatly improve the general signal-to-noise ratio in the i.f. stages.

The relay activated switch will also be described along with a simple method of improving the stability of the synchronisation oscillator of the Cirkit demodulator reviewed in the May '89 issue of *Short Wave Magazine*.

The Cirkit v.h.f. weather satellite receiver is available from **Cirkit Distribution Limited, Park Lane, Broxbourne, Herts, EN10 7NQ.** The cost is £42.52 and an additional crystal for NOAA-10 is available at £4.78 (prices do not include V.A.T.) □

BANDSCAN

☞12

relay transmitter site in Central America. In the middle of May a new Costa Rican government was sworn in, and this will mean more delays than expected, because the land granted to Spanish Foreign Radio by Costa Rica did not meet the necessary technical conditions. So, they have had to start the whole process again, looking for new land. The transmitters and other equipment is now in Costa Rica, and they expect to begin construction of the relay station as soon as possible. It could be on the air before Christmas. Spanish Foreign Radio's relay station will be equipped with three 100kW transmitters to cover the southern part of the United States, Central America, the Caribbean and the northern part of South America.

Chinese Ship Problems

As you might recall, a pirate broadcasting vessel, known as the *Goddess of Democracy*, is an initiative of the French weekly, *Actuel*, a Chinese dissident group, as well as 18 other newspapers and press organisations, some of them Taiwanese. The radio ship left the port of La Rochelle in western France in mid-March and made a short stop-over in Singapore, though the *Goddess of Democracy* got lost in a storm.

It reappeared at a port in Taiwan, claiming that it would take a transmitter on board. However, at this point at the end of May, Taiwan was busy trying to repair diplomatic relations with the mainland. A pirate radio ship was the last thing the Taipei authorities wanted.

The French organisers seemed to be totally confused as to what was happening. They refused to give the frequency of the new station, although they said it would be on both medium and short wave. Even the organisers seem to realise that one medium wave transmitter on board the ship won't cover all the Chinese mainland.

In spite of the veil of secrecy surrounding the operations, the organisers claimed back in March that small transmitters would be set up throughout the People's Republic to re-broadcast the *Goddess of Democracy's* radio signals. No mention was made whether these transmitters in major Chinese cities would be on medium wave or f.m. However, this method of simply re-broadcasting an off-air signal is very easy for the authorities to jam. In fact, short wave broadcasts from the BBC, Taiwan and VOA are currently interfered with quite effectively.

The radio ship has been flying the flag of Saint Vincent and the Grenadines, a small Carribbean island nation. St Vincent is one of the 166 member countries of the ITU - the International Telecommunications Union - and, as such, is required to observe the ITU's rules and regulations.

Rene Fontaine, a spokesman for the ITU told *SWM* that any broadcast activity from a ship is in contravention of the ITU regulations. It is up to the member state concerned to enforce that regulation if the ship is in international waters. The likelyhood of the *Goddess of Democracy* being shadowed by a vessel from the St Vincent PTT is somewhat remote, of course.

As we go to press, the ship had left Taiwan and was heading for Japan, in the hope that backers in Tokyo would sell them a transmitter. The French crew and ten foreign journalists on board the *Goddess of Democracy* are determined to carry out their project, despite the considerable risks involved. □

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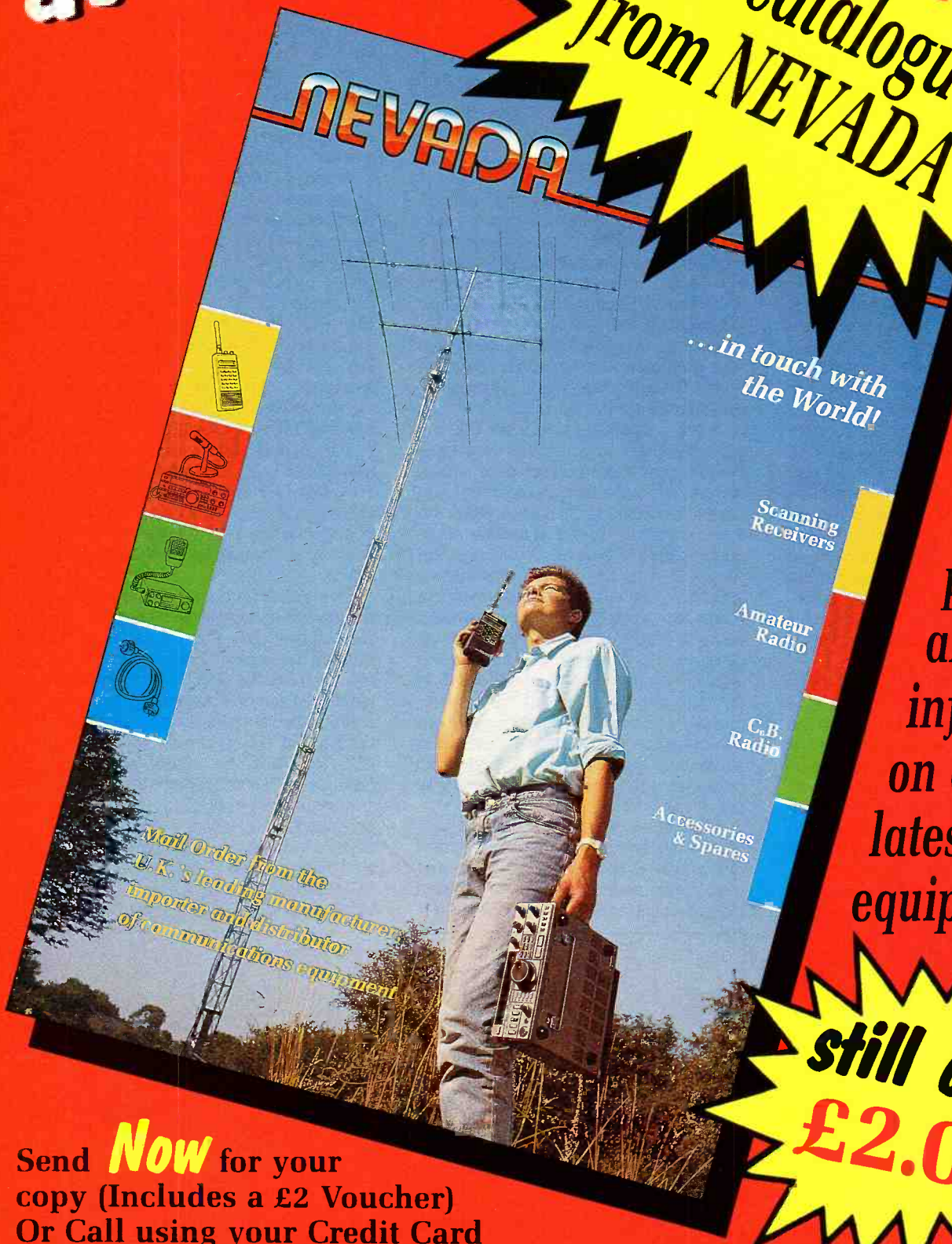

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NEVADA COMMUNICATIONS

STARTING OUT

Brian Oddy G3FEX

An automatic gain control (a.g.c.) is usually provided in a superheterodyne receiver to vary the amplification of the radio frequency (r.f.) and intermediate frequency (i.f.) stages in sympathy with the strength of incoming signals, so that a relatively constant audio listening level is maintained. It also prevents the r.f./i.f. stages from being overloaded by a potent signal and helps to counteract the effects of fading. The action of the a.g.c. is usually 'delayed', so that a weak incoming signal has to exceed a predetermined level before the reduction in gain commences. The operation of several types of a.g.c. circuit has already been outlined in this series - see November '88 *SWM*.

In the absence of a signal, the a.g.c. will set the gain of the r.f./i.f. stages to maximum, so unless the volume control is turned well down a high level of noise will be emitted from the loudspeaker. When a signal arrives it will be necessary to turn the volume up so that the demodulated audio can be heard at a comfortable listening level. As soon as the signal ceases, or the receiver is tuned to an unoccupied frequency, the a.g.c. will increase the gain to maximum and a high level of noise will once again be emitted from the loudspeaker. Such a high noise level can be very annoying to an operator who has to monitor an unoccupied frequency for a long period. If mobile operation is contemplated it may prove to be a serious distraction.

The high noise level produced by a receiver in the absence of an incoming signal can be both annoying and distracting. Various methods of silencing the noise have been devised and some are now in common use.

Squelch

These undesirable effects can be eliminated by incorporating a circuit in the audio stages of the receiver which will cut off the audio output until an incoming signal is present. Such an arrangement is known as a squelch circuit. One of the simplest methods of muting a receiver is to use the a.g.c. potential to control a switch which, in the absence of an incoming signal, prevents the noise output from the demodulator from passing through the audio stages.

In some of the older receivers this is achieved by using a valve to control a relay - see Fig.1. The circuit is set up initially in the absence of a signal. The bias on the cathode of the triode valve (V2) is carefully adjusted by means of the squelch control (R2), so that the anode current (Ia) flowing through the relay coil (RLA) is just sufficient to make the relay 'pull-in' and close the contacts (S1), thereby shorting the audio input to the control grid of the audio pre-amplifier (V1) to earth and muting the receiver. During normal operation the arrival of a fairly strong signal will produce a negative a.g.c. potential. Since it is applied as a bias to the control grid of V2 it will cause a reduction in Ia and allow the relay to 'drop out', thereby opening S1 and allowing the audio to pass into the pre-amplifier. Whilst this simple arrangement will operate satisfactorily with fairly strong signals, it is quite unsuitable with very weak signals because they do not result in a negative potential owing to the delay introduced into the a.g.c. system. The squelch circuit must therefore be disabled when listening for weak signals by opening the switch S2.

Some modern receivers still use the a.g.c. potential to control an electronic switch known as a squelch gate, which will only allow the demodulated signal to pass through the audio stages when the a.g.c. potential exceeds a certain value. Such systems however do not respond to weak signals, so an alternative approach is usually adopted in which the noise component of the demodulated audio is used to operate the squelch gate. In the absence of an incoming signal the high noise level will result in the gate being closed and the receiver muted. However, the presence of even a weak incoming signal will result in a substantial reduction in demodulated noise, so the gate will open and the signal will be heard.

The circuit of the audio stages of a receiver incorporating a squelch system of that type is shown in Fig.2. Note that the output from the demodulator is routed along two paths. A conventional role is played by the Class A audio pre-amplifier (TR1) and power amplifier (TR2) stages in the main path, namely to build up the wanted audio output from the demodulator to a level which will be sufficient to drive a loudspeaker (LS) - see pages 33, 34, March '90 *SWM*.

In contrast, the role of the stages in the second path, known as a side chain, is rather unusual. The task of the first two stages (TR3, TR4) is to amplify the noise component of the demodulated output, which has a wide spectrum. For satisfactory operation of the system it is essential to tailor the response of the noise amplifier so that only the high frequency components of the noise (i.e. those above the wanted audio signal) are amplified. This has been achieved in this circuit by using small value coupling capacitors (C3, C5) between the stages and by employing a small inductor (L1) in the collector of TR3, which is effectively in parallel with a capacitor (C4) and forms a resonant load in the noise spectrum. Furthermore, frequency selective negative feedback has been introduced by using small value by-pass capacitors (C6, C7) across the emitter resistors of TR3, TR4, thereby reducing the gain at low frequencies. The general principles of negative feedback have already been outlined in this series - see May '90 *SWM*.

The output from the noise amplifier is rectified by a voltage-doubler employing two diodes (D1, D2) to produce the positive d.c. potential required to control the *npn* transistor (TR5), which acts as an electronic switch or squelch gate. Some positive forward bias is always applied to the base of TR5 by the potential divider (R3, R4), but the actual amount is determined by the setting of the squelch control (R5). The rectified noise voltage produced in the absence of an incoming signal will result in a much higher positive bias being applied to the base of TR5 via R5, which will drive it into saturation. When in the saturated state, TR5 will

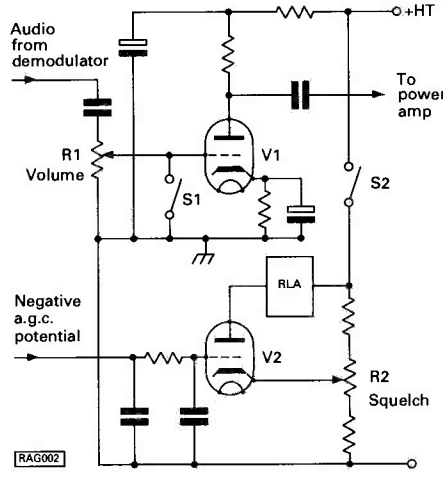


Fig. 1.

behave as a closed switch. Since its collector is connected to the base of the audio pre-amplifier (TR1), it will effectively short circuit R2 and the audio input when saturated, thereby muting the receiver.

The sensitivity of the squelch is controlled by the setting of R5, which determines the amount of forward bias applied to the base of TR5 - the higher the bias the greater the incoming signal level must be to open the squelch. To ensure that weak signals will open the squelch, it is necessary to adjust R5 very carefully to the point where the squelch only just operates in the absence of a signal.

Circuit Variations

Although the concept of amplifying the noise and then rectifying it to produce a d.c. control potential to operate a gate is the basis of many squelch systems, in practice a number of variations in the individual stages may be encountered. In some designs a high-pass filter may be employed ahead of the noise amplifier to ensure that only the higher frequencies present in the noise are applied to the noise rectifier. However, the components required for a passive filter tend to be rather cumbersome, so an active high-pass filter based on an operational amplifer may be used - see page 37, August '89 *SWM*. The squelch control is sometimes installed at the input to the noise amplifier, so that the overall sensitivity of the system may be controlled. Several different types of squelch gate are in common use. The circuit of one such alternative, known as a diode squelch gate, is shown in Fig. 3.

In this arrangement the path between the demodulator and the input to the audio pre-amplifier is controlled by a gate consisting of two diodes, which will only allow the demodulated signal to pass through them when their junctions are forward biased. The receiver noise is amplified and rectified to produce a positive potential as in Fig. 2, but in this circuit it is applied via the squelch control (R2) to the base of an *npn* transistor (TR6) which controls the application of forward bias to the diodes (D3, D4) in the gate. In the absence of an incoming signal the d.c. potential from the noise rectifier will be more than adequate to turn TR6 hard on, consequently the voltage at the junction of R3, R4 will fall to zero. This results in a lack of forward bias on D3, D4, which mutes the receiver. When an incoming signal is present there will be a substantial reduction in receiver noise, consequently the output from the noise rectifier will be insufficient to drive TR6 into saturation. The forward bias applied to D3, D4 via R3, R4 will enable the demodulated audio to pass through the gate to the input of the pre-amplifier. Note that sufficient forward bias must be applied to the diodes in the gate to ensure that they are operating on the linear portion of their characteristic, as silicon diodes have a non-linear characteristic close to their junction potential (0.6V) which would introduce distortion into the audio signal. □

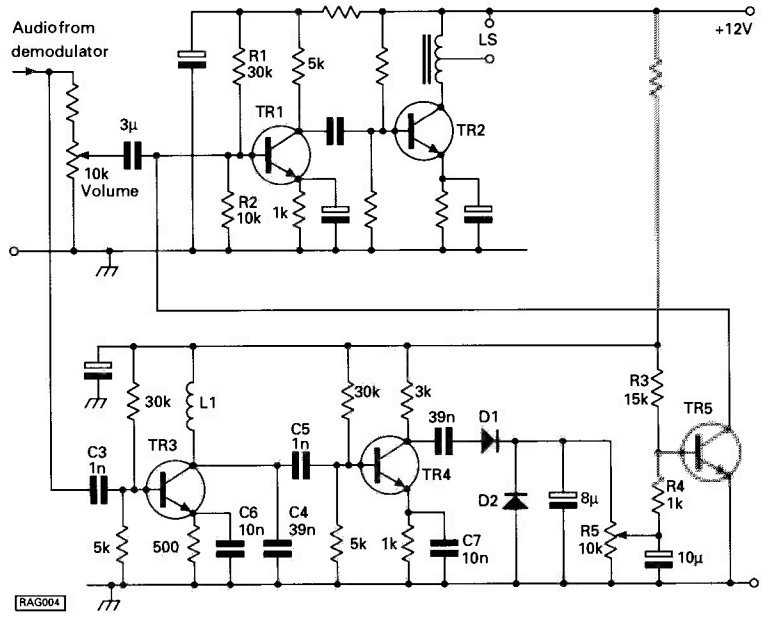


Fig. 2.

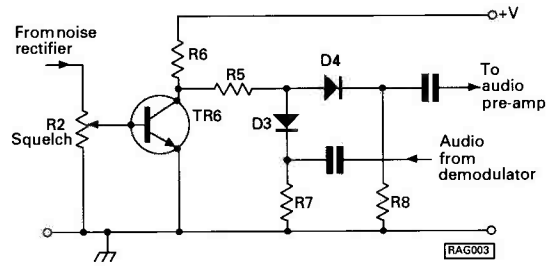


Fig. 3.

