Short Wave Magazine

ISSN 0037-4261

£1.45

JUNE 1989

LOWE HF-225 COMMUNICATIONS RECEIVER REVIEWED

THIS IS TWO EMMA TOC

The story of P.P.Eckersley

SPECIAL BOOK OFFER

Buy the 9th Edition of Guide to Facsimile Stations by Klingenfuss and save over £2.00

For The Radio Listener

When you are ready to graduate to real listening Look to Lowe

The New HF-225 Receiver

I am particularly proud to announce that the new HF-225 receiver is now in production, and available from the better dealers on the short wave scene. This is the receiver designed to give you high performance under European band conditions, and dig out the weak signals under the welter of Megawatt broadcasters and jammers.

Technically, the HF-225 distinguishes itself by having a low phase noise synthesiser, which gives a reciprocal mixing performance not far off that of "professional" receivers costing up to ten times the price, and that's not just advertising talk, it is really true. The synthesiser actually tunes in steps of 8Hz, which betters most other receivers and gives a smooth "VFO" feel when tuning. As one user has already commented "If you tuned the HF-225 with your eyes closed, you would believe you had a £5,000 receiver on the table".

The HF-225 has a range of low cost options which extend its appeal; such as a keypad for direct frequency entry, which simply plugs into a rear panel jack; an active whip aerial; a rechargeable battery pack for portable use; and an attractive carrying case which protects the receiver whilst allowing full operational use. The new D-225 detector option is really something special, because it gives true synchronous AM detection for dragging sensible programme quality out of a signal being affected by selective fading distortion. The same option also gives narrow band (communications) FM demodulation.

Every listener these days appreciates a receiver which offers facilities for memorising favourite or regularly used frequencies, and the HF-225 offers 30 memory channels for this purpose. Using the memories has been made particularly versatile, because the operator can review the contents of the memories whilst still listening to the frequency he is using, or alternatively in the "Channel" mode, can tune through the memory channels using the main tuning knob, listening to each frequency as it appears on the display. Just like having a bank of single channel receivers under your control. Terrific for checking HF airband channels for activity.

Unlike most HF receivers on the market, the HF-225 comes complete with all filters fitted for every mode:— 2.2kHz, 4kHz, 7kHz, and 10kHz. There is also a 200Hz audio filter for CW, and if the D-225 detector is fitted, a 12kHz filter for FM. The correct filter for each mode is automatically selected by the receiver mode switch, but further selection can be made by the user from the front panel and the receiver remembers which filter was last used. True versatility and all built in at no extra cost. When selecting filters in use, the filter bandwidth is shown on the main display.

The display itself is a high contrast liquid crystal type, and shows frequency, filter bandwidth, detector lock (when D-225 is fitted), and whether the receiver is in memory mode. Automatic placing of the decimal point takes place as the receiver is tuned, so there can be no ambiguity in reading.

At the end of the day, what does the HF-225 offer you as a user? I can do no better than quote what was said by Rainer Lichte about the earlier HF-125:—"The HF-125 is a serious piece of equipment: don't be deceived by the unassuming front panel and the lack of spectacular features. The HF-125 will outperform most competitors. If you like an honest approach to receiver design, this is it. British understatement at its best".

The HF-225 is even better.

John Wilson

HF-225 £395

LOWE ELECTRONICS LIMITED

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482

VOL 47 ISSUE 6 JUNE 1989

ON SALE MAY 25th

JULY ISSUE ON SALE
JUNE 29

|10| **Lowe HF-225 HF Receiver.**

Cover John Wrightson has reviewed the new Lowe HF-225 communications receiver for *Short Wave Magazine* readers and was favourably impressed with what he found.

EDITOR: Dick Ganderton, C.Eng., MIEE, G8VFH
ART EDITOR: Steve Hunt
FEATURES EDITOR: Charles Forsyth
EDITORIAL ASSISTANT: Sharon George
ADVERTISEMENT PRODUCTION: Marcia Brogan
TECHNICAL ARTIST: Rob Mackie

Editorial & Advertising
Enefco House, The Quay,
Poole, Dorset BH15 1PP
Poole (0202) 678558 (24hrs)
FAX (0202) 666244
Prestel MBX 202671191

ADVERTISMENT DEPARTMENT
ADVERTISEMENT MANAGER:
Roger Hall G4TNT
(01-731 6222)
Dave Gadsden G4NXV

CONTENTS

Short Wave Magazine

REGULARS

SEEN & HEARD

GOOD LISTENING

A WORD IN EDGEWAYS

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

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines.