Abbreviations	
a.g.c.	automatic gain control
d.c.	direct current
i.f.	intermediate frequency
npn	negative-positive-negative
r.f.	radio frequency

SEEN & HEARD

AMATEUR BANDS ROUND-UP

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

For this month, my view of life has been biased-off by the absence of a rig with which to operate or listen; save when I was passed on an old KW2000A to repair while its owner was overseas. In fact, all it needed from the electrical point of view was a squirt of Lectrolube grease into the gain control pot; to solve the mechanical problem of insufficient friction on the tuning dial, thanks to some 30-years plus of continuous usage by several owners, wasn't quite so quick of solution! But - and this is the point of interest to impecunious s.w.l.s - when sorted, the old rig was still able to hear as well as ever.

If you think of an older receiver, think of the valves and the mechanical details. For example in an HRO you can change a leaky capacitor for a modern one at the drop of a hat - but you would need to be a good model engineer to repair a damaged HRO tuning drive. If the receiver has a 'string' drive, then, even if it is working perfectly, draw a sketch-map showing just how the string is threaded how many times it goes round its drum - and note down just how you think you would be able to re-string it should the drive break. It's a bit too late to think about this after the string has broken and sprung away from its proper route!

Often the old receiver is casually said to be 'deaf'; more often than not the action to make it 'not so deaf' merely succeeds in reducing the receiver's ability to cope with nearby, blocking, signals. For a simple check, remove the antenna connector and instead connect a resistor of appropriate value (usually 50Ω nominal, so use 47 or 51 or even 56Ω) between the antenna and earth terminals. Now set to receive s.s.b. signals; there will be some 'sharsh' audible from the speaker. Now tune the receiver front-end for a peak in the 'sharsh' - this may be a knob titled 'Preselector' or 'Antenna Tune' or you may even have to crank a preset trimmer inside. If you can hear the peak in the sharsh as you tune through resonance, and if with r.f., i.f. and a.f. gains all at full, the level of the sharsh in the speaker is not excessive then your receiver has enough (not too much) gain and sensitivity is also adequate. Be quite clear: every decibel of surplus gain over and above that needed is not just useless but is actively working against you.

Events

Don't forget about Wireless Line, for the very latest information on what's going on. Often an interesting event such as a DXpedition will be first noted in the specialist news-sheets, make it's appearance, and be over and done with, all between the time the copy leaves me and the issue reaching you!

Setting up a station

Obviously most people start with something pretty basic and, from then on, like Topsy it 'just growed.' There comes a time when you begin to wonder whether you can't improve things. Here then is a check-list of useful features.

It's not a bad idea to start by considering whether you are basically right or left-handed! With a conventional communications receiver, and a right-handed operator the vital thing is that the receiver be so placed that the main tuning knob falls just right to the left hand, while the right hand is allowed enough room to write in the log. This usually means jacking up the front of the receiver off the operating table, so that it slopes backwards. This has a dual function in that it lifts up the display or dial to where you don't have to move to read it clearly, and in addition puts the knob where it 'falls into the fingers' naturally. An inch or less either way may spoil things completely. You might also if you are tall or short investigate either raising the table level or lowering it until it falls just right for you and your chair. Before you take a saw to the table-legs, though, you can get a fair idea of the worth of the change by lifting your chair upwards on blocks. Aim to get the arm level to lie just nicely when you are sitting in your normal attitude. Look at the ventilation: most people nowadays are in centrally-heated houses, and as a result the air circulation is poorer than it used to be; if necessary, improve it. Look at the mains wiring; a multi-way distribution board can be screwed to the back of an operating desk, so mains leads for equipment can be plugged in and the surplus leads coiled-up neatly; this 'RF Choke' effect alone was enough to reduce TVI from the two-metre set-up here to acceptable proportions.

If you have more than one receiver, then arrange things so that you can switch from one to t'other without disconnecting coaxial or mains leads. (a little box with a decent switch, and three coaxial connectors is simple enough to make and mighty useful!

Now you can have just one lead from the distribution board to the power mains socket. By switching-off at the socket, you knock everything in the shack off - you have the fabled Big Switch! By pulling out the plug at the socket you have total isolation of the equipment.

If you use a computer, or a TV set in the shack, do make great efforts to silence them electrically. The problem here is that we can filter all the leads fairly easily, but to stop radiation off the set itself is a bit more tricky. If you can't shut them up, switch 'em off! Seriously, the Amstrad 8000 series on which this copy is prepared puts a 59 signal into the two-metre rig, so if one uses a logging program with it, or W6EL's Miniprop, or whatever, one must make all the log entries and store them while not listening on the bands, unless you can shut the computer up.

On the antenna front, take a peek at the Great Circle Map, based on London. Clearly, if we take, say, a half-wave dipole, it will be a lot more use if it 'fires' E-W, than if it fires N-S. So we want our dipole's ends to be N-S for preference. You'd be surprised how much difference you can make like this. Another approach might be a vertical; with this you get all-round pick up, but you must expect it to be 'equally poor all round' unless you are prepared to spend lots of time laying out radials or raise it up somewhat. While the radials should be of the specified lengths, it is quite important that on any given band they be the same length. If one is a bit over, and one a bit under, funny things can happen, arising from phase changes. And, incidentally note that verticals can be a pain-in-the-neck where noise pick-up is concerned; that old familiar S8 roar of rain static is always worse on a vertical, and so is most of the electrical noise for some reason. Alas it is only too true that almost every electrical gadget you can think of kicks out unwanted noise pollution on to our h.f. bands, right down to the fruit machine in the pub next door, or the central heating thermostat.

Letters

Dennis Sheppard (Earls Shilton) first; Dennis uses an inverted-vee of 40m, as his main interests are on 3.5 and 28MHz, heard on an RCA AR88D receiver. On 3.5MHz, Dennis found T77C, TL8WD, YB0WWP, VK6LK, HZ1AB, ZL1CCR, VK2AVA, VK4YB, VE1KQS, ZL2ANR, ZL4AP, and K4JDY; as for 28MHz, the crop included CX1BBC, CX4PA, PY1AQT, PY2GR, ZP5RG, 9J2FR, 9Q5SK, D68KB, J28DN, OD5SK, WD4OXT, VP8CDR, XT2BW, ZV7AZ, TA2EZ, JY4ZM, OD5RL, VP8ML, 5T5SR, 9K2DR, 9V1WW, 9V1YE, WZ6C/ST4, loads of JAs, EL7X, TJ1PD, VU2NTA and VU2OHZ.

A letter of support for the revival of the old HPX Ladder comes in from **John Doughty** (Cheslyn Hay); John used to play at HPX 'backalong, and he reckons that as his opportunities for contesting are limit, between work and family commitments, the HPX Ladder gave him something on which to vent his competitive instincts without too many late nights! So that's two people who have indicated a ewish for it's return - a few more and we'll have to do something about it!

Now for a newcomer to the game; **Phil Cooper** is based in Guernsey, who uses a Sony ICF-7600DS with a random wire antenna some 30 metres long and run out in a N-S direction.

Phil has some interesting queries: first IK3ABY/IL3 wasn't in the Southern Hemisphere, but on one of the Italian offshore islands probably from memory Tremiti Is. ZS8MI is a DXCC country in its own right, Marion Island. W1FDA was operating in a violent hailstorm, and a query in 4XZSJ, Judy who sounded to be in London.

Alas, Phil that is a misreading of a callsign, but I'll lay long odds that the call was more like 4X7SJ or 4X8SJ, in either case from Israel. GB4BKA was a special-event station for the Beekeepers Association. Otherwise it was largely European signals, as one expects until one masters the knack - and it is a knack - of copying the weaker signals. To sort out these questions of what prefix is what, perhaps the best buy in amateur radio at about a pound a time is a copy of Geoff Watts' Prefix List; get one by contacting Geoff at 62 Belmore Road, Norwich NR7 0PU. Geoff also does some other lists such as a list of Russian prefixes related to the oblasts for those who chase the Russian awards or want to know more accurately where a particular station is located, and which Zone or continent it counts as.

J. Heys (Hastings) looked on 28MHz to find UH8ABD, 4Z8C, 5B4YC, ZS200WOL, BY8AC, A41KM, 6W2EX, VP8CDR, G4WYG/ST2, C53GB, TZ6RC, FT5XH, VQ9IF, 9J2FR, HZ1AB, S79FT and VKs; on 21MHz there were VP5P, UA9LAC, JAs, YC2NFD, 4Z4UW, ER4L, KB6DDV/DU3, ZD8GT, 5N0SKO; while on 14 MHz UA1ZO, 3B9FR, TK/PA3DQW, EX1A, VK3EGN, UI1D/UI8IAY, VU2GR, and UA0/GB4ICE - nice to hear Morag on the key despite the auroral activity of late.

Vale

Long-time listeners to the DX bands and particularly Top Band will have been saddened to hear of the death of Stewart Perry W1BB, on May 5, at the age of 86. W1BB was, with a doubt, Mister Top Band. He was the first to reach the 100 countries on the band, and was the original instigator of the Transatlantics every winter, going back to the early thirties. W1BB was the first to realise the advantages of having a 'DX Window' on the band and the use of split frequency operation to give each end of the QSO the best segment for listening. In addition, Stew was the author of a Top Band Newsletter, lively and quirky, which for many years was sent out to Top Band enthusiasts licensed or s.w.l., everywhere. Thus W1BB disseminated know-how on all aspects of Top Band, technical and operating. However, he was stricken by illness several years ago, and although a station was always kept operational against the chance that he might be able to come home and get back on the band, it was, alas, not to be.

More Letters

Charles Wells (Mansfield) has been chasing after the oblasts since 1985, and so it has greatly pleased him to find Russian signals on the WARC bands. On a different tack, Charles mentions WZ6C/ST4 giving his QSL address as via W4FRU. Despite the

SEEN & HEARD

odd reference to this one in various publications, the Wells nose is still full of the aroma of fish.... time alone will show!!

Bob Alexander now, hailing from Ayrshire; Bob uses c.w. mainly, and seems to prefer 14MHz, though his log does show forays on to 21, 28, 7 and 144MHz bands. The five pages of logs don't include anything particularly splendiferous, but that having been said, all the continents were represented, and for Bob, there were new ones by way of KP2BL (St. Croix), VP5P (Turks & Caicos), KP4GC (Puerto Rico), FY5FO (French Guiana), 4S7WP (Sri Lanka), CE3WD (Chile) and OX3TW (Greenland)

Just about everyone should have heard the Spratly (1S0XV) which afterwards moved on to Vietnam as 3W1PZ, 3W6PY and 3W9CZ; not to mention the use of 3W1HCM and XV100HCM to commemorate the 100th anniversary of the birth of Ho Chi Minh. The Conway Reef 3D2AM has also stirred up the bands a little, and of course all these have entered the log of **P. Parmentier** (Kortrijk, Belgium). One has to comment that the Russians both at Spratly and in Vietnam have certainly put on a very good show - one would think these two countries have been toppled from the 'Most Wanted' lists in many a shack!

Andy Chadwick G4ZVJ, writes to say that QSLs for his ZD7VJ and ZD8VJ activities Should be sent to him either through the Bureau system, or direct to Andy Chadwick G4ZVJ, 3 Park Villas, Monkhouse, Cheadle, Stoke-on-Trent ST10 1HZ. It seems that many people have sent cards to G4ZVT, or to an old address, so if you are one such, here's the chance to put things right!.

Which brings me to the end for another month. Comically enough, I started to write the piece with no rig with which to listen. At this precise moment there are three in the shack..... *embarras de richesse* indeed! However, it will be rather fun to put them alongside each other and compare just the 'operability' of the three compare; one from the late 'fifties, one from a decade ago, and one recent; it'll be interesting to see how they look from an operators-eye view.

Meanwhile, note the deadlines; July 9, August 13 and September 10 to arrive with me, at the usual address.

DECODE

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

Roy Bessant of Chester reports on his visit to the RSGB exhibition at the NEC. This was the first radio rally Roy had attended and he was very disappointed with what he found. What he really wanted was some advice on how to start FAX and satellite reception and a selection of equipment to choose from. His experience at the NEC has put him off rallies but I would suggest that he tries a few of the Northern rallies like the Leicester show in October. Incidentally I shall be attending that one so please come a see me for a chat if you can.

Anyway to get back to the point of Roy's letter of how to start in FAX and satellite reception. This is a pretty broad question and the answer depends on what equipment you currently have and how deep your interest is in such modes. It should also be remembered that it is not really appropriate to lump together h.f. FAX and satellite systems as they are completely different modes which need non-compatible decoding and receiving equipment. HF FAX uses an a.m. system and is used mainly for the transmission of weather charts with just a few press photos. The only exception to this being the re-broadcast satellite pictures that are transmitted by stations such as Offenbach Meteo on 134.2kHz. These pictures are very good quality and have been enhanced by the ground station to clarify the image and highlight the land masses.

Weather satellites on the other hand use an f.m. system and transmit mainly live pictures which are broadcast on v.h.f. and u.h.f.

With regard to the decoding equipment for h.f. FAX, if you have access to a computer then probably the easiest and cheapest way to start is by purchasing a FAX program for that computer. The majority of amateur computers are supported with some form of FAX software.

Satellite reception is a little more complicated with consequently far fewer computers supported. The best bet is to scan through the adverts in *Short Wave Magazine* and its sister magazine *Practical Wireless*. In addition to special decoding equipment you will also need a receiver that covers the v.h.f. and u.h.f. weather satellite frequencies.

Roy's existing set-up comprises a Yaesu FRG-8800 receiver, Datong AD-270 active antenna and an ERA Microreader RTTY and c.w. decoder. If you have a aversion to using computers in the shack an alternative is to look at stand alone FAX decoders such as the FAX-1 from ICS Electronics. This device takes the audio signal from the receiver and produces the FAX image on a computer printer. Another option would be to use one of the multi-mode decoders such as the Wavecom 4010 which just requires a monitor and a printer to resolve a vast array of modes. So you can see that there are many choices on the market and at the end of the day its the depth of your pocket that is the main consideration.

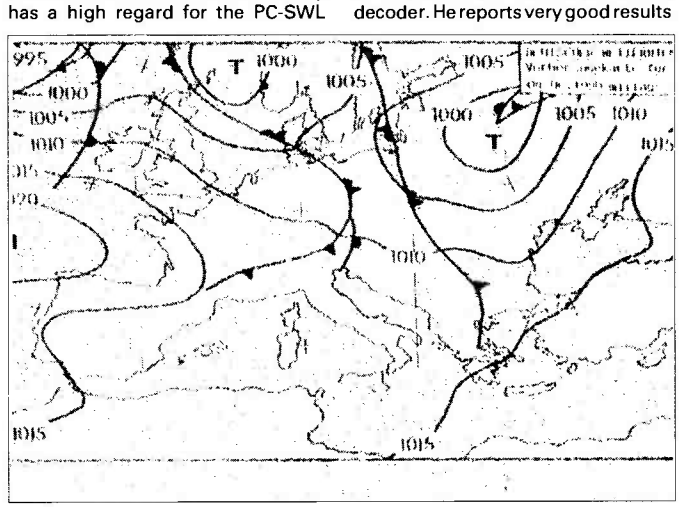
For anyone with a particular interest in satellite images then I would recommend that you join the Remote Imaging Group as they can be a very useful source of advice and information.

Regular readers will have no doubt seen my recent review of the PC-HF-FAX program from Comar Electronics. **Robert Wilcox** of Bristol did and has written with details of his experiences. In addition to the FAX program Robert bought the new PC-SWL program which uses the same decoder but enables the reception of RTTY, c.w. and FEC. This program also features quite sophisticated signal analysis facilities which can prove very useful when trying to decode a new station. Robert certainly has a high regard for the PC-SWL program and as I have now kindly been sent a review copy by Comar I will be giving my impressions in the near future.

John Higham of Dover writes with a thank you for my frequency list, which he found to be a great help with his decoding. John uses a Maplin TU-1000 decoder with some home brew decoding software, so he was anxious to find some reliable signals to prove that his system worked!

One point he did make was that he occasionally receives perfectly decoded jibberish from stations such as the MAP Rabat press agency. He has rightly concluded that this occurs when information in Arabic is being transmitted. Decoding of this information is possible, but not easy! Anyone who is interested would be well advised to get hold of the *Radioteletype Code Manual* by Klingenfuss which is available from the *Short Wave Magazine* Book Service. This book details most of the 'odd' alphabets and gives details of how they are encoded for transmission over a RTTY link. In addition the book includes a great deal of technical information on the operation of most of the utility modes.

S. Utili of London uses a Yaesu FRG-7700 receiver with a 25m long wire antenna and a FRT-7700 a.t.u. On the decoding front he has an ICS Electronics FAX-1 which has recently been complimented by the addition of a Pocom AFR-2010 all mode decoder. He reports very good results from the Pocom that fully justify its fairly high price. Mr Utili is another listener who has invested in the Datong FL2 active filter to enhance utility reception under difficult conditions. Mr Utili included a photo of this impressive station but unfortunately the quality was not quite good enough for reproduction in the magazine.



Fax picture using the Wavecomm W4100

Computer interference is the problem area for **Ken Quigg** of Belfast. Ken runs a BBC-B computer and wonders if I will be covering interference problems in the near future. I tend to cover the problems as they occur, using this column as the forum. With regard to the BBC-B, the problems are well known and usually centre on the monitor. The basic rules that should always be followed are as follows:

1: Use as large an antenna as possible and site it well clear of any sources of interference (i.e. TV antennas, electrical appliances, etc.)

2: Use one and only one good earth for all station equipment.

Once these conditions have been met you should find a reduction in interference levels. The most common source of interference with the BBC-B is the RGB video output which is incredibly noisy.

The best option is to use the composite video and forget about the RGB. Although this means a reduction in video quality the interference benefits are enormous. Associated with this is, of course, the video monitor itself which can often be very noisy. In my experience it is not normally necessary to go to such lengths as to spray the inside of the computer case with a radio screening material.

I have successfully run a station with my unmodified BBC sat right next to the receiver with no undue problems. The computer probably brings the h.f. noise floor up to about S-2 which is not particularly significant on the noisy h.f. bands. If you wanted to get rid of that residual interference you would be faced with a number of quite involved operations such as zinc plating the inside of the case.

Dragon Support

I recently made mention of the Dragon range of computers and the limited support available. The only source of

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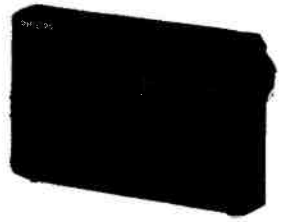

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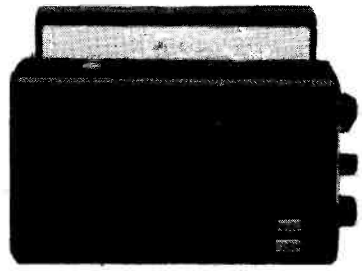

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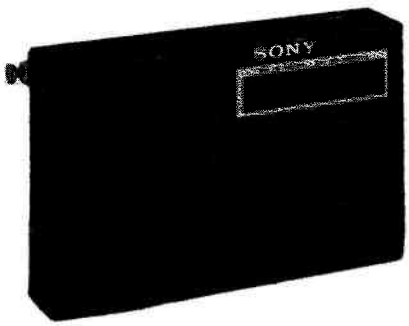

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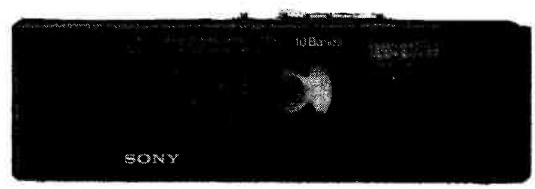

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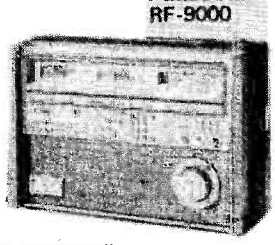

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P.O.A.

radio related software being that from Grosvenor Software. One point that perhaps needs to be made clear is that there are a lot of similarities between the Dragon and the Tandy TRS-80 range of computers and a lot of the software is interchangeable.

As a result of my comments **Peter Brent** has sent me details of the National Dragon User Group or NDUG as they are known. This group provides a regular newsletter which is packed with lots of useful tips and information.

Judging by the number of articles the Dragon is far from dead! If you would like to join the group and keep the Dragon and TRS-80 alive, then the man to contact is Paul Grade, 6 Navarino Road, Worthing, Sussex.

If you have any details of user groups for computers which have some radio software available, please drop me a line and I will publicise them via this column.

Microreader Display

I have received several letters from readers asking for advice on how to utilise the RS-232 output of the ERA Microreader. This simple output actually opens up a whole new world to Microreader users.

The output comprises a 3.5mm jack socket on the rear panel which carries the decoded data in a standard format known as ASCII. This is an acronym for American Standard Code for Information Interchange.

We don't need to go into the complications of this here but suffice it to say that it is a standard way of communicating between computers and terminals.

So what can we do with this signal? There are two basic options the first is to connect it to a printer with a serial port so that you can have a printout of every thing that is displayed on the Microreader screen.

The second option is to connect the Microreader to a computer or v.d.t., visual display terminal so that the decoded signals can be displayed on a large screen for easier reading.

However before you can proceed you need a little understanding of how to set the system up.

The main variable in the system is the speed or baud rate at which the data is sent. The Microreader has a standard or default setting of 1200 baud, but this can be adjusted from the front panel between 600 baud and 4800 baud.

If you are connecting to a computer you will also need a serial port on the computer and some simple serial communications software.

If you don't have a computer the best option is to get yourself a surplus v.d.t. These can often be picked up at rallies very cheaply, though you will need to make sure that it can handle the baud rates of the Microreader. The best advice I can offer is that you take a friend along who knows a little about serial communications.

HOKA Code 3

A snippet of hot news for advanced utility listeners! HOKA Code 3 is a new utility decoding program from The Netherlands which is designed to run on IBM PCs and compatibles. I have just managed to get my hands on a review copy and it looks very impressive indeed. The range of modes covered is enormous and it also includes a very powerful set of signal analysis tools which are essential for identifying new stations. I will obviously be giving a full report in due course but, for those that are keen to get going, it looks as if its very good value for money.

Frequencies

I have received a very good selection of logs this month, so thanks to **Day Watson**, **Jan Neiuwenhuis**, **Maurice Lloyd**,

One interesting comment came from **Ray Howgego** of Caterham who was monitoring TASS on 14.7MHz during the Eastern Europe earthquake on May 30. Shortly after, he heard the BBC news where they stated that the location of the quake was uncertain. Ray then contacted the BBC to inform them that TASS were giving the location within 10km. He was very pleased to hear that in subsequent reports the BBC were using this updated information! So it would appear that our hobby can in fact provide a useful service on occasion!

Back to the frequencies for this month, I have used the usual format of frequency, mode, speed, shift, callsign, time and notes.

3.253ZMHz, RTTY, 50, ?, LZF8, 1921UTC, Coded meteo

4.202MHz, FAX, 90, 576, RAT21, 1940UTC, Moscow meteo

4.268MHz, TOR, 100, 170, ?, 1948UTC, Goeteborg

5.020MHz, FAX, 90, 576, RWW74, 2008UTC, Moscow

5.274MHz, RTTY, 50, 425, MENA, 2127UTC

7.845MHz, RTTY, 50, 425, SOH2284, 2039UTC, PAP Warsaw - news

9.113MHz, RTTY, 50, 425R, MTIE, 1719UTC

12.856MHz, CW, -, -, XSG7, 2027UTC, Shabghai Radio

12.864MHz, CW, -, -, XSW, 2040UTC, Kaohsiung Radio

12.903MHz, RTTY, 50, ?, RBSL, 2052UTC, Bombay

14.794MHz, RTTY, 50, 425, ?, 1315UTC, XINHUA

15.633MHz, RTTY, 50, ?, HMF26, 1038UTC, KCNA Pyongyang news

16.347MHz, RTTY, 50R, 425, ?, 1306UTC, TASS

18.163MHz, RTTY, 50, 425, ?, 1317UTC, Khartoum air

18.362MHz, RTTY, 50, 425, ?, 1547UTC, Kinshasa air

19.528MHz, RTTY, 50, 850, JMG, 1238UTC, TOKYO MET

20.56MHz, RTTY, 50, ?, ?, 1652UTC, JANA TRIPOLI news

INFO IN ORBIT

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

Many of us were able to tune into the recent shuttle transmissions on 21.394MHz u.s.b. and hear the astronauts discussing the deployment of the solar panels. **John Goodwin** of Plymouth is a regular listener to the short wave bands and reminded me of this broadcast frequency.

David Paget of Farnborough has also been a regular listener to shuttle broadcasts and has received QSL cards from NASA and the shuttle crew. He heard the *Columbia* crew discussing problems with ground control on 21.198MHz.

Satellites for Schools

I am keen to hear of schools using satellite systems for teaching purposes so it was nice to receive a letter from **Dave Allen** of Droitwich, a teacher at Chantry High School which operates the Maplin Mapsat satellite receiver and decoder.

His school is in a valley and so can only receive the higher elevation passes. He has had difficulty getting Kepler elements to keep his computer predictions accurate and wrote to ask whether either I or *SWM* could oblige?

Kepler Elements

Any reader who wishes to receive a list of Kepler elements for all weather satellites including currently operational oceanographic ones can have one by sending me an s.a.e. Mine are updated every four weeks with the latest data, courtesy of **Des Watson** of the Remote Imaging Group.

Some contacts of mine are not only advising me of launchings but are keeping me fed with recent Kepler elements and so I am repaying the compliment by making copies of the data freely available to *SWM* readers.

Cassette Tapes

A second offer that seems to be popular is available for those readers who want to test framestores, computer programs or other decoders but don't have receivers to collect the original a.p.t. data. Just send me a post-paid package including an audio cassette and I will record some METEOSAT frames on it to help you to test your equipment.

R Miles of Rickmansworth is now retired and, having an interest in weather forecasts, he decided to build the Maplin decoder for his Amstrad computer. He sent me a tape for some satellite recordings and also wanted some Kepler elements. Both were despatched quite quickly because the holiday period let me get the recordings done.

Also requesting recorded satellite data was **Tony Branton G8VUS** of Worcester who has a BBC computer and has been writing his own FAX program. I returned Tony's tape with several METEOSAT frames plus several minutes from NOAA 11. I hope that these recordings are of help to those setting up their systems.

Ian Wraith of Sheffield is another reader who sent me a tape for some a.p.t. data to test his Commodore 64 computer FAX systems. Software for decoding FAX signals is available from several sources and also for various computers including Ian's. As mentioned in a previous column I don't know of software for decoding weather satellite pictures on this computer but if any readers do know of such software and let me know I will include details in a future column.

Satellite Predictions

I am including another set of satellite predictions to allow those of you who are new to the subject but have receivers that can tune into the band to try your receivers out by tuning into the various frequencies used by the a.p.t. satellites. You should be able to receive signals even with hand-held portable units. Do allow for the possible frequency changes that the Russian controllers sometimes make. If you don't hear a Russian weather satellite that I have listed, remember that it might have been switched off or switched to a different frequency. The NOAA satellites are almost guaranteed to be operating so they are a good test of your system.

I have picked Saturday June 30 for this list. The times given should be within a couple of minutes. As in last month's list, the format is satellite identification, approximate time of signal acquisition, time of signal loss, maximum elevation of satellite, whether easterly or westerly, and whether travelling north or southbound. The list will only be valid for the UK.

Beginners

Over recent months several *SWM* readers have told me of their interest in building up a satellite receiving system to decode pictures. **Leo Barr** of Sunderland decided to take the plunge and asked me whether I could forward a letter from him to Chris Spray whom I mentioned in a previous column. Both Leo and Chris have similar equipment, a Maplin decoder and an Electron computer.

Leo has successfully decoded both Morse and RTTY using an ERA Microreader, an SEM v.h.f. to h.f. converter, a Matsui MR-4099 receiver and an AOR 800 scanner.

These receivers will be able to pick up the powerful transmissions from the weather satellites though of course they will probably not have a suitable i.f. bandwidth that would allow them to receive the complete frequency spectrum of the a.p.t. signal

- that is why a purpose-built weather satellite receiver is a must for good quality pictures.

D McDonald wrote from Nuneaton to ask for Kepler elements for his satellite work. He has a Dragon 32 computer and is keen to know of companies supplying software for this machine.

Pictures

Both pictures are from **Bob Buttery** of Kettering who used his Amiga computer to process recent recordings of NOAA 11 data. Bob mentions that his computer provides a resolution of 640 by 256 with 16 grey levels.

Bob actually wrote the software himself and says that it requires a Maplin Electronics decoder, as well as the computer. His software is menu driven and of course written in assembly language for speed. Bob describes several features of his software which those of you with Amigas might well appreciate, including facilities to stretch the contrast of the satellite pictures and allow artificial colour to be added. The program has been tested with the Amiga A500 computer and requires a simple cable to connect the computer to the decoder.

Bob has offered to make his home-written software available for a rather modest price compared with the commercially available systems and he has very kindly offered to provide readers of this column with a demonstration if they care to send him a blank disk and return postage. Bob has spent over a year of his spare time to develop this software.

Those readers wishing to know more can write to Bob at 55 Northumberland Road, Kettering, Northants NN15 6LN.

Finally Bob's own satellite receiving equipment includes a Lindenblad antenna feeding a Dartcom receiver and he stores the data on a Denon tape recorder. Well done Bob!

OKEAN 2

This Russian oceanographic satellite has been busy during March and April and I have received several pictures from it, transmitted on 137.40MHz. I have heard that some stored pictures have also been transmitted but I'm afraid that I have missed those - despite all my recording sessions!

Until a year or two ago not very much was known about the equipment carried by the OKEAN series of satellites but various articles have been appearing following the gradual release of information from the scientific authorities. This means that the various types of pictures that we can receive from OKEAN-2 can be interpreted properly.

Receiving transmissions from OKEAN-2 is a matter of both patience and checking out the most likely passes each day. Those occasions when the satellite is over Europe, and therefore to our east hold the most promise. The majority of transmissions that I have logged are from passes when the satellite is up to a maximum of about 30 degrees in the east.

There were two exceptions though, when I received transmissions without knowing where the satellite was. Later when I received Kepler elements I was astonished to find OKEAN-1 was over the Atlantic! The pass times fitted perfectly and no land was visible in the pictures. Presumably the Russians have ships able to receive oceanic satellite data directly.

NOAA satellites

While the Russian satellites underwent frequency and operational changes the American NOAA weather satellites carried on their regular transmissions. NOAAs 9 and 11 provide a.p.t. (picture) transmissions on 137.62MHz and NOAA 10 transmits on 137.50MHz. The only changes seen with these satellites occur when NOAA 9's pass times drift into conflict with NOAA 11, at which time the ground controllers switch off NOAA 9 for a couple of weeks or so, until the conflict ends. Occasionally the infra-red sensors are decontaminated for a few days and during that time the NOAAs don't transmit infra red.

METEOSAT

The change-over from METEOSAT-3 operations back to METEOSAT-4 was announced in an administration message transmission and took place on April 19th at 0900UTC. Pictures seem to be very good so I hope that the problems have been identified. As at mid-May the re-transmissions received from GOES-E at Lannion (France) are still good.

GOES

In Britain we have had access to the American geostationary weather satellite GOES-E for a long time but when its manoeuvring fuel ran out the satellite started to drift and by mid-May it was about 76 degrees west. This has effectively stopped us from receiving good signals from it. I can just about hear a signal if I move one of my dishes away from the washing line but no pictures are identifiable.

The plan to allow a Meteosat to be drifted across the Atlantic to provide support before the next GOES launch seems to have hit an administrative problem of all things!

METEORS

During the last few weeks the frequencies of the Russian satellites seem to have settled down after a period of swopping around. It is quite possible that there will be more changes to come because according to the schedule of expected satellite launches that I received from **Geoffrey Falworth** of Penwortham, there is likely to be another METEOR launch soon. If it does happen by the time that *SWM* appears I would guess that it would transmit on 137.40MHz now only being used by OKEAN 2.

As of the second half of May there are two METEOR satellites in regular transmission, METEORS 2/16 and 3/3. Both seem to be having problems of one sort or another. METEOR 2/16 is transmitting very good pictures for most of its sunlight track but near the terminator its aperture controller seems to stick causing sudden changes in the picture brightness. This was quite marked in early May.

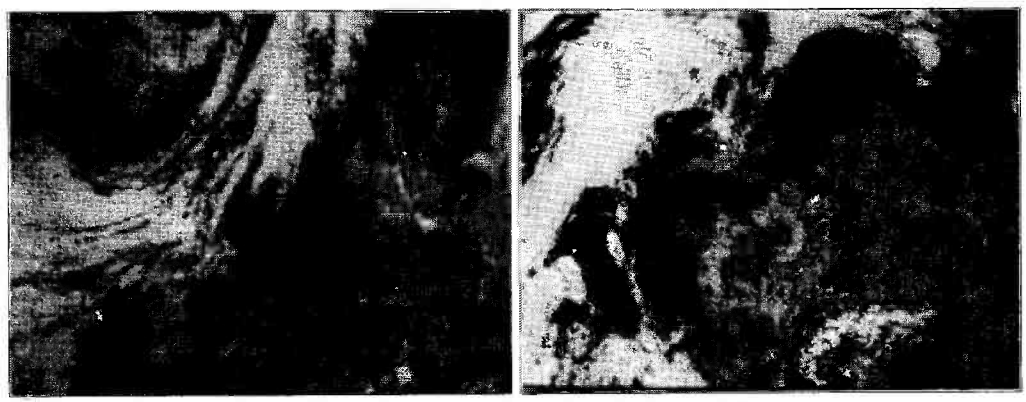
METEOR 3/3 continues to be unpredictable with its infra-red transmissions. For several nights there were no night-time pictures. Then overnight between May 17 and 18th I recorded a whole tape containing good quality infra-red pictures. Perhaps it's the unpredictability of the Russian METEORS that makes them so interesting! Will METEOR 2/19 be launched or will METEOR 2/17 or 2/18 be re-activated? Who knows!