Sir

It is most interesting to read the letters page each month with readers' news and views. Andrew Keddie comments as to reviews on "ordinary" radios, some not even having a short wave capability. Yes Andrew, the mag is called Short Wave Magazine, *that being the title as bought by it's publishers, but look closer, it also reads "for the radio listener". SSB is not everyones prerequisite, just look at "Seen & Heard" and observe the loggings for local radio BBC/IBA. Medium wave DXing is hard work!*

Moving on to C. Stapleton of Torquay. He likes his Philips D1835, I do too, that's why I sell 'em! His comments are very accurate! I hope the person who recently phoned as to this model reads CS' s letter as to his QSLs.

Mrs L. A. Reed of Cheltenham has brought up a point in airport/plane security. We have checked this out. CARRY your radio so that those involved in checking such items can do so quickly. OK, so it is that little bit extra to have to hand, but radios packed away in luggage are likely to cause delay and holdups! There are a host of pocket multi-band portables available, we have a choice of over six in stock. Bon voyage everyone!

Nice comments from Harold G3FLJ, but would-be buyers BEWARE!!! There is a batch of these radios under the Sangean badge which have a "fault". There is a programming error in the organising software for IC402. On 16, 19, 25 and 31 metres the start frequency is wrongly programmed, hence the clearout price! To date, I have been unable to source who will service these models. With the Tatung TMR7602 we have the full UK Factory Service Department backup for service and parts! Caveat emptor.

John Berridge writes about his Russian radios - four in all! Well, I sell Vega radios in large quantities, and I can say, very honestly, that we find our radios very reliable indeed, with little comebacks and if we did have trouble I can assure you I would show them the door pretty quick! Mind you, John has a point about the turret tuner. To quote from a letter which I received from a Russian - "One must be a brave man to sell the dinosaur of the radio industry, the wavechange switch sounds like a Kalishkonov machine gun". Still, they don't come much cheaper. If you require spares John, contact Vega at Zenith House, 69 Lawrence Rd, Tottenham, London. Tel: 01-800 8088,

There is now an alternative to the Vega range. ITC market a Polish made radio and we have sent one of these to SWM *for review so they will tell you the facts!*

PETER BROWNBRIDGE
JOHNSONS SHORTWAVE RADIO
WORCESTER

Sir

Brian Oddy's "Starting Out" article in the April issue was both interesting and well done, as usual.

My interest in calibration has prompted me to write. As the h.f. time-signal transmissions of MSF from Rugby, ceased on the 29 February 1988, experimenters might receive those of RWM from Moscow. These are 4kHz lower in frequency than those given by Mr Oddy. BPM from China are "expected" frequencies, like WWV from USA, but are much weaker.

T. J. WYNN
NEWPORT
GWENT

Sir

With reference to Mr Wright's letter in the March issue of SWM *asking for recommendations regarding suitable radios in the £100 to £150 bracket.*

I have been an avid s.w.l. for 20 years and in that time have owned a number of short wave receivers including a Lowe SRX-30, various Eddystone and Grundig models, Vega portables, and so on. However, I believe that my present model, a Sony 7600DS, has the edge over all of them.

I would mention the following points as being important factors to consider when purchasing a set:

1. Portability
2. Sensitivity
3. Digital Readout (Accuracy)
4. Stability
5. SSB

However, the 7600DS, has plenty of other features as well, all with a function and not just add-on gimmicks. The price is slightly higher than the £150 limit quoted by Mr Wright, but in its price range, I believe this radio would suit all his needs easily.

R. B. WATSON
GREEN DUNSCROFT
DONCASTER

WHATS NEW

DXpedition

The Eastern Highlands ARC will be undertaking the first amateur radio transmission from the top of Mt. Wilhelm, at 4509m the highest mountain in Papua New Guinea. The location is 145E 06S.