Frequencies

METEOR 2/16 is on 137.85MHz
METEOR 3/3 is on 137.30MHz
OKEAN-2 is on 137.40MHz
NOAA 9 and 11 are on 137.62MHz
NOAA 10 is on 137.50MHz
METEOSAT/GOES on 1691MHz

For Saturday 30 June 1990
Times in UTC (GMT)

Satellite	AOS	LOS	Max El
METEOR 2/18	0821	0836	42°W SB
NOAA 10	0853	0907	46°W SB
METEOR 3/3	0928	0942	10°W SB
METEOR 3/2	1020	1039	62°E SB
METEOR 2/16	1028	1043	31°E SB
NOAA 11	1201	1214	22°E NB
METEOR 2/16	1213	1229	79°W SB
NOAA 11	1341	1356	79°W NB
METEOR 2/17	1408	1423	24°E SB
NOAA 9	1550	1604	30°E NB
NOAA 9	1730	1745	52°W NB



NOAA 11 pictures of the UK and N. Europe from Bob Buttery, Kettering.

BAND II DX

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

An Eye For Detail

"What impressed me most during the evening was the presence of many weaker local stations not normally heard either immediately adjacent to or on the same channels as higher powered local stations," wrote **Jeremy Morley** (Nottingham) after his Band II DXing on May 1. He added, "For example by moving my antenna I was able to hear BBC Radio Bristol on 95.5MHz above BBC Radio Nottingham which has a Mansfield relay on the same channel."

This is what DXing is all about Jeremy and, like many other readers, he has used his equipment sensibly to find a few more stations during a spell of good conditions which had generally increased the range of v.h.f. signals.

Weather

Jeremy reports that the pressure with him on May 1 was very high and that the evening was calm and warm. This was typical of the general weather pattern at that time and one national newspaper reported the "Hottest May 1st ever" with temperatures around 81°F.

Although the sun was shining and the pressure was high (30.3in/1026mb) and rising on the 17th, I looked toward the west at midday and saw the leading clouds of a weather front. It was a fantastic sight and looked like a giant hand in the bright blue sky with a large single cloud forming the palm and long wispy clouds representing each of the five fingers. The 18th was mainly overcast and as the pressure began

SEEN & HEARD

to fall, late on the 20th, another tropospheric opening began and the number of broadcast stations soon multiplied in Band II.

The weather buffs among you may like to see how the amount of rain-fall that I recorded each month between May 1989 and April 1990, Fig. 1, reached the total of 30.48in for the year. Some while back I published a photograph in this column of the sundial on a tower at Chichester Cathedral and recently, while at Chiddingstone, a National Trust village in Kent, I spotted another interesting sundial above the church porch, Fig. 2, dated 1626.

Tropospheric

A quick tune with my elderly R216 v.h.f. communications receiver, fed by a chimney mounted horizontal dipole, at 1835 on March 16 located four very strong French stations between 98 and 100MHz, a Welsh language station around 96.8MHz and BBC Radios Wales and WM on 95.9 and 95.6MHz respectively.

I found at least a dozen very strong continental signals spread through Band II during the late evening of May 1 and the early morning of the 2nd. Between 2100 and 2315 on the 1st, Jeremy Morley, using his Saisho SW5000 receiver with its own rod antenna and a length of copper wire, heard faint 'warbles from a couple of French stations around 100MHz, logged good signals, some in stereo, from BBC Radios Bristol, Sheffield, Wales and WM and ILRs Beacon Radio (Wolverhampton and Shrewsbury relay), Capital Radio (London), Chiltern Radio (Luton), Fox FM (Oxford), Jazz FM (London), LBC (London), Radios Hallam (Sheffield & Rotherham), Wyvern (Hereford) and 210 (Basingstoke relay) and 'Viking Radio (Hull).

"Yesterday [May 1] I heard the Jazz station on 102.2MHz with 20 to 40dB of signal strength and partly in excellent stereo with low noise and the selectivity selector of my Accuphase T-107 switched on narrow," wrote **Ed Wieringa** from Zandvoort on May 2. Ed uses a three-element antenna and could not select the broad band on his receiver because this would have let in signals from Belgium's BRT Stad Brussel and Lelystad both on 102.1MHz. He also logged BBC Radio 1 on 99.3MHz at good strength.

Brian Renforth (Newcastle Upon Tyne) received programmes from BBC radio in Northern Ireland, an ILR station from Scotland (possibly Northsound Radio) and f.m. stereo transmissions from Belgium and Holland on April 30 and ILR Radio Broadland (Norwich on 102.4MHz). Fox FM (102.6MHz), The Hot FM (Milton Keynes on 103.3MHz), Invicta Radio (Bluebell Hill on 103.1MHz) and ultra strong signal from Metro FM (Fenham on 103.0MHz) and "the usual Yorkshire ILRs" on May 1. Brian received some of these signals by "careful orientation of the indoor copper dipole" feeding his Alba tuner.

On April 30 **George Garden** (Edinburgh) went DXing high on Cairn O' Mounth and found Band II "quite active". He logged BBC 'Radio Cleveland, not often heard there, a fluctuating signal "coming in waves" which he thinks was from Manx Radio on the Isle of Man and BBC Radio York.

Simon Hamer (New Radnor) received BBC Radio Suffolk (Manningtree on 103.9MHz and Gt. Barton on 104.6MHz), Belgium (BRT1,2 & 4 between 95.7 and 102.1MHz), France (Caen on 99.6 and Lille on 88.7, 98.0 and 103.7), West Germany (BFBS on 96.5 and 103.0MHz, Deutschlandfunk on 101.8MHz, R-Hamburg on 103.6MHz and WDR1, 2 & 3 on 90.3, 99.2 and 97.0MHz respectively) and Holland (NOS 1, 2, 3 & 4 on many spots between 88.2 and 100.3MHz) on May 1 and 2 and BBC 'Radio Ulster, ILR Downtown Radio, Ireland's RTE FMI, II and III and the Irish Independants Capital Radio (Dublin on 104.4MHz), Century Radio (Dublin on 100.3 and 104.4MHz), Clare FM on 96.4MHz, County Sound (Cork on 103.7MHz), NWR Bray on 94.9MHz and LM-FM (Dundalk on 95.8MHz) on the 4th.

Band II was open again during the evening of the 5th, when I heard BBC Radios Shropshire and Wales to my west, Invicta Radio from Maidstone, Kent, in the east and from the north came Fox FM, Jazz FM, The Hot FM, 210 FM and BBC Radio WM in Birmingham. Band II was lively again during the evening of the 20th and the morning of the 21st, when I heard both French and German voices, plus many co-channel 'warbles' on about 15 spots between 87.8 and 103MHz.

Sporadic-E

Around 1820 on May 14 and 0815 and 1800 on the 15th I counted about five very strong signals, with the typical deep and sharp fading which goes with Sporadic-E, from East European broadcast stations spread-out between 66 and 73MHz. When this lower f.m. band is open, try and get idents from stations in Albania, Bulgaria, Czechoslovakia, Hungary, Poland and Romania who, between them, transmit on many spots within this frequency range. An extensive Sporadic-E event can extend into Band II and here one may find Italian television sound, Ch. Ic on 87.5MHz, Russian sound for their Chs. R4 and 5 on 91.75MHz and 99.75MHz respectively and the vision pulses, a low fluctuating buzz, for Ch. R5 on 93.25MHz.

Under such conditions signals are likely to appear from Algeria (96.6MHz), Bahrain (96.5MHz), BFBS (Cyprus on 89.9, 92.1, 95.3 & 99.6MHz), Cyprus (94.8 & 97.2MHz), and UAE Dubai (92.0MHz)

Info

"I read in a local main Aberdeen paper, which is circulated over all east/west coast, that Meldrum v.h.f. transmitter is undergoing changes. By October 1990 Radio 4 v.h.f. will be transmitted from here," wrote George Garden, adding "This transmitter was the first one on v.h.f. serving Scotland, it serves Laurencekirk, although we have much stronger signals from the v.h.f. TV mast at Durris."

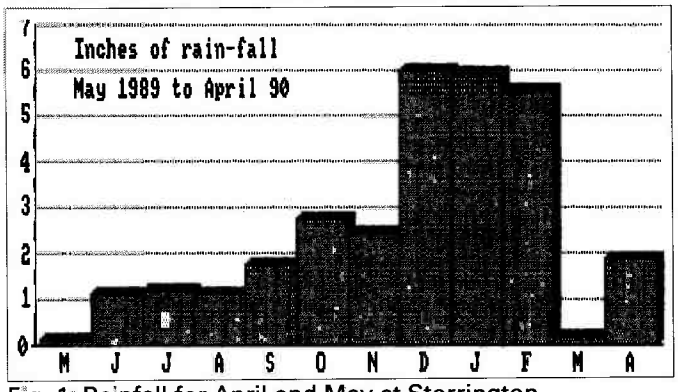


Fig. 1: Rainfall for April and May at Storrington.


Fig. 2: Sundial on Chiddington, Kent church..

TELEVISION

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

Les Jenkins (Godalming) has added a small compact vertical antenna called a Saturn to his 50MHz antenna farm. While Band I (48-68MHz) was quiet earlier in the year, Les found many of the 'Sporadic-E season regulars' such as Italy's RAI, and Spain's TVE, in good colour, via a multi-satellite system which he has been building and is currently developing. I would imagine that Les has also seen the test patterns from Germany (RTL-Plus), Fig. 1 and Holland (PTT-NL-AVVC), Fig. 2 received by **Edwina** and **Tony Mancini** in Derby. Also in Derby, **Garry Smith** has a new DX antenna layout for bands I, II and III seen on the 8m high pole on the left of Fig. 3. His main mast on the right supports a TRIAX 92 beam for the u.h.f. band (top), an 11-element Yagi for Band III (centre) and at the bottom, a 4 element array for Band I which includes a dipole for Band II.

Picture Archives

Looking back to 1989, **Lt. Col. Rana Roy** (Meerut, India) received pictures from 'Delhi TV' on Chs. E2 (48.25MHz) and E3 (55.25MHz) with interference due to an 'F2' reflection on April 25, Fig. 4 and multiple images from Bangkok, Fig. 5, on Ch. E3 via another 'F2' disturbance on the 27th.

In Arbroath, **David Glenday** watched 'Weather-view' on BBC2, from Chatton on Ch. E45, Fig. 6, showing the high pressure over the North-Sea at 1300 on July 4.

At that point in time the prevailing tropospheric opening was 41 hours old and among the countries David logged in the u.h.f. bands were Belgium, Denmark, West Germany (ZDF), Fig. 7 and Holland.

This event hung about for a few days and he received pictures from West Germany again at 0730 on the 7th, Fig. 8.

Band I

David logged a test card from Poland (TVP) via a minor Sporadic-E opening on Ch. R2 (59.25MHz) at 0940 on April 9 and a caption 'HEAD ooD" from Estonia followed by the test-card scribed 'EESTI TV TALLIN' at 2200 on the 10th. Earlier that evening he received pictures, "probably auroral" on Chs. E3, E4 (62.25MHz), R1 (49.75MHz), R2 (59.25MHz) and R3 (77.25MHz). He logged Spain's TVE-1 on Chs. E2 and E3 at times during the day on the 23rd.

I had my ex-military R216 receiver monitoring Ch. R1 between 0800 and

SEEN & HEARD

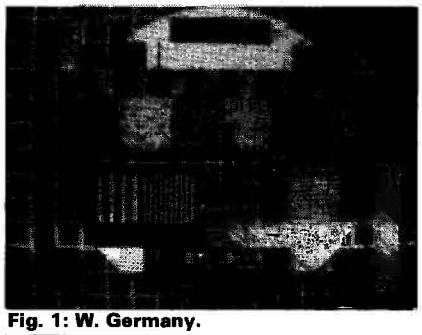


Fig. 1: W. Germany.

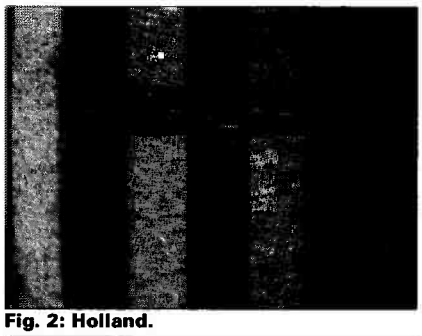


Fig. 2: Holland.

Fig. 3:

Fig. 4: Delhi.

Fig. 5: Bangkok.

Fig. 6: England.

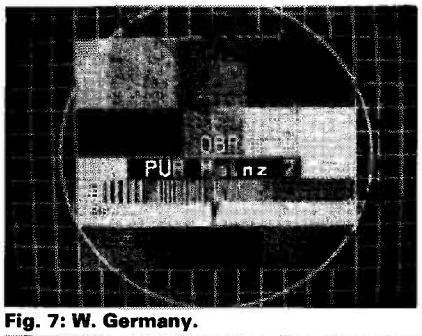


Fig. 7: W. Germany.

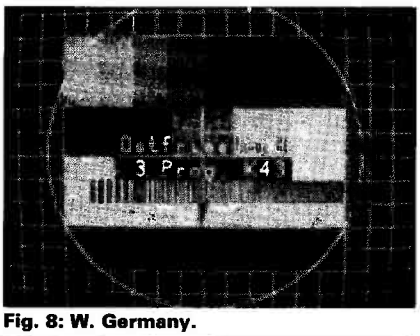


Fig. 8: W. Germany.

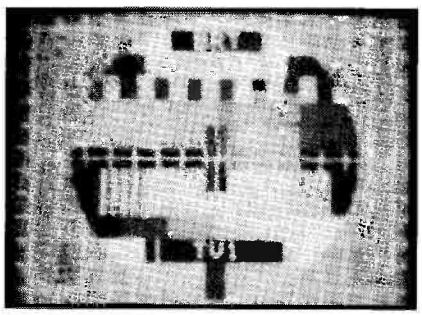


Fig. 9: Belgium.

Fig. 10: Hungary.

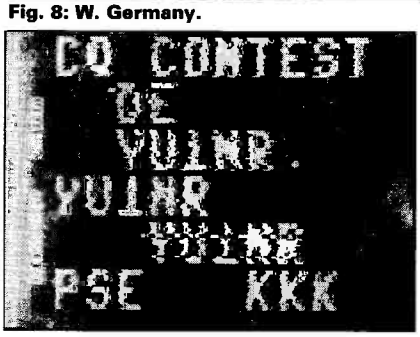


Fig. 11: Yugoslavia.

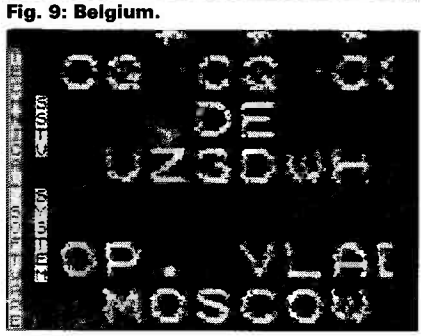


Fig. 12: Russia.

1000 on May 6 and heard numerous 'pings' of television synchronising-pulses which I believe were being reflected by an increased number of meteor particles while the earth, on its orbital path, was leaving one of the Aquarid meteor showers. The same pulses came up around 1800 on May 14, but this time the cause was Sporadic-E and I received weak pictures on Chs. E2 and R1 and at 1940 I saw the fading picture of a conductor and his orchestra on Ch. R2. The 1990 Sporadic-E season had begun because next morning, between 0900 and 1000, I received strong test cards from Iceland (RUV Island) and Sweden (Kanal 1 Sverige) and fading pictures of a helicopter on Ch. R1 and a programme with a TVE logo on Ch. E3. A sudden and short lived opening during the mid-morning of the 19th produced strong pictures on Ch. R1 of, what looked like a film with cyrillic captions, followed by a discussion programme.

While parked in Chichester at midday on the 21st, I checked Band I with my Plustron TVR5D, using its own rod antenna and received test-cards, fading from just visible to very strong, from the Norwegian regional (Bagn) and Sweden's (Kanal1 Sverige) on Ch. E3 and there were signs of the Soviet (TSS -Televidenie Sovietskovo Soiuza) Optical test-card trying to break through on Ch. R1 and/or R2. There was a classic Sporadic-E mix-up at the time.

Tropospheric

During the month prior to May 22, the atmospheric pressure averaged around 30.25in (1024mb) with me and my barograph recorded a peak of 30.5in (1032mb) from April 27 to May 3 and a low of 30.1in (1019mb) from May 10 to 15. With pressure at this level many of us expected more tropospheric enhanced activity than there was and the openings that did occur seemed short lived and very directional.