This event will be taking place from 2300 June 2 to 2300 June 3. The proposed frequencies will be 14.195, 14.305, 144.01 and 144.10MHz The callsign to look for is P29CEH. A special QSL card will be available. Any s.w.l. who is able to receive the station should send a detailed reception report to the address listed below. **PO Box 789, Goroka, EHP, Papua New Guinea**

Sherwood Forest Award

This award is available to all licensed radio amateurs and short wave listeners (on a heard basis) from 1 January 1982.

A total of 30 points are required for the basic award, obtainable as follows:

a: one point per station worked (heard) in Nottinghamshire.

b: two points per Mansfield ARS members station worked (heard)

c: five points for working (hearing) the Mansfield ARS stations G3GQC and G1GQC

Log details only are required to be sent together with the fee to the Mansfield ARS Awards manager.

All permitted bands and modes may be used, however, working (hearing) the same station on a different band or mode does not count.

Proof of contact (hearing) may be requested. The cost of the award is £1.50 including postage. A full list of current licensed members of the Mansfield ARS is available from the awards manager on the receipt of an s.a.e. Mr A. Gibbins G4GNC, 52 Wheatfield Crescent, Mansfield Woodhouse, Mansfield, Notts NG19 9HQ.

EJ0A DXpedition

A DXpedition to the Aran Islands, IOTA EU06 will take place from June 2 to June 5. A group of US and Irish amateurs will be active on 3.5, 7, 14, 21 and 28MHz s.s.b./c.w. and 144MHz s.s.b., f.m. and packet. The group will use the callsign EJ0A. QSLs via Joe W2ORA or Alan EI8EM.

WHATS NEW

Trans-atlantic Challenge

The Royal Air Force Finningley ARC are planning their own form of Trans-atlantic Challenge. Between July 16-27, they are going to try to cross the Atlantic with radio signals from the Mull of Kintyre. The callsign will be GB2TAC. The main aim of the expedition is to cross the Atlantic direct via the Aurora Borealis. Hopefully during slow periods they will be operating on the WAB net on 3.5 and 14MHz.

Operational frequencies & modes: 144MHz station - 144.101 (A1A, c.w.); 144.225 (J3E s.s.b.): 70MHz station - 70.144 (A1A and J3E): 50MHz station - to be announced: HF control station - 14.330 (J3E); 21.330 (J3E); 3.76 (J3E).

Experimental Criteria: To log weather electromagnetic, atmospheric noise and solar radiation patterns to assist in the prediction of Aurora activity so that a study of anomalous v.h.f. radio propagation can be carried out. To monitor amateur radio beacons in the North American continent. To study the following propagation modes and mechanisms: radio propagation by Sporadic-E, communication paths utilising moon bounce and meteor scatter, the effect of various weather patterns on propagation and the effect of long range v.h.f. propagation over water. To study the effect of auroral activity on h.f. propagation by monitoring the 14.1MHz world-wide beacon network, as established by the North California DX Foundation.

Catalogues

Cablemaster, Harlow have published their latest pocket-sized catalogue of cable and wire products. It's fully illustrated in colour, 156-pages long and free-of-charge. Many specialised products are included, such as Belden cable. Most products meet both national and international specifications and the publication not only lists cable and wire specifications in full, but also provides a useful technical reference and glossary section. **Cablemaster, Edinburgh Way, Harlow, Essex CM20 2DF.**

Solex International have produced a test and measuring equipment product catalogue for 1989. The catalogue says they now accept both Access and Barclaycard and accept personal orders from any individual, which is good news, especially as they don't have a minimum order charge. **Solex International, 95 Main Street, Broughton Abbey, Leicestershire LE9 6RE. Tel: (0455) 283486**

The Vintage Wireless Company Ltd **Newsheet No. 132** has landed in the office. It contains all kinds of information, readers' adverts, urgent wants, components available, new and used literature. Subscription to the **Newsheet** costs £4 for twelve issues. **The Vintage Wireless Company Ltd., Tudor House, Cossham Street, Mangotsfield, Bristol BS17 3EN. Tel: (0272) 565472.**

Celdis have copies of a new handbook on frequency dividers and synthesiser i.c.s available. Plublished by Plessey Semiconductors, this 352-page publication provides detailed specifications on a wide variety of products, a comprehensive selection of application notes plus dimensional illustrations of packages. The publication is free-of-charge. **Celdis, 37 Loverock Road, Reading, Berkshire RG3 1ED. Tel: (0734) 585171.**

The 800 Award

In 1189, Northampton was granted a charter by Richard I. The anniversary of this is being celebrated this year. Northampton Radio Club is playing its part in these celebrations by the operation of the station GB8OO throughout the year, and by contacting the other Northamptons in the world on the actual anniversary in November.