"A lean month on the DXTV front," wrote **John Woodcock** (Basingstoke) on May 9, however, his consistent monitoring found weak signals from France, mainly 'Canal+', in Band III on April 10, 26, 28 and 29 and May 1 and 3.

During the period April 28 to May 2, **Les Jenkins** was at his holiday home in Deal and took advantage of the high atmospheric pressure to make good use of his 934MHz transceiver in addition tohis DXTV gear. The 11 element home-brew Yagi for 934MHz and a Triax BB grid feeding his Salora televison receiver are both only 3m a.s.l., so Les has every right to be delighted to have a station in Darlington among his contacts on 934MHz and colour pictures from Belgium (BRT1), Fig. 9, France (Antenna 2, FR3 & TF1) and Holland (NEDs 1,2 & 3) in his u.h.f. TV log.

Do keep in mind that a tropospheric opening is unlikely to effect just a tiny part of the v.h.f. or u.h.f. regions of the spectrum, because, as Les has shown, DX in one band can also mean DX in another close at hand. For instance, a good u.h.f. opening can bring great joy to the radio-amateurs who use the 432MHz band for communications by sound and vision, the televison DXers on Bands IV (471-607MHz) and V (615-855MHz) and the operators on 934MHz.

I found weak pictures from Belgium and France in Band III and considerable co-channel interference on several stations in the u.h.f. band during the evening of May 1 and the early morning of the 2nd.

Andrew Jackson (Wirral) had a good haul of pictures in the u.h.f.

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band from BBC1 Northern Ireland (Divis) on Ch. 31, Border TV on Ch. 48 and Ireland's RTE-1 on Chs. 40 and 52 and RTE-2 on Chs. 43 and 56 on April 23 and France (Antenne 2 and TF1) and Holland (PTT NEDs 1 & 3) and from the UK he identified Anglia TV, Border TV, Central TV, HTV, Thames TV, TVS and Tyne Tees TV on May 1. "The pressure was 30.7in (1039mb) and very hot about 77C I think," said Andrew.

In Newcastle Upon Tyne, **Brian Renforth** received test-cards from Belgium (BRT TV1) and Holland (PTT NED 3) and pictures from Yorkshire TV (Belmont on Ch. 25) on April 30, very strong signals from Belgium, France (system L, negative images, around Ch. 46) and Holland on May 1 and BBC North and BBC Midlands from Emley Moor and Sutton Coldfield respectively on the 2nd.

Simon Hamer (New Radnor) received weak pictures from Belgium (BRT1 on Ch. E10 and RTBF1 on Ch. E8) in Band III on April 22 and on May 1 and 2 he logged pictures from Belgium (BRT1 and RTBF1), France (TDF), West Germany (ARD/WDR1 and RTL PLUS), Holland (NED 1) and Ireland (RTE1 and NETWORK 2) in Band III and Belgium (BRT1 & 2), France (TDF), West Germany (WEST3 and ZDF), Holland (NEDs 1,2 & 3) and Ireland (RTE 1 and NETWORK 2) on several spots in the u.h.f. bands.

In Scotland, David Glenday received u.h.f. pictures from Belgium (BRT2), Denmark (TV2), West Germany (NDR3 and ZDF) and Holland (Neds 1,2 & 3) on April 23 and 24, Ireland (RTE1) on their Ch. H (207.25MHz) in Band III on the 29th and again from Denmark (TV2), East Germany (DFF2), West Germany (ARD1 and ZDF) and Holland (NEDs 2 & 3) on the 30th.

During the first three days of May David logged pictures from Belgium (BRT & RTBF), Denmark and Holland in Band III and Belgium, Denmark, France, West Germany (AFN, ARD/BADN, BFBS, NDR3, SSVC, SWF3, TELE-5, WDR3 and ZDF) and Holland on many of their respective channels Bands IV and V.

Among his highlight catches this time were the Teletext service from Denmark's TV2 and East Germany's DFF-2 called 'TECHNISCHER.....' and the American and British forces broadcasting services, 'EINS PLUS', 'RTL+', 'SAT 1', 'TELE 5' and '3-SAT' from West Germany.

SSTV

On April 21, **Ian Armstrong G7GVN** (Millom) received slow scan television pictures from stations in Hungary, Italy, Lithuania and Luxembourg and on the 28th copied a good selection of 8, 16 and 32 seconds pictures from HB9ANT in Switzerland. This increased his new countries score, mainly around 14.230MHz, to 14.

The captions that Ian received from Hungary, Fig. 10, Yugoslavia, Fig. 11 and the USSR, Fig. 12 are typical examples of the picture print-out available from an Alphacom 32 printer which Ian has attached to his Sinclair 'Spectrum' computer.

LONG MEDIUM & SHORT

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

Long Wave DX

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT).

In Javea, Spain **Jurgen Thiel** has been receiving the 600kW transmissions from Atlantic 252 in Clarkstown, S.Ireland. They rate as SINPO 22532 at 1020. In contrast, the BBC Radio 4 broadcasts on 198, shared by Droitwich (500kW), Burghead (50kW) and Westerglen (50kW), reach him at 55555 at 1220. His log included a 10kW transmission from Caltanissetta, Italy on 189, which he noted as 45554 at 1010.

For some time **Sheila Hughes** (Morden) has been trying to hear the broadcasts from Oslo, Norway on 216, but the 1400kW co-channel transmissions from Radio Monte Carlo via Roumoules have prevented her from doing so. After checking the transmission times in *Dial Search* (see below), Sheila waited for Roumoules to close down at 2305 and then heard Oslo for the first time at 34333. It is unfortunate that this technique cannot be used when checking all shared frequencies, as some of the broadcasters operate 24 hours a day.

In addition to transmission times, *Dial Search* contains a great deal of information about l.w./m.w. broadcasts. The two fold-out coloured maps in this 54-page guide book are unique, one shows station locations in the UK and S.Ireland and the other in Europe, E USSR and N.Africa. The 1990/91 (6th) edition is available from the *SWM* Bookservice.

MW Transatlantic DX

In Grimsby, **Jim Willett** checked the band during two nights, but the conditions proved to be rather poor. He heard eight broadcasts from Canada and the USA during the first night. The first signals reached him from St.Johns, NF at 2350, they stemmed from CBN on 640, rated as SIO222 and CJYQ on 930, which peaked SIO322. Nothing was heard from the USA until 0220, when WCBS in New York became audible on 880 at SIO222. Later, WINS 1010 and WCAU 1220 were heard at SIO222. During the second night only the Caribbean Beacon, Anguilla 1610 was heard at 0212 (SIO222).

Whilst searching the band during three nights in Bristol, **Tim Shirley** also found the conditions favoured Canada and USA. Nothing could be identified on the first night until 0200 when the broadcasts from New York's WOR on 710 and WCBS on 880 became clearly audible, they peaked to SIO333. During the second night he picked up WNEW in New York on 1130, which he rated as SIO333 at 0230 and WKKU in Boston on 1510, SIO222 at 0330. Western and Country music from CFFX in Kingston, Ontario on 960 was heard at 0330 on the third night.

A holiday in St.Lucia enabled **Andy Cadier** (Folkestone) to hear some interesting stations in the Caribbean area, see chart.

Other MW DX

While checking the band in Dublin, **William Coughlan** picked up the 1000KW transmission from Jeddah, Saudi Arabia on 1512 at 0105, a distance of about 3025km! In New Radnor, **Simon Hamer** was able to hear the broadcasts from Tel Aviv, Israel 1287 at 2100, as the co-channel transmissions from Czechoslovakia were off the air. The sky wave signals from some of the broadcasters in N.Africa also reached the UK after dark, see chart.

MW Local Radio DX

The first reports on the new Isle of Wight Radio via Wootton on 1242 show that their ground wave signal reaches Bridgwater, Cambridge, Coventry, London, New Radnor and Winchester! It seems likely that the sky wave component of their 0.5kW transmission will be heard in more distant places after dark. The station welcomes reception reports, send them to IOW Radio, Dodnor Park, Newport, IOW PO30 5XE.

Another new one to add to your DX list is KCBC Kettering and Corby on 1530. Simon Hamer has been hearing their transmission at SIO222 around 1200. Writing from Cambridge, **Mike Smith** informs me that BBC Radio Peterborough is on 1449kHz on a temporary basis via the BBC transmitter at Gunsthorpe. At a later date their programmes will be radiated on v.h.f. only from Peterborough on 95.7MHz.

Short Wave DX

Although the effects of solar flares have disturbed the ionosphere and disrupted reception in the higher frequency bands during some days, many interesting broadcasts from all continents have reached the UK. The present high level of solar activity is likely to continue, so some disturbances can be expected in the weeks ahead.

The **25MHz (11m)** broadcasts from Radio RSA in Johannesburg, S.Africa on 25.790 have been sadly missed by UK Dxers since their closure on May 1st. The excellent propagation conditions between the UK and Africa have enabled the BBC 300KW transmissions via Daventry 25.870 (Fr to Africa 1200-1245) to reach their target at remarkable strength. In his latest report from S.Africa, **Dick Moon** rated their signal in George as SINPO 55555. He also quoted similar ratings for Radio DW via Julich, W.Germany 25.740 (Ger to SE Asia 1100-1355) and Radio Moscow, USSR 25.780 (Eng to E Africa, Middle East 0300-1300), but RFI via Issoudun, France 25.820 (Fr to E Africa 0600-1700) is usually 45544.

Good 11m reception was also noted by **Rhoderick Illman** in Thumrait, Oman. He logged SRI via Schwarzenburg, Switzerland 25.680 (Eng, Fr, Ger to S.Asia 1315-1500) as 44444 at 1345 and Radio Denmark via RNI Oslo 25.730 (Da to S.Asia 0730-?) as 44443 at 0753. In contrast, a marked decline in the 11m propagation conditions to Canada was observed

DXers:
A: Kenneth Buck, Edinburgh.
B: Scott Caldwell, Warrington.
C: Robin Clark, Plymouth.
D: Adrian Don, Whitley Bay.
E: Simon Holland, Douglas, I.O.M.
F: Sheila Hughes, Morden.
G: Eddie McKeown, Co.Down, N.Ireland.
H: George Millmore, Wootton, I.O.W.
I: Ike Odoom, Glasgow.
J: Fred Pallant, Storrington.
K: Alex Radulovic, Burton-upon-Trent.
L: Chris Shorten, Norwich.
M: John Stevens, Largs.
N: Jurgen Thiel, Javea, Spain.
O: Phil Townsend, London.
P: Peter Walduck, Milton Keynes.

Long Wave DX Chart

Freq kHz	Station	Location	Power (W)	DXer
153	Bechar	Algeria	1000	N
153	DLF Donebach	Germany (W)	500	A,B,D,E,G*,H,I,J,K,N,O
153	Brasov	Romania	1200	A
162	Allouis	France	2000	A,B,D,E,G*,H,I,J,K,L,N,O
171	Kaliningrad	USSR	1000	A,B,G*,H,I
171	Moscow	USSR	500	J*
177	Oranienburg	Germany (E)	750	A,D,I,J,N,O
183	Saarlouis	Germany (W)	2000	A,E,G*,H,I,J,K,N,O
189	Caltanissetta	Italy	10	N
189	Motala	Sweden	300	A
189	Tbilisi	USSR	500	B*
198	Ouargla	Algeria	1000	N
198	BBC Droitwich	UK	500	G*,H,J,K,L,N,O
198	BBC Westerglen	UK	50	A,D,E,I
207	DLF Munich	Germany (W)	500	A,B,D,F*,G*,J,N,O
207	Azilal	Morocco	800	N
216	Roumoules	Monaco	1400	A,D,E,G*,H,I,J,N,O
216	Oslo	Norway	200	A,F
225	Konstantinow	Poland	2000	A,D,E,F,G*,H,I,J*,N,O
234	Junglinster	Luxembourg	2000	A,D,E,G*,H,I,J,N,O
243	Kalundborg	Denmark	300	A,D,E,F,G*,H,I,J,O
252	Tipaza	Algeria	1500	A,E*,F*,G*,J*,N
252	Lahti	Finland	200	A
252	Atlantic 252	S.Ireland	500	A,B,C,D,E,G,H,I,J,K,M,N,O,P?
261	Burg (R.Volga)	Germany (E)	200	B,H,I,O
261	Moscow	USSR	2000	A,E*,J,N
270	Topolna	Czechoslovakia	1500	A,B,D,E,F,G*,H,I,J*,N,O
279	Minsk	USSR	500	A,E*,I*,J*

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

SEEN & HEARD

by **Alan Roberts** in Quebec. His daily ratings for RTBF Brussels 25.645 (Fr to Africa 0530-1755) and RFI 25.820 varied from 35555 to inaudible, whilst those from SRI 25.680, RNI Oslo 25.730 (Norw to Africa 1500-1530) and Radio DW 25.740 varied from 35444 to inaudible. At best, Radio Moscow 25.780, Radio Yugoslavia 25.795 (Eng to S.Asia 1200-1230) and the BBC 25.870 peaked 25333.

Some of Radio Australia broadcasts have been reaching our shores in the **21MHz (13m)** band. Their transmission to C.Pacific areas via Shepparton 21.740 (Eng 2200-0730) was rated as 24532 at 0640 by **David Edwardson** in Wallsend; to S.Asia via Darwin 21.775 (Eng 0630-1400) as 44444 at 1100 by **George Millmore** in Wootton, IOW; to S/SE Asia via Darwin 21.525 (Eng, Chin 1300-1430) as 33233 at 1300 by **Alan Smith** in Northampton.

Many of the broadcasts to Europe are also being received well. They include Radio Japan, Yamata 21.500 (Sw, It, Fr, Eng, Jap 0530-0830), rated as 33433 at 0716 by **Kenneth Reece** in Prenton; Radio Japan via Moyabi, Gabon 21.690 (Sw, It, Fr, Eng, Jap 0530-0830), 54344 at 0710 by **Chris Shorten** in Norwich; Voice of Israel, Jerusalem 21.780 (Eng, Fr 1000-1100), 44544 at 1022 by **Roy Spencer** in Coventry; Radio Pakistan, Islamabad 21.575 (Ur, Eng 0715-1120), SIO444 at 1100 by **Neil Wheatley** in Newcastle-upon-Tyne; Radio Peace and Progress, USSR 21.840 (Fr 1100-1159), 55544 at 1109 by **Jim Cash** in Swanwick; WCSN Scotts Corner, Maine 21.780 (Eng, Ger, Fr 1400-1555), SIO545 at 1430 by **Thomas Barnett** in Slough; RCI via Sackville, Canada 21.545 (Russ, Uk, Fr, Eng, Pol, Ger 1330-1700), 33433 at 1450 by Andy Cadier; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700), heard at 1500 by **Julian Wood** in Elgin; Radio Sweden via Karlsborg 21.655 (Fr, Eng 1500-1600), 33433 at 1553 by **Darren Beasley** in Bridgwater; UAE Radio Dubai 21.605 (Ar, Eng 0600-1645), 54343 at 1600 by **John Sadler** in Bishops Stortford; Radio HCJB Quito, Ecuador 21.470 (Cz, Ger, Sw, Eng, Norw, Da, Fr 1800-2200), 43434 at 1928 by **Cliff Stapleton** in Torquay; WYFR via Okeechobee, Florida 21.615 (Ger, It, Eng 1600-2145), 44444 at 2000 by Sheila Hughes.

Some of the many broadcasts to other areas stem from Radio Austria Int, Vienna 21.490 (Ar, Ger, Fr, Eng to Middle East 0500-0800), logged as 25333 at 0736 by **David Wratten** in Cambridge; Radio Finland via Pori 21.550 (Fin, Sw, Eng to E Asia, Pacific areas 0830-0957), SIO233 at 0840 by **Brian Hallett** in Burgess Hill; Radio Moscow, USSR 21.800 (Eng, Fr, Ar to N.Africa 0800-1600), 55444 at 1100 by **Ken Whayman** in Bexleyheath; Radio DW via Trincomalee, Sri Lanka 21.640 (Ger to E Asia 0700-1200), SIO222 at 1117 by **Philip Rambaut** in Macclesfield; Vatican Radio, Rome 21.485 (Eng to Africa 1115-1130), 42453 at 1125 by **Eddie Mc Keown** in Co. Down; Radio Denmark via RNI Kvitsoy 21.710 (Da to S.Asia, Australia 1330-1355), 42432 at 1344 by Rhoderick Illman (Oman); Radio Finland, Helsinki 21.550 (Eng, Sw, Fin to E Africa, Middle East 1405-1557), heard at 1429 by Dick Moon (S.Africa); Radio Austria Int, Vienna 21,490 (Ger, Sp, Eng, Fr to W.Africa 1300-1700), SIO444 at 1615 by **John Coulter** in Winchester; Radio Pakistan, Islamabad 21.740 (Ur, Eng to Middle East 1545-1630), SIO322 at 1615 by **Kenneth Buck** in Edinburgh; WCSN Scotts Corner, Maine 21.640 (Eng, Fr to N/E Africa 1600-1955), 33343 at 1754 by **Robin Clark** in Plymouth; Vatican Radio, Rome 21.650 (It, Eng, Fr, Sp, Esp to Africa 1840-1910), 44444 at 1734 by **Leo Barr** in Sunderland.