It has also now been decided to instigate the 800 Award Certificate which can be earned as follows:

Minimum of 25 points necessary in the UK or 20 points elsewhere, points awarded for contacts in the area of Northampton Borough Council: GB8OO = 10 points, G3GWB or G8LED = 5 points, Northampton Radio Club members = 2 points, other amateurs = 1 point.

The award will run until 1 January 1990 and contacts made after 1 March 1989 are eligible. Contacts made via repeaters are not eligible. The award may be endorsed for contacts on mixed bands, single band or QRP.

Logs, together with £1.50 should be sent to: **Mr D.J. Linnell G7CMA, 19 Beech Avenue, Northampton NN3 2HE.** A list of club members is also available from the same address on receipt of an s.a.e.

Snippets from Sweden

Dominican Republic: Since February 16, a transmitter on 11.7MHz has been observed relaying programmes from Radio Mil and Radio Clarin weekdays. The transmitter usually signs on between 1030 and 1130 with the **Radio Mil Informando** morning news bulletin in progress until the end of the programme, usually at about 1230. This is followed by Radio Clarin's local service, with Radio Mil's news programmes from 1600-1730/45 and again from 2130 to approximately 2300. Relays of Radio Clarin's local service include an evening news programme entitled **Clarin Informativo** between 2300 and 2400.

Iran: The Voice of the Islamic Republic of Iran broadcasts in German at 1800-1845 to Europe, North Africa and the western part of the Soviet Union on the new frequency of 7.285MHz. 9.022MHz remains in parallel.

Iraq: Radio Bagdhad in Spanish was heard at 1800-1855 on 9.755MHz, at 2200-2255 on 11.710MHz and 13.680MHz.

Argentina: Radio Argentina al Exterior now broadcasts in Arabic 1700-1730, English 1730-1830, German 1830-1930, French 1930-2015 and Italian 2015-2100. The frequency is 15.345MHz.

Mauritius: According to a letter from the Studio Manager of the Mauritius Broadcasting Corporation, the transmitter on 4.855MHz, which has long been off the air, is to resume in the future.

Pakistan: Radio Pakistan is broadcasting to Europe on a new frequency 15.545MHz, replacing 9.76MHz. This concerns Urdu at 1645 and 1800, English at 1718 and French at 1915, 11.57MHz is in parallel. The new Radio Pakistan address is: English Section, World Service, Radio Pakistan, Box 1393, Islamabad, Pakistan.

Radio Sweden English Schedule

UTC	MHz	m	Beam
Europe/Africa/Middle East			
1700	9.615	31	180
1700	6.065	49	210
1700	1.179	254	omni
2100	9.655	31	180
2100	11.705	25	235
2100	1.179	254	omni
Asia/Australia			
1230	21.610	13	55
1230	17.795	16	100
1400	21.610	13	70
1400	17.705	16	100
1530	17.705	16	100
0100	17.790	16	85
0100	15.390	19	100
North America			
1530	21.610	13	305
1530	17.880	16	320
0300	11.705	25	290
0300	9.695	31	320

DLF European Services

Weekdays

236.4m m.w. 1.269MHz	
Danish	1930-2000
English	2015-2100
Dutch	2100-2130
Swedish	2130-2200
Norwegian	2200-2230
194.9m m.w. 1.539MHz	
French	1930-1945
Czech & Slovak	2000-2030
Polish	2030-2100
French	2100-2130
Polish	2130-2200
Czech & Slovak	2200-2230
Hungarian	2230-2300
Italian	2300-2330

Sundays

236.4m m.w. 1.269MHz	
English	2015-2100
Dutch	2100-2130
194.9m m.w. 1.539MHz	
Czech & Slovak	2000-2030
Polish	2030-2100
French	2100-2130
Polish	2130-2200
Czech & Slovak	2200-2230
Hungarian	2230-2300
Italian	2300-2330

Times are given as local West German times

LISTEN OUT FOR

GB2NTS, GB2NTU, GB2NTW and **GB2NTE:** On July 29/30 four stations will be on the air from different National Trust properties, one each in Scotland, Ulster, England and Wales. Hopefully Ireland will make up a fifth country (EI). If you live overseas and can contact two of these stations, or if you live in the UK/Ireland and contact three stations there is a Commemoration Certificate available. Overseas the cost is $1 or equivalent return postage by Air Mail, UK/Ireland it requires a 19p s.a.e. You need to send QSL cards or log extracts to: **Scottish Tourist Board (Radio Amateur) Expedition Group, PO Box 59, Hamilton, Scotland ML3 6QB.**

GB2WW & GB4BOB: During 1989, the Bedford & District Amateur Radio Club plan to commemorate the outbreak of the Second World War by operating several Special Event Stations. The locations will include a number of former RAF and USAAF stations in and around the Bedford areas which were in use during the hostilities.

GB2WW: The station will be on the air from Kimbolton Airfield to celebrate the 45th Anniversary of D-Day landings.

GB2WW: This station will be on the air again from Kimbolton Airfield for the Remembrance Service of 379 Bomb Gp USAAF. Then, on September 3, it will be on the air from RAF Cardington for the 50th anniversary of the start of WWII.

Further details can be obtained from the **Special Events Manager, Ray G0EYM. 30 Cotswold Close, Putnoe, Bedford MK41 9LR. Tel: (0234) 244506.**

GB?ATC: This station will be on the air from Cardington Airfield to celebrate the 50th Anniversary of 157 Sqdn (Bedford) ATC.

GB2RB:** Celebrating Robert Burns, this station will be on the air May 27/28 from Burns House Museum, Mauchline, Ayrshire.

GB2RBC:** Located at Royal Balmoral Castle, Crathie, Aberdeenshire on June 24/25.

There are two awards available for working those stations, denoted by ** (see *Short Wave Magazine* "What's New" April 1989) and other Special Event Stations for which the dates will be announced.

GB0DOB: This is the provisional callsign for the special event station to be set up in July this year. The purpose is to link church members and school children in the Diocese of Bradford with others from the USA and elsewhere. They should be using s.s.b. on the 7, 14, 21 and 28MHz bands (WACRAL frequencies). More from: **G4YRH. QTHR.**

GB1SI, GB4SI, GM1WAB & GM4WAB: On May 26 a group of WAB enthusiasts will be operating from Out Skerries which is situated to the east of mainland Shetland. The party intend to operate on all bands from 1.8MHz to 430MHz from a coastguard look-out post now belonging to GM0AVR on the Island of Housay HU67.

They will also be activating ZR, ZS, ZT and ZU squares from the decks of the P&O Ferry. During their stay on the Island, some members will venture out to the more remote uninhabited islands either by inflatable boat or by helicopter. Due to the risks involved, operation will be restricted to one v.h.f. band and one h.f. band. Details from: **Steve Bryan G1SGB. QTHR.**

GB4SRS: A group of amateurs mainly from the Stroud ARS along with Cheltenham ARS and the Swindon ARC will be setting up on Steepholm Island during May 27 - 29 using the 3.5, 7, 28, 50 and 144MHz bands.

GB0RAF: The Scarborough Special Events Group will be on the air from the Scarborough Air Show on July 1 to celebrate the 50th Anniversary of RAF Staxton Wold Radar Base. The RAF Red Arrows display team will also be present and a special QSL card will be issued to commemorate the celebrations. Operation will be around 3.725 and 7.055MHz in the h.f. band and also on 144MHz. Further details from: **Roy Clayton G4SSH. QTHR.**

GB4ATG: This is the talk-in station for the BARTG Rally on August 27 from Sandown Park Racecourse, Esher, Surrey.

GB4VMR: This is the talk-in station for the Vange ARS 10th Annual Mobile Rally from Basildon on September 10.