Good long distance reception has also been noted in the **17MHz (16m)** band. During the early evening the broadcasts from Radio New Zealand International on 17.680 (Eng to Pacific areas 1800-2110) have been attracting the attention of many Dxers. In London, **Phil Townsend** rated their 100kW transmission from Rangitaiki as 25433 at 1940. In Spain, Jurgen Thiel logged them as 43534 at 1900. Much to the annoyance of DXers, Radio Moscow now leave their carrier running on 17.680 after their broadcast in Spanish to C.America has ended at 0500 and this obliterates the RNZI transmission. Presumably it is in readiness for their broadcast to Europe at 0600.

Some of Radio Australia's broadcasts have also been received here. Whilst checking the band during the early morning, Kenneth Reece logged their transmission to C.Pacific areas via Shepparton 17.790 (Eng, Fr 2100-0800) as 24322 at 0414. In Bristol, **Francis Hearne** picked up their broadcast to SE Asia via Darwin 17.715 (Eng, Chin 0100-1400), which rated as SIO222 at 0700. Their transmission to C.Asia via Carnarvon 17.630 (Eng, Chin 0000-0900) was rated as 44344 at 0030 by Chris Shorten.

Quite a number of the broadcasts to other areas were noted in the reports: Radio Japan, Yamata 17.890 (Eng, Jap to SE Asia 0500-1000), rated as SIO443 at 0705 by Brian Hallett; Radio Finland via Pori 17.800 (Fin, Sw, Eng to SE Asia 0700-0825), 54444 at 0814 by David Wratten; AIR via Delhi 17.387 (Eng to E Asia 1000-1100), 32222 at 1050 by Jim Cash; Radio Peace and Progress, USSR 17.840 (Eng to SE Asia 1330-1350), 43433 at 1350 by Rhoderick Illman (Oman); RTM Tanger, Morocco 17.595 (Eng, Fr to N.Africa, Middle East 1400-1700), 53433 at 1415 by Ken Whayman; Radio Romania Int, Bucharest 17.745 (Eng, Fa to S.Asia 1500-1556), 43333 at 1510 by Sheila Hughes; Voice of Greece, Athens 17.535 (Gr, Eng to USA 1500-1550), SIO455 at 1530 by Kenneth Buck; VOA via Tinang, Philippines 17.790 (Chin to C.Asia 1000-1600), SIO444 at 1530 by Thomas Barnett; Radio Sweden via Horby 17.880 (Sw, Fr, Eng to USA 1430-1630), 33443 at 1542 by Andy Cadier; Radio Cairo, Egypt 17.745 (Hi, Ur 1500-1730), SIO444 at 1640 by John Coulter; BBC via Ascension Island 17.860 (Eng to C/E Africa 1515-1745), SIO322 at 1710 by Philip Rambaut; Vatican Radio, Rome 17.710 (Port, It, Eng, Fr, Sp to W.Africa 1800-1900), 43433 at 1800 by John Sadler; Radio Moscow, USSR 17.585 (Eng to USA 1330-2100), 55555 at 1855 by **John Stevens** in Largs; Voice of Israel, Jerusalem 17.630 (Eng, Fr to Africa 1900-1955), 43434 at 1905 by Cliff Stapleton; VOA via Greenville, USA 17.785 (Eng to W.Africa 1600-2200), 22232 at 1910 by Leo Barr; WYFR via Okeechobee, Florida 17.612 (Eng, Ar, Fr, Port to W.Africa 1600-2245), 33333 at 2145 by **Robin Harvey** in Bourne.

In contrast, very few of the many broadcasts to Europe were noted; Voice of Israel, Jerusalem 17.575 (Eng, Fr 1000-1100), rated as 44544 at 1008

Local Radio DX Chart

Freq kHz	Station	ILR	BBC	Power (kW)	DXer
585	R.Solway		B	2.00	D,H,K,N,Q,X*,Y
603	Invicta Snd(Coast)		I	0.10	Q,S,T,V,W,Z
603	R.Gloucester		B	0.10	E,J,M,Q,S,Y,Z
630	R.Bedfordshire		B	0.20	E,M,Q,S,T,V,W,Y,Z
630	R.Cornwall		B	2.00	F,M,Q
657	R.Clwyd		B	2.00	D*,E,F,H,L,M,N,Q,S,Y,Z
666	DevonAir R		I	0.34	M,Z
666	R.York		B	0.80	E,H,P,S,X*,Y,Z
729	BBC Essex		B	0.20	E,M,S,T,V,Y,Z
738	Hereford/Worcester		B	0.037	E,M,S,V,Y,Z
756	R.Cumbria		B	1.00	H,K,N,X*
756	R.Shropshire		B	0.63	E,M,S,Z
765	BBC Essex		B	0.50	E,M,P,S,T,V,Z
774	R.Kent		B	0.70	L,M,N,S,T,V,Z
774	R.Leeds		B	0.50	D,E,H
774	Severn Sound		I	0.14	M,S,Z
792	Chiltern R		I	0.27	E,S,T,V,Y,Z
792	R.Foyle		B	1.00	N
801	R.Devon		B	2.00	F,M,N,O,S,Z
819	Hereford/Worcester		B	0.037	E,S,Z
828	2CR		I	0.27	M
828	R.WM		B	0.20	S
828	R.Aire		I	0.12	H
828	Chiltern R		I	0.20	N,S,T,V,Z
837	R.Cumbria		B	1.50	D,F*
837	R.Furness		B	1.00	H,N,Y
837	R.Leicester		B	0.45	E,L,M,P,S,T,V,Z
855	R.Devon		B	1.00	M
855	R.Lancashire		B	1.50	E,H,K,S,X*
855	R.Norfolk		B	1.50	E,H,L,S,T,V,Z
873	R.Norfolk		B	0.30	E,H,L,M,S,T,V,Z
936	GWR (Brunel R.)		I	0.18	M,S,T,Z
945	R.Trent (GEM-AM)		I	0.20	D,E,H,P,S,T,W,Z
954	DevonAir R		I	0.32	M
954	R.Wyvern		I	0.16	S,Y,Z
990	R.Aberdeen		B	1.00	B,X*
990	Beacon R. (WABC)		I	0.09	P,S,Z
990	R.Devon		B	1.00	M
990	Hallam R.(C.Gold)		I	0.25	E,S
999	Red Rose R		I	0.80	F,H
999	R.Solent		B	1.00	L,M,Z
999	R.Trent (GEM-AM)		I	0.25	E,S,Y,Z
1026	R.Cambridgeshire		B	0.50	E,P,S,V,Z
1026	Downtown R		I	1.70	N
1026	R.Jersey		B	1.00	M
1035	R.Kent		B	0.50	L,M,V,Z
1035	NorthSound R		I	0.78	H,X*
1035	R.Sheffield		B	1.00	E,P,S
1035	West Sound		I	0.32	N
1107	R.Northampton		B	0.50	E,M,S,Z
1116	R.Derby		B	1.20	E,S,Z
1116	R.Guernsey		B	0.50	L,M
1152	BRMB (Xtra-AM)		I	3.00	E,S
1152	R.Broadland		I	0.83	K*,Z
1152	R.Clyde (Clyde 2)		I	3.60	N
1152	LBC (L.Talkback R)		I	23.50	L*,M
1152	Metro R. (GNR)		I	1.80	X*,Y
1161	R.Bedfordshire		B	0.10	J,S,V,Z
1161	GWR (Brunel R.)		I	0.16	M,S
1161	R.Sussex		B	1.00	L,M
1161	R.Tay		I	1.40	N
1161	Viking R.(Gold)		I	0.35	E,Z
1170	R.Orwell		I	0.28	V,Y,Z
1170	Signal R		I	0.20	D*,E,S
1170	TFM Radio (GNR)		I	0.32	H,X*
1170	Ocean Sound		I	0.12	L,M
1242	Invicta Snd(Coast)		I	0.32	D,S,V,Z
1242	Isle of Wight R		?	0.50	A*,C,G,I,M,S,V,Z
1251	Saxon R		I	0.76	M,S,V,Y,Z
1260	GWR (Brunel R.)		I	1.60	M
1260	Leicester (GEM-AM)		I	0.29	E,L,P,S,W,Z
1260	R.York		B	0.50	H
1278	Pennine R.(C.Gold)		I	0.43	D
1305	R.Hallam (C.Gold)		I	0.15	E,S
1305	Red Dragon R		I	0.20	M,S
1323	R.Bristol S'set Snd		B	0.63	M,S,Z
1323	Southern Sound		I	0.50	L,M,S,V,Z
1332	Hereward R		I	0.60	E,S,V,Z
1332	Wiltshire Sound		B	0.30	M,S,Y,Z
1359	Essex R.(Breeze)		I	0.28	L,V,Z
1359	Mercia Snd(Xtra-AM)		I	0.27	E,S,W,Z
1359	R.Solent		B	0.85	J,M
1368	R.Lincolnshire		B	2.00	E,Z
1368	R.Sussex		B	0.50	L*,M,V,Z
1368	Wiltshire Sound		B	0.10	M
1431	Essex R.(Breeze)		I	0.35	E,L,O,Z
1431	Radio 210		I	0.14	M
1449	R.Cambridgeshire		B	0.15	E,R,S,Z
1458	R.Devon		B	2.00	M
1458	GLR		B	50.00	M,U,Z
1458	GMR		B	5.00	D,N
1458	R.Newcastle		B	2.00	D,X*
1458	Radio WM		B	5.00	E,P,S,U
1476	County Sound(Gold)		I	0.50	E,L,M,S,Z
1485	R.Humberside		B	1.00	E,H,Z
1485	R.Merseyside		B	1.20	K,S
1485	R.Oxford		B	0.50	M,W,Z
1485	R.Sussex		B	1.00	L,M,S
1503	R.Stoke-on-Trent		B	1.00	D*,E,F,K,M,P,S,Z
1521	R.Mercury		I	0.64	L*,M,Z
1521	R.Nottingham		B	0.50	E,P,S,Z
1530	R.Essex		B	0.15	V,Z
1530	KCBC Ket'ring/Corby		I	?	I
1530	Pennine R.(C.Gold)		I	0.74	B,E
1530	R.Wyvern		I	0.52	S
1548	R.Bristol		B	5.00	M,S,U
1548	Capital R. (Gold)		I	97.50	L,M,S,U,W,Z
1548	R.City		I	4.40	D,K
1548	R.Cleveland		B	1.00	H,X*
1548	R.Forth (Max AM)		I	2.20	N
1548	R.Hallam		I	0.74	E
1557	R.Lancashire		B	0.25	K
1557	Chiltern (Nthant96)		I	0.76	E,S,Z
1557	Ocean Sound		I	0.50	M,Y
1584	R.Nottingham		B	1.00	E,S,Z
1584	R.Shropshire		B	0.50	S
1584	R.Tay		I	0.21	F,N
1602	R.Kent		B	0.25	E,F,L,M,S,Y,Z

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

DXers:
A: Thomas Barnett, Slough.
B: Leo Barr, Sunderland.
C: Darren Beasley, Bridgwater.
D: Scott Caldwell, Warrington.
E: Jim Cash, Derby.
F: William Coughlan, Dublin.
G: John Coulter, Winchester.
H: Adrian Don, Whitley Bay.
I: Simon Hamer, New Radnor.
J: Geoff Harris, Sturminster Newton.
K: Simon Holland, Douglas IOM.
L: Sheila Hughes, Morden.
M: George Millmore, Wootton, IOW.
N: Ike Odoom, Glasgow.
O: Roy Patrick, Derby.
P: Alex Radulovic, Burton-upon-Trent.
Q: Tim Shirley, Bristol.
R: Mike Smith, Cambridge.
S: Roy Spencer, Coventry.
T: Darran Taplin, Tonbridge.
U: Jurgen Thiel, Javea, Spain.
V: Phil Townsend, London.
W: Peter Walduck, Milton Keynes.
X: Neil Wheatley, Newcastle-upon-Tyne.
Y: Jim Willett, Grimsby.
Z: David Wratten, Cambridge.

Medium Wave DX Chart

Freq kHz	Station	Country	Power (kW)	DXer
520	Hof-Saale	Germany (W)	0.2	D*
531	Ain Beida	Algeria	600	A*,D*,R
531	Leipzig	Germany (E)	100	D*
531	Beromunster	Switzerland	500	R
540	BRT-2 Wavre	Belgium	150/50	C,E,G,J,O
540	Solt	Hungary	2000	N*
540	Sidi Bennour	Morocco	600	D*
549	Les Trembles	Algeria	600	A*,D*,G*,R
549	DLF Bayreuth	Germany (W)	200	E
558	Espoo	Finland	100	J
558	Valencia	Spain	20	B,D*,R
567	West Berlin	Germany (W)	100	D*
567	RTE-1 Tullamore	S.Ireland	500	B,C,D,E,G,J,K,M,O,P,S,T
567	Volgograd	USSR	250	D*,N*
576	Stuttgart	Germany (W)	300	D*,M,R
585	Orf Wien	Austria	600	R
585	FIP Paris	France	8	J
585	RNE-1 Madrid	Spain	200	C,D*,G*,R
585	BBC-R.Scot Dumfries	UK	2	D
594	HRF Frankfurt	Germany (W)	400	A*,B,G*
594	Oujda-1	Morocco	100	D*
603	Lyon	France	300	R
603	BBC-R4 Newcastle	UK	2	D,J,K
612	RTE-2 Athlone	S.Ireland	100	C,D,G,K,M
612	Lerida	Spain	10	R
612	Sarajevo	Yugoslavia	600	R
621	RTBF-1 Wavre	Belgium	300	C,E,J
621	Barcelona	Spain	10	R
630	Vigra	Norway	100	D*
630	Timisoara	Romania	400	R
630	Tunis-Djedeida	Tunisia	600	R
639	Liblice	Czech'	1500	D*,E,R
639	RNE-1 Almeria	Spain	20	R
639	La Coruna	Spain	100	D*
648	Palma de Mallorca	Spain	10	D*,R
648	BBC Orfordness	UK	500	D*,E,G,H,M*,R
657	Napoli	Italy	120	R
657	RCE-2 Madrid	Spain	20	D*,R
657	BBC-R.Wales Wrexham	UK	2	B,S
666	Bodenseesender	Germany (W)	300/180	D*
666	Lisboa	Portugal	135	D*,R
666	Barcelona	Spain	20	L,R
675	Marseille	France	600	C*,D*,M*,R
675	Hilversum-3 Lopic	Holland	120	D*,E,H*,J,K*,R
684	RNE-1 Sevilla	Spain	250	A*,C,D*,H*,R
684	Beograd	Yugoslavia	2000	A*,R
693	Ain el Hamam	Algeria	5	R
693	BBC-R2 Droitwich	UK	150	D,R
702	Aachen/Flensburg	Germany (W)	5	D*
702	Monte Carlo	Monaco	300	G*
702	Zamora	Spain	5	R
702	Yerevan	USSR	100	N*
711	Rennes 1	France	300	D*,G*,J,R
711	Heidelberg	Germany (W)	5	R
711	Jefren/Sebha/Ghadames	Libya	50	R
720	WDR-2 Langenberg	Germany (W)	200	O*
720	BBC-R4 Lisnagarvey	N.Ireland	10	D,E,K
720	Sfax	Tunisia	200	R
720	BBC-R4 Lots Rd London	UK	0.5	J
729	RTE-1 Cork	S.Ireland	10	D
729	RNE-1 Alicante	Spain	10	R
729	Oviedo	Spain	50	A*,D*
738	In Amenas	Algeria	5	R
738	Paris	France	4	A*,J
738	Poznan	Poland	300	A*
738	RNE-1 Barcelona	Spain	250	A*,C,D*,R
747	Hilversum-2 Flevo	Holland	400	C,D*,E,H*,J,M,R
747	R.Cadena, Cadiz	Spain	10	D*
756	Brunswick	Germany (W)	800/200	B,D*,R
756	Lugoj	Romania	400	R*
765	Sottens	Switzerland	500	R*
774	BBC-R4 Enniskillen	N.Ireland	1	D
774	RNE-1 Caceres	Spain	60	D*
774	RNE-1 San Sebastian	Spain	60	A*
774	RNE-1 Valencia	Spain	50	R
783	Burg	Germany (E)	1000	D*,E,J,R*
783	R.Porto, Miramar	Portugal	100	D*
792	Sevilla	Spain	20	A*,D*,G*,R*
801	BRF via Munich	Germany (W)	420	D*,E,K*,M,R*
801	Castellon	Spain	5	A*,R*
810	SER Madrid	Spain	20	D*
810	BBC-Scot.Westerglen	UK	100	B,D,E,K,M,P
819	Trieste	Italy	25	D*
819	Rabat	Morocco	25	L
819	Warsaw	Poland	300	D*
828	NDR Hannover	Germany (W)	100/5	D*
828	Sebha	Libya	300	R
828	Barcelona	Spain	20	A*,R
837	Nancy	France	200	A*,J
837	COPE Ibiza	Spain	1	R
837	R.Popular, Sevilla	Spain	10	D*
846	Rome	Italy	540	D*,R
855	RAIS Berlin	Germany (W)	100	M*
855	Murcia	Spain	125	C,D*,R
864	Paris	France	300	A*,C,D*,J,R
873	AFN Frankfurt	Germany (W)	150	A*,C,D*,K,M
873	Lakihegy	Hungary	20	R
873	Zaragoza	Spain	20	R
882	COPE Alicante	Spain	2	R
882	R.Sabadell	Spain	2	R
882	BBC-Wales Washford	UK	70	C,D,E,H,J,M,P
891	Algiers	Algeria	600/300	A*,D*,R
900	Milan	Italy	600	A*,D*,E,R
909	Palma de Mallorca	Spain	10	R
909	BBC-R2 Moorside Edge	UK	200	D
909	BBC-R2 Westerglen	UK	50	K
918	R.Intercont. Madrid	Spain	20	D*,R
927	BRT-1 Wolvertem	Belgium	300	E,J,R
927	Lleida	Spain	5	R
927	Izmir	Turkey	200	R*
936	Radio Bremen	Germany (W)	100	A*,B,D*,E
945	Toulouse	France	300	A*,B*,D*,R
954	RCE Madrid	Spain	20	D*,R
963	Pori	Finland	600	A*,D*,P*
963	Paris	France	8	J
972	NDR/WDR Hamburg	Germany (W)	300	A*,B*,D*,E,K*,R
981	Alger	Algeria	600/300	A*,D*,M,R
990	RIAS Berlin	Germany (W)	300	A*,B,R
990	SER R.Bilbao	Spain	10	D*
990	BBC-Redmoss	UK	1	E
999	R.Popular, Madrid	Spain	20	D*,R
1008	Hilversum-5 Flevo	Holland	400	D*,E,H*,J,M,R
1017	SWF Wolfsheim	Germany (W)	600	D*,H*,R
1026	SER Alicante	Spain	3	R
1026	SER Reus	Spain	10	R
1035	Milan	Italy	50	H*,R
1035	Prog.3 Lisbon	Portugal	120	D*
1044	DDR-1 Burg	Germany (E)	250	D*,H*
1044	Sebaa-Aioun	Morocco	300	D*
1053	Tripoli	Libya	50	R
1053	BBC-R1 Droitwich	Uk	150	D,R
1062	Kalundborg	Denmark	250	D*,H*,M
1062	Cagliari	Italy	25	R
1071	Brest	France	20	J
1071	Lille	France	40	D*
1080	Katowice	Poland	1500	N*
1080	Palma de Mallorca	Spain	5	R
1089	BBC-R1 Brookmans Pk	UK	150	D,R
1098	RNE-5 Lugo	Spain	5	R
1107	AFN via Munich	Germany (W)	40	D*
1107	RNE-5 Barcelona	Spain	20	R
1107	BBC-R1 Wallasey	UK	0.5	D*
1116	Bari	Italy	150	D*,R
1125	La Louviere	Belgium	20	J
1125	BBC Llandrindod Wells	UK	1	D*
1125	Zagreb	Yugoslavia	200	D*,L
1134	R.Pop de Menorca	Spain	2	R
1134	Zadar	Yugoslavia	1200	N*
1143	AFN via Stuttgart	Germany (W)	10	E
1143	Messina	Italy	6	R
1143	Kaliningrad	USSR	150	M*
1152	Lerida	Spain	10	R
1152	RNE-5 Zamora	Spain	?	R
1161	Ajaccio	France	10	R
1161	Strasbourg (F.Int)	France	200	D*
1161	Toulouse	France	100	R
1179	SER Murcia	Spain	5	R
1179	Solvesborg	Sweden	600	C*,D*,E,H*,M*,P
1197	VOA via Munich	Germany (W)	300	M
1197	BBC-R3 Bournemouth	UK	0.5	J
1206	Wroclaw	Poland	200	D*,O*
1215	COPE Castellon	Spain	10	R
1215	BBC-R3 Moorside Edge	UK	100	D,R
1224	COPE Madrid	Spain	20	B,R
1233	Prague	Czech	400	D*
1242	Marseille	France	150	D*,R
1260	Valencia	Spain	20	R
1269	Neuminster	Germany (W)	600	D*,E,J,L,O
1269	COPE Reus	Spain	2	R
1278	RTE-2 Dublin/Cork	Ireland (S)	10	P,U*
1287	Litomysl/Liblice	Czech	300/200	D*,O*
1287	Tel Aviv	Israel	100/50	F*
1296	COPE Valencia	Spain	10	R
1296	BBC Orfordness	UK	500	D*
1314	Kvitsoy	Norway	1200	C,D*,E,J,M*,R*
1314	RNE-5 Tarrega	Spain	2	R
1323	R.Moscow via Leipzig	Germany (E)	150	C,D*
1332	Rome	Italy	300	C,D*,S
1341	BBC-Ulst.Lisnagarvey	N.Ireland	100	C,D,E,S
1341	SER Tarrasa	Spain	2	R
1350	Nancy/Nice	France	100	C*,D*,R
1359	RNE-1 Melilla	Spain	5	R
1368	Manx Radio, Foxdale	I.O.M	20	B,D,K*,L*,P*
1368	Venice	Italy	20	R
1377	Lille	France	300	C,O*
1377	Ukraine	USSR	50	R
1386	Kaliningrad	USSR	500	M*
1395	R.Tirana via Lushnje	Albania	1000	D*
1395	Alicante	Spain	2	R
1395	RNE-5 Tortosa	Spain	2	R
1404	Ajaccio, Corsica	France	2	R
1404	Brest	France	20	C,J
1413	RNE-5 Castellon	Spain	5	R
1413	Pristina	Yugoslavia	1000	G*,M*
1422	Alger	Algeria	50/25	D*,R
1422	Heusweiler	Germany (W)	600	C*,R
1422	Saarbrucken	Germany (W)	1200/600	D*
1431	Bernburg	Germany (E)	20	D*
1431	Dresden	Germany (E)	250	R
1440	Marnach	Luxembourg	1200	B*,D*,J,R
1449	Squinanzo	Italy	50	R
1449	BBC-R4 Redmoss	UK	2	E
1458	R.Tirana, Lushnje	Albania	500	D*,R
1467	TWR Monte Carlo	Monaco	1000/400	B*,C*,D*,G*,H*,M*,R
1476	Wien-Bisamberg	Austria	600	C,R
1476	RCE Bilbao	Spain	20	D*
1494	Clermont-Ferrand	France	20	B,R
1503	Stargard	Poland	300	D*,H*,O*,R
1503	Pamploma	Spain	2	D*
1512	BRT Wolvertem	Belgium	600	C*,D*,J,O,R
1512	Jeddah	Saudi Arabia	1000	D*,R*
1521	Duba	Saudi Arabia	2000	R*
1521	Radio Manresa	Spain	2	R*
1530	Vatican Radio, Rome	Italy	150/450	C*,D*,R,S
1539	DLF Mainflingen	Germany (W)	700	D*,R
1548	Trincomalee(DW relay)	Sri Lanka	600	I
1557	Nice	France	300	D*,R
1566	Sfax	Tunisia	1200	D*,R
1575	RBI via Burg	Germany (E)	250	D*,M
1575	Genoa	Italy	50	D*
1575	Villanueva y Geltru	Spain	2	R
1584	SER Gandia	Spain	2	R
1593	Langenberg	Germany (W)	400/800	D*,R
1602	Bolzano	Italy	2	D*
1602	SER Cartagena	Spain	2	R
1602	R.Onteniente	Spain	2	O*,R
1611	Vatican Radio, Rome	Italy	5	Q*

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

DXers:
A: Darren Beasley, Bridgwater.
B: Scott Caldwell, Warrington.
C: Jim Cash, Swanwick.
D: William Coughlan, Dublin.
E: Adrian Don, Whitley Bay.
F: Simon Hamer, New Radnor.
G: Geoff Harris, Sturminster Newton.
H: Sheila Hughes, Morden.
I: Rhoderick Illman, Thumrait, Oman.
J: George Millmore, Wootton IOW
K: Ike Odoom, Glasgow.
L: Roy Patrick, Derby.
M: Alex Radulovic, Burton-upon-Trent.
N: Tim Shirley, Bristol.
O: Chris Shorten, Norwich.
P: Roy Spencer, Coventry.
Q: John Stevens, Largs.
R: Jurgen Thiel, Javea, Spain.
S: Phil Townsend, London.
T: Peter Waldock, Milton Keynes.
U: Neil Wheatley, Newcastle-upon-Tyne.

by Roy Spencer; Radio Suriname Int via RNB Brasilia, Brazil 17.755 (Du, Eng 1700-1745), 32443 at 1700 by Darren Beasley; Radio HCJB Quito, Ecuador 17.790 (Cz, Ger, Eng, Sw, Norw, Da, Fr, Sp 1700-2230), 44444 at 1925 by **Ted Agombar** in Norwich; RCI via Sackville, E Canada 17.870 (Eng, Fr to Europe 2030-2200), 33434 at 2132 by Robin Clark.

Some of the **15MHz (19m)** broadcasts from Radio Australia have been received well in the UK. Those via Shepparton were on 15.130 (Eng to SE Asia 2030-0130), rated as 34343 at 2115 by Cliff Stapleton; 15.160 (Eng, Fr to S.Pacific 1930-1030), 32222 at 0830 by Alan Smith; 15.240 (Eng to S.Pacific 2200-1030), heard at 0800 by Tim Shirley; also 15.465 (Eng to E Asia 2030-21000, SIO333 at 2100 by John Stevens. Their transmission to S.Asia via Carnarvon 15.485 (Eng 1400-1630) was rated as SIO444 at 1430 by Thomas Barnett. An "English by Radio" programme in Chinese to C.Asia via Darwin 15.170 may be heard between 2200 and 2300. David Edwardson quoted 35553 at 2225.

Many of the broadcasts in this band are beamed towards Europe and most are potent signals. Those noted stemmed from Radio Sophia, Bulgaria 15.160 (Ger, Fr, Eng 0530-0700), rated as 54444 at 0630 by David Wratten; Radio HCJB Quito, Ecuador 15.270 (Cz, Sw, Norw, Da, Ger, Eng 0500-0830), 32333 at 0801 by Leo Barr; UAE Radio Dubai 15.435 (Ar, Eng 0600-2050), SIO544 at 1625 by Brian Hallett; Radio Korea, Seoul 15.575 (Ar, It, Eng, Ger, Sp 1645-2300), 44444 at 1700 by Mike Smith; Radio Bangladesh, Dacca 15.255 (Eng, Ben 1815-2000), 44444 at 1815 by **Alex Radulovic** in Burton-on-Trent; WWCR Nashville, USA 15.690 (Eng 1400-0200), 54555 at 1824 by Robin Clark; WYFR via Okeechobee, Florida 15.565 (Ger, It, Eng, Sp 1600-2245), SIO242 at 1940 by Kenneth Buck; WCSN Scotts Corner, Maine 15.610 (Eng 2000-2155), 45444 at 2000 by **Roy Patrick** in Derby; Voice of Vietnam, Hanoi 15.010 (Russ, Sp, Eng, Fr 1600-2130), 55544 at 2043 by **Darran Taplin** in Brenchley; Radio Yugoslavia, Belgrade 15.105 (Eng 2100-2145), SIO444 at 2115 by **Alf Gray** in Birmingham; RCI via Sackville, Canada 15.325 (Ger, Hung, Cz, Uk, Russ, Pol, Eng, Fr 1630-2200), 33223 at 2128 by Robin Harvey; Voice of Israel, Jerusalem 15.640 (Fr, Eng, Yi 2100-2225), 55444 at 2130 by Ken Whayman; RNE via Aganda, Spain 15.280 (Fr, Eng 1800-2157), 44454 at 2153 by Roy Spencer; VOFC Taipei

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SEEN & HEARD

via Okeechobee, Florida 15.440 (Chin, Ger, Fr, Eng 1900-2300), 33443 at 2235 by Sheila Hughes.

Throughout the day there are many broadcasts in a variety of languages to other areas. They include Radio Japan via Montsinery, Fr.Guiana 15.325 (Jap, Eng, Sp to C.America 0200-0400), noted as 34433 at 0215 by Kenneth Reece; RFO Papeete, Tahiti 15.170 (Fr, Tah to Oceana 1600-0930), SIO333 at 0500 by Simon Hamer; BRT via Wavre, Belgium 15.515 (Du to Africa 0500-0555), 53343 at 0500 by Chris Shorten; Radio Romania Int, Bucharest 15.340 (Eng to Africa 0530-0600), 34334 at 0530 by John Sadler; also to SE Asia 15.335 (Eng 0645-0715), SIO333 at 0700 by Francis Hearne; BBC via Mahe, Seychelles 15.420 (Eng, Swa to E Africa 0300-1215), SIO211 at 0913 by Philip Rambaut; Voice of Greece, Athens 15.630 (Gr, Eng to E Asia 1000-1050), 33222 at 1047 by Jim Cash; Radio Austria Int, Vienna 15.430 (Ger, Eng to E Asia 1100-1400), 55555 at 1337 by Andy Cadier; Radio Finland via Pori 15.185 (Eng, Sw, Fin to Middle East 1405-1557), 43333 at 1425 by Rhoderick Illman (Oman); RBI via Nauen, GDR 15.145 (Fr, Swa, Ar, Eng to Middle East, E Africa 1415-1815), 53554 at 1740 by Darren Beasley; Radio Kuwait, Sulaibiyah 15.495 (Ar to N.Africa 0200-0000), SIO444 at 1835 by John Coulter; Radio Nederlands via Talata Volon, Madagascar 15.560 (Eng to Africa 1830-1925), 44434 at 1855 by Ted Agombar; Radio Portugal, Lisbon 15.250 (Port to Africa 1400-2100), 45454 at 1910 by Eddie McKeown.

The broadcasters now using the **13MHz (22m)** band include Radio Australia via Shepparton 13.700 (Eng to C.Pacific 0200-0800), rated as 43343 at 0702 by Alan Smith; Radio Korea, Seoul 13.670 (It, Fr, Ger, Eng to Europe 0800-0900), 33233 at 0805 by Chris Shorten in Norwich; SRI via Sottens, Switzerland 13.685 (It, Eng, Ger, Fr to Australia, Pacific areas 0745-1030), 44333 at 0830 by Sheila Hughes; BRT via Wavre 13.675 (Eng, Fr, Du to Africa, Europe 0900-1125), SIO333 at 0925 by Brian Hallett; Radio Australia via Brandon 13.740 (Eng to S.Asia, Europe 1530-1800), 44333 at 1700 by **Derek Carter** in Cambridge; Radio Pakistan, Islamabad 13.665 (Ur, Eng to N.Africa, Middle East 1315-1630), SIO333 at 1600 by Kenneth Buck; Radio Austria Int, Vienna 13.730 (Ger, Fr, Eng, Sp to Europe 0400-1700), 45554 at 1632 by David Edwardson; AWR Agat, Guam 13.720 (Hi, Tel to S.Asia 1600-1700), SIO322 at 1650 by Philip Rambaut; Radio Kuwait, Sulaibiyah 13.610 (Eng, Ar to Europe, USA 1800-2100), 33333 at 1806 by Leo Barr; ISBS Reykjavik 13.855 (Ic to Europe 1855-1930), SIO444 at 1900 by Simon Hamer; Radio DW via Julich, W.Germany 13.790 (Ha, Eng to Africa 1800-1950), 44444 at 1950 by Rhoderick Illman (Oman); WHRI Noblesville, USA 13.760 (Eng, Sp, Port, Yu to E USA, Europe 1700-0000), 43433 at 1952 by Roy Spencer; WSHB Cypress Creek, USA 13.770 (Eng, Ger, Fr to E USA, Europe 2000-2155), heard at 2000 by Roy Patrick; WRNO New Orleans, USA 13.720 (Eng to E USA, Europe 2100-0000), 34333 at 2145 by Mike Smith; Radio Nederlands via Flevo 13.700 (Fr, Ar, Eng to E/W.Africa 1830-2125), 24443 at 2055 by Andy Cadier; VOA via Bethany, USA 13.740 (Sp to C.America 0100-0400), 23433 at 0316 by Kenneth Reece.