GB0KCF: This event will take place on June 24 in the recreation ground of the village of Kingston Bagpuize, which is situated 15km south-west of Oxford. They hope to be active on 3.5, 7, 14, 21, 28 and 144MHz with s.s.b. and f.m. where appropriate.

TRADING POST

FOR SALE Icom R-70 receiver with instruction manual, plus Yaesu FRT-7700 antenna tuner £340. D. Corbett, 33 Albert Avenue, Glasgow G42 8RB. Tel: 041-423 8627.

FOR SALE Trio R-2000 general coverage receiver 150kHz-30MHz fitted with VC10 v.h.f. converter 118-174MHz, excellent condition. Buyer collects, offers £525. Tel: (0582) 668716.

FOR SALE 11 band a.m., f.m., transoceanices Zenith radio, made in USA, solid state, when new was £370 now £190, postage package free when settlement agreed, pay cash only. A. Hamid. Tel: (0324) 562550.

WANTED Short wave for Sep/Oct 1981. **For Sale** Scopes working order 1035 MkII D33R £40 EA. Eddystone 77OU MkII £40. Solarisation scope no tube £15. Tubes 3KP1, 5AP1, VCR97 £5 each. D. Griggs, 5 Collingwood Ave, Muswell Hill, London N10 3EH. Tel: 01-883 3474.

WANTED Zenith 7000 transoceanic receiver. R. J. Webley, 25 Kensington Place, Newport, Gwent NP9 8GP. Tel: (0633) 271754.

FOR SALE Racal 17L 0-30MHz, good condition £165. Also BNRS oscilloscope and audio signal generator built from Cirkit kit. Dave. Tel: Heath Hayes (0543) 75640.

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

FOR SALE BJ 200 MkII scanner, little used, boxed with charger and accessories. £175.00. Tel: (0296) 81624.

FOR SALE 4 new amplifier valves, unsealed and unused, at £45 each. Ring or write for details to J. Heron, Windsor House, 35B East Reach, Taunton, Somerset. Tel: (0823) 275656.

FOR SALE Black Jaguar MkII computerised scanning receiver h.f., v.h.f. low, air + v.h.f. mid, v.h.f. high, u.h.f., 8 months old. Bargain £135 with full frequency guide. Mr. L. Wilkins. Tel: Redhill (0737) 769788.

WANTED v.h.f./u.h.f., 5 inch colour multi-standard TV, Pal/Secam, a.c./d.c., Pref Secam L, 5.5/6.0/6.5MHz sound, might consider, Yoko (mono) F-6, or (colour) JVC CX 610 GB. M. B. Evans. Tel: 01-505 6303.

Complete the form in July '88 issue of *Short Wave Magazine*, or write out your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it, together with your payment of £2.30, to Trading post, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Advertisements will be published in the earliest available issue and *SWM* reserves the right to exclude any advertisement not complying with the rules. You must send the corner flash from this page, or your subscription number as proof of purchase of the magazine.

FOR SALE Trio R2000 receiver. Very good condition, original packaging, manual, etc. Also MM 2m converter £400 ono. Ian Fay, 7 Oakridge Close, Forest Town, Mansfield, Notts NG19 0EY. Tel: Mansfield (0623) 25651.

FOR SALE AEA Pakratt PK-232 multimode terminal unit. Six modes including fax. Complete with ICS IBM-PC and fax software. Cost over £300 four months ago £240 ovno. AOR scanner 25-550 & 800-1300MHz £375. Peter Blanchard. Tel: (0798) 22363 (Sussex).

FOR SALE Realistic PRO-34. Hand-held scanner 68-88, 108-174, 380-512, 806-960MHz. 200 memories, complete with NiCads. Bought 15/11/88. Best offer over £200. Mr L. Pounder Tel: Blackpool (0253) 302525 Ext. 25 after 6pm.

FOR SALE Sony ICF-2001D immaculate and complete with power supply etc. £190.00. Tel: (0533) 558063 ask for Mike.

FOR SALE Kenwood R2000 receiver with VC10, v.h.f. converter and Maplin a.t.u. Showroom condition, no mods, also homebrew mast and 144MHz Slim Jim antenna also computer desk. Complete station for £500.00. Tom Colborne, 13 College Close, Long Load, Langport, Somerset. Tel: (0458) 24626.

FOR SALE Dressler ARA30 active antenna, as new, original packing, half price £60 ono. **Wanted** antenna tuning unit. J. House, 4 Elizabeth Way, Kemilworth, Warwicks CV8 1QP. Tel: (0926) 54556 (6-8pm).

FOR SALE Yaesu FRG-9600 v.h.f./u.h.f. receiver, 60-950MHz, vgc, boxed with discone antenna, £380. Tel: (0444) 417509 (pm). Poss deliver locally.

SWM JUNE 1989 TP

RALLIES

* SWM in attendance

May 28: The 13th Annual East Suffolk Wireless Revival will take place at the usual venue of the Civil Service Sportsground, Straight Road, Bucklesham, Ipswich. That's between Bucklesham Road and Felixstowe Road (now the A1156) and adjacent to the Suffolk Showground. There will be the usual traders, an RSGB book stand, an antenna testing range, Bring & Buy, car boot sale, transceiver clinic, etc., plus non-radio stands, a children's play area and a model flying display. Doors open at 10am. Further information from: **Colin Ranson G8LBS, 100 Stone Lodge Lane West, Ipswich IP2 9HR. Tel: (0473) 464047.**

May 28: Plymouth Radio Club are holding their mobile rally at Plymstock School, Church Road, Plymstock. Doors open at 10am and there is a large, free car park, refreshments, raffle, trade stands, demonstrations and talk-in on S22. Full details from: **Joe G1RXR on (0752) 509855.**

May 28: The rally will be at the Maidstone (YMCA) Sportscentre on the A229 at Loose Village. Admission is £1 at 10.30am, but disabled visitors can get in free at 10am. There is also free overnight parking with a snack bar, showers, etc., available. There are children's videos and a playroom, GB2YSC active on all bands, ATV demo, a beer tent and all the usual trade stands. For more details, contact: **G6FZD. Tel: (0622) 50709.**

May 29: The Doncaster Radio Rally will be held at the Bircotes Sports Centre, near Bawtry, Doncaster. This rally is organised by the Doncaster RAYNET Group and they rely on this rally for their source of income to keep the group running.

***June 11:** The Royal Naval Amateur Radio Society's Annual rally is scheduled to be held at HMS Mercury again this year.

June 11: The Mid Lanark Amateur Radio Society are having their open day at the Community Education Centre, Newarthill, by Motherwell. This is on the A723, 2.4km south of the Newhouse interchange on the M8. There will be trade stands, bring & buy, demonstrations of packet, RTTY and QRP together with lectures and the award of the Society's annual EHI Trophy. Talk-in is on S22 and refreshments will be available.

June 11: The Elvaston Castle Radio Rally will be held in the showground of the Elvaston Castle Country Park. This is 5 miles southeast of Derby.

June 18: The Newbury & District ARS will be holding a Radio Boot Sale and Rally at Acland Hall and Recreation Fields, Cold Ash, Newbury. The sale is on between 10am and 3pm and admission if free. There are both indoor and outdoor stands and talk-in will be given by GB4NBS. Details and bookings from: **Mike G3VOW. Tel: (0635) 43048.**

***June 25:** The 32nd Longleat Amateur Radio Rally will be held as usual in the grounds of Longleat House, Warminster, Wiltshire. This rally is always popular as it offers something for the whole family. More details from: **Shaun O'Sullivan G8VPG, 15 Witney Close, Saltford Bristol BS18 3DX.**

June 30 - July 2: The Popular Flying Association Rally is again being held at Cranfield Aerodrome, Bedfordshire. The rally covers the whole spectrum of sporting aviation from light aircraft through powered gliders and microlights to airband radio. For more details, contact: **Popular Flying Association. Tel: (0273) 461616.**

July 2: The Newport Amateur Radio Society will be holding their 2nd Grand Surplus Equipment and Junk Sale at Brynglas House, Newport. The event opens at 11am (10.30am for disabled visitors) and it finishes at 4pm. There will be surplus/second-hand equipment and junk stands. From 12 noon to 3pm