Amongst the many **11MHz (25m)** broadcasts noted in the reports were the BBC via Masirah, Oman 11.760 (Eng to Middle East 0300-0815), rated as 33423 at 0330 by Kenneth Reece; Radio Korea via Sackville, Canada 11.715 (Eng to USA 1030-1100), 44444 at 1040 by Chris Shorten; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N.Africa 1400-1600), 33232 at 1405 by Andy Cadier; FEBC Bocaue, Manila 11.850 (Eng 1300-1600), heard at 1410 by Dick Moon (S.Africa); FEBA Radio Seychelles 11.865 (Hi, Eng to S.Asia 1400-1625), 34333 at 1608 by Rhoderick Illman (Oman); TWR Agana, Guam 11.650 (Eng to S.Asia 1500-1636), 32232 at 1610 by Alan Smith; Radio Australia via Carnarvon 11.800 (Eng to SE Asia 2000-2200), SIO333 at 2115 by Francis Hearne; VOA via Tinang, Philippines 11.870 (Eng to E Asia 2100-2200), heard at 2145 by Mike Smith; Radio Vilnius, Lithuania 11.770 (Eng to USA 2200-2230), 33333 at 2200 by Sheila Hughes.

Some of the numerous broadcasts to Europe were also mentioned: Radio Cairo, Egypt 12.050 (Ar 0600-2250), rated as 55555 at 0700 by **Bill Griffith** while in Krackow, Poland; TWR Monaco 11.655 (Eng 0855-1005), SIO544 at 0910 by Philip Rambaut; Voice of Greece, Kavala 11.645 (Gr, Eng 1500-1550), SIO555 at 1530 by Kenneth Buck; Radio Pakistan, Islamabad 11.570 (Eng 1715-1800), 33433 at 1727 by Leo Barr; AIR via Aligarh, India 11.620 (Eng 1845-2045), SIO544 at 1845 by Brian Hallett; Radio Afghanistan via USSR 11.830 (Ger, Eng, Fr 1700-2000), 33443 at 1845 by Robin Clark; Radio Portugal, Lisbon 11.740 (Eng, Fr, It, 1900-2030), SIO433 at 1920 by Alf Gray; Voice of Israel, Jerusalem 11.605 (Eng, Fr, Russ, Yi 1900-2225), 44544 at 1924 by Darran Taplin; RAI Rome 11.800 (Eng Da, Sw, Esp 1935-2020), 43333 at 1935 by Jim Cash; Radio Damascus, Syria 12.085 (Ger, Fr, Eng 1805-2105), 54454 at 2017 by Roy Spencer; Radio Beijing, China 11.500 (Russ, Ger, Eng 1700-2155), 54544 at 2022 by Darren Beasley; RNE Arganda, Spain 11.790 (Fr, Eng 1800-2157), 44434 at 2116 by Robin Harvey; Radio Moscow, USSR 11.630 (Eng 2200-2300), 54444 at 2200 by Ken Whayman; RHC Havana via USSR 11.705 (Fr, Eng 2100-2300), heard at 2218 by **Scott Caldwell** in Warrington; also RHC via USSR 11.930 (Fr, Eng 2100-2300), 45554 at 2235 by David Edwardson; Radio Japan via Moyabi, Gabon 11.835 (Jap, Eng 2200-0000), 43243 at 2300 by Eddie McKeown.

There are a great many broadcasts to Europe in the **9MHz (31m)** too! A few that are seldom reported stem from TWR Monaco 9.480 (Eng 0640-0825) rated as 45444 at 0815 by Roy Patrick; AWR via Sines, Portugal 9.670 (Pol, Ger, Eng 0600-0900, Sun Only), heard at 0815 by Scott Caldwell; IRRS Milan, Italy 9.860 (Eng 1000-1230, Sun Only), 33333 at 1100 by Alex Radulovic; Radio Pyongyang, N.Korea 9.345 (Eng 2000-2050), SIO344 at 2000 by Neil Wheatley; Radio Finland via Pori 9.550 (Fin, Eng, Ger, Fr, Sw 1600-2055), 55545 at 1945 by Ted Agombar.

The **7MHz (41m)** band is very

Transatlantic DX Chart

		USA		
710	WOR	New York, NY	0200	B
880	WCBS	New York, NY	0200	B,D
1010	WINS	New York, NY	0305	D
1130	WNEW	New York, NY	0230	B
1210	WCAU	Philadelphia, PA	0257	D
1510	WKKU	Boston, MA	0330	B,C
		CANADA		
590	VOCM	St.John's, NF	0100	D
640	CBN	St.John's, NF	2350	D
930	CJYQ	St.John's, NF	2350	D
960	CFFX	Kingston, ON	0330	B
1220	CKCW	Moncton, NB	0200	D
1290	CHRM	Matane, PQ	0230	D
		C.AMERICA & CARIBBEAN		
535	R.Grenada	St.George's,Grenada	1615	A
555	ZIZ	Basseterre,St.Kitts	2047	A
595	Dominica B.Corp	Roseau, Dominica	1240	A
610	R.Reloj	Trinidad	0200	A
620	ABBS	St.Johns, Antigua	1234	A
660	R.St.Lucia	Castries, St.Lucia	1027	A
705	R.St.Vincent	Kingstown,St.Vincent	0209	A
730	Trinidad B.Corp	Trinadad	0215	A
790	Voice of Barbados	St.George, Barbados	1615	A
825	R.Paradise	Basseterre,St.Kitts	0222	A
900	Caribbean BC	Bridgetown, Barbados	1615	A
1030	WQSO	San Juan,Puerto Rico	0644	A
1060	Voice of Life	Roseau,Dominica	1019	A
1090	R.Caribbean	St.Lucia	1615	A
1310	RFO Ft de France	Martinique	1500	A
1370	WIVV	Puerto Rico	1300	A
1480	R.Disco	S Domingo, Dominica	1251	A
1505	R.Anguilla	Anguilla	1246	A
1610	Caribbean Beacon	The Valley,Anguilla	0212	A,D

DXers:
A: Andy Cadier, while in St.Lucia.
B: Tim Shirley, Bristol.
C: Jurgen Thiel, Javea, Spain.
D: Jim Willett, Grimsby.

Ted Agombar: Grundig Satellit 400 + 20m random wire.
Thomas Barnett: Kenwood R2000 + random wire.
Leo Barr: Matsui MR4099 + internal antenna.
Darren Beasley: Philips D2935 + Hexagon loop or ATU + 10m random wire.
Kenneth Buck: Lowe HF225 + random wire or home-built TRF set + loop.
Andy Cadier: Saisho SW500 + 40m random wire or Datong active antenna.
Scott Caldwell: Saisho 2000 + random wire.
Derek Carter: Matsui MR4099 + random wire.
Jim Cash: Kenwood R5000 + random wire or Sony ICF 2001D + AN-1.
Robin Clark: Saisho SW5000 + 20m random wire.
William Coughlan: Home built superhet + ferrite rod antenna.
John Coulter: Yaesu FRG-7 + random wire.
Adrian Don: Philips 752 digital car radio + whip antenna on car.
David Edwardson: Trio R600 + trap dipole 22m long.
Alf Gray: Codar CR70 + Codar ATU + Ex-Army rod antenna.
Bill Griffiths: Sony ICF 2002 + built-in whip.
Brian Hallett: Trio R2000 + 10m random wire.
Simon Hamer: Lafayette HE30 + "Sooper Loop" or Grundig S1400 + 19m wire.
Geoff Harris: Home built 3 transistor reflex receiver + ferrite rod.
Robin Harvey: Matsui MR 4099 + SW loop.
Francis Hearne: Sharp GFA3 + random wire.
Simon Holland: Philips 870 portable.
Sheila Hughes: Panasonic DR48 + 15m inverted L or Sony ICF 7600DS + whip.
Rhoderick Illman: Sony ICF 7600DS + 23m random wire.
Eddie McKeown: Tatung TMR 7602 portable.
George Millmore: Tatung TMR 7602 portable.
Dick Moon: Icom R-70
Ike Odoom: Philips D2935 portable.
Fred Pallant: Trio R2000 + random wire in loft.
Roy Patrick: Lowe HF 125 + 20m wire.
Alex Radulovic: Matsui MR 4099 portable.
Philip Rambaut: Int.Marine Radio R.700M + random wire.
Kenneth Reece: Icom R9000 or Kenwood R5000 + delta loop.
Alan Roberts: Panasonic RF-B40 + built-in whip.
John Sadler: Omega 4020 or Omega 4022 + built-in whip.
Tim Shirley: Trio R600 + random wire.
Chris Shorten: Matsui MR 4099 portable.
Alan Smith: Matsui MR4099 + Mizuho KX-3 ATU + random wire.
Mike Smith: Lowe HF-225.
Roy Spencer: Realistic DX-200 + 0.5m loop or DX-400 + 5m wire.
Cliff Stapleton: Trio R1000 + dipole or 25m random wire.
John Stevens: Hammarlund HQ 180 or Icom R70 + random wire.
Darran Taplin: Lowe HF225 + Global ATU + 30m random wire.
Jurgern Thiel: Grundig Satellit 3000 + 2.2m hexagon spiral loop
Phil Townsend: Lowe SRX-30 + loop or ATU + random wire.
Peter Walduck: Saisho SW5000 + built-in whip.
Ken Whayman: Realistic DX-440 + 15m inverted L or Vega 206 + whip.
Neil Wheatley: Sangean ATS 803 + built-in whip.
Jim Willett: RCA AR77 + X dipole in loft or 4m loop.
Julian Wood: Trio R2000 + random wire.
David Wratten: Philips D2999 + loop or Trio R2000 + ATU + 30m random wire.

Scott Caldwell DXing in Warrington.

INDEX TO ADVERTISERS

SEEN & HEARD

Tropical Band Chart

Freq kHz	Station	County	UTC	DXer
2.560	Xinjiang	China	2254	D,L
3.200	TWR	Swaziland	0500	L
3.210	R.Mozambique	Mozambique	0545	L
3.215	R.Orange	S.Africa	0230	L
3.220	R.Togo, Lome	Togo	0510	P
3.230	R.Nepal	Kathmandu	0030	P
3.230	ELWA Monrovia	Liberia	2150	I,L
3.255	BBC via Maseru	Lesotho	0445	G
3.300	R.Cultural	Guatemala	0342	C
3.365	GBC Radio 2	Ghana	2010	P
3.915	BBC Kranji	Singapore	2005	O,P
3.955	BBC Daventry	England	2035	E
3.965	RFI Paris	France	1731	M,O
3.975	BBC Skelton	England	0348	C
3.980	VOA Munich	W.Germany	0455	M
3.985	R.Beijing, China	via SRI Berne	2105	E,M
3.985	SRI Berne	Switzerland	1745	F,M
3.995	DW Cologne (Julich)	W.Germany	2200	J
4.080	R.Ulan Bator	Mongolia	2250	L,P
4.330	PBS Xinjiang	China	2315	D
4.500	Xinjiang	China	2335	D,M
4.545	Alma Ata	USSR	2157	A
4.735	Xinjiang	China	0020	C,D,P
4.740	R.Afghanistan	via USSR	1930	E
4.755	Caracol Neiva	Columbia	0144	C
4.760	ELWA Monrovia	Liberia	2047	C,I
4.765	R.Moscow	via Cuba	0620	D
4.770	FRCN Kaduna	Nigeria	1850	I
4.775	R.Gabon, Libreville	Gabon	2230	D,I
4.865	V of Cinaruco	Colombia	0518	D
4.870	R.Cotonou	Benin	2245	A,I
4.880	SABC Radio 5	S.Africa	2000	P
4.885	Voice of Kenya	Kenya	2025	I,P
4.900	V de la Rev.Conakry	Guinea	2035	I
4.905	R.Relogio, Rio	Brazil	0545	N
4.905	R.Nat.N'djamena	Chad	2100	B,I,J,P
4.915	R.Anhanguera	Brazil	0617	C
4.915	R.Ghana, Accra	Ghana	2155	E,I,J
4.915	Voice of Kenya	Kenya	2025	I
4.930	R.Moscow	USSR	2100	E
4.935	Voice of Kenya	Kenya	1950	C,I,K,O
4.940	R.Kiev 2	USSR	2005	C,I
4.945	Caracol, Neiva	Colombia	0558	C
4.958	R.Baku	USSR	2140	E,H
4.975	R.Uganda, Kampala	Uganda	2055	C,I
4.980	Ecos del Torbes	Venezuela	0250	C
4.985	R.Brazil Central	Brazil	0602	C,D,N
4.990	AIR via Madras	India	2358	O
4.990	FRCN Lagos	Nigeria	2045	I
5.000	YVTO Caracas	Venezuela	0450	P
5.005	R.Nacional, Bata	Eq.Guinea	2003	C,E,I,J
5.015	R.Moskva 4 (Ashkhabad).	USSR	0001	O
5.025	R.Rebelde, Habana	Cuba	0145	P
5.035	R.Bangui	C.Africa	2025	C,I
5.035	R.Alma Ata	USSR	2359	C
5.047	R.Togo, Lome	Togo	2050	I
5.055	Faro del Caribe	Costa Rica	0547	C
5.055	RFO Cayenne(Matoury)	French Guiana	0602	N
5.060	PBS Xinjiang	China	2315	D
5.065	R.Candip, Bunia	Zaire	1830	I,J,P
5.075	Caracol Bogata	Colombia	0530	D,N,P
5.163	R.Beijing	China	2151	C
5.440	PBS Xinjiang	China	2315	D

DXers:
A: Leo Barr, Sunderland.
B: Darren Beasley, Bridgwater.
C: Jim Cash, Swanwick.
D: David Edwardson, Wallsend.
E: Bill Griffith, while in Kracow, Poland.
F: Brian Hallett, Burgess Hill.
G: Rhoderick Illman, Thumrait, Oman
H: Dick Moon, George, Rep. S. Africa.
I: Fred Pallant, Storrington.
J: Roy Patrick, Derby.
K: Alex Radulovic, Burton-on-Trent.
L: Tim Shirley, Bristol.
M: Chris Shorten, Norwich.
N: Alan Smith, Northampton.
O: Darran Taplin, Brenchley.
P: Jim Willett, Grimsby.

congested with broadcasts to Europe from nearby stations, e.g. Radio Kiev, Ukraine 7.240 (Eng to Europe 1800-1830), heard by Julian Wood, but some have to travel much longer distances to reach us, e.g. WWCR in Nashville, USA 7.520 (Eng 0100-0530), rated as SIO454 at 0100 by Neil Wheatley; or WYFR via Okeechobee, Florida 7.350 (Russ, Ger, Eng 0400-0745), 55555 at 0700 by Bill Griffith.

Others, however, are relayed e.g. VOA via BBC Woofferton, UK 7.175 (Hung, Cz 1700-2100), SIO444 at 1815 by John Coulter, or RCI Montreal via BBC Daventry, UK 7.235 (Ger, Hung, Cz, Eng, Fr 1630-2200), 44444 at 1930 by Ted Agombar.

Many of the broadcasts to other areas are good signals here too e.g. Radio Korea, Seoul 7.550 (It, Fr, Kor, Ar, Ger, Eng, Sp, Port to Middle East, E Africa 1545-2345), noted as 44433 at 1815 by Darran Taplin; Voice of Nigeria, Lagos 7.255 (Eng, Fr, Ha to W.Africa 0500-2200), SIO444 at 2200 by Simon Hamer.

The broadcasters using the **6MHz (49m)** band to reach listeners in Europe include BRT via Wavre, Belgium 6.035 (Du, Eng, Fr, Ger 0600-0800), SIO434 at 0600 by Ike Odoom; VOIRI Tehran, Iran 6.035 (Tur, Ger, Eng, Sp 1700-2130), 33433 at 1950 by David Edwardson; RBI Berlin 6.115 (Eng 1945-2030), 55555 at 1955 by Bill Griffith; King of Hope, Lebanon 6.280 (Eng 2000-2200), 34423 at 2200 by Darran Taplin.

Abbreviations

Ar	Arabic
Beng	Bengali
Chin	Chinese
Cz	Czechoslovakian
Dan	Danish
Du	Dutch
Eng	English
Esp	Esperanto
Far	Farsi
Fin	Finnish
Fr	French
Ger	German
Gr	Greek
Ha	Hausa
Hi	Hindi
Hung	Hungarian
Ic	Icelandic
It	Italian
Jap	Japanese
Kor	Korean
Norw	Norwegian
Pol	Polish
Port	Portuguese
Russ	Russian
Sp	Spanish
Sw	Swedish
Swa	Swahili
Tah	Tahitian
Tel	Telugu
Uk	Ukrainian
Ur	Urdu
Yi	Yiddish
Yu	Yugoslavian

Station Addresses

BBC Radio Scotland, Broadcasting House, Queen Margaret Drive, Glasgow G12 8DG.

ILR Plymouth Sound, Earl's Acre, Alma Road, Plymouth PL3 4HX.

Deutsche Welle, P.O.Box 100 444, D-5000 Cologne 1, West Germany.

Radio Canada International, P.O.Box 6000, Montreal, Canada H3C 3A8.

Radio Nederlands, P.O.Box 222, 1200 JG Hilversum, The Nederlands.

World Harvest Radio (WHRI), P.O.Box 12, South Bend, Indiana 46624, USA.

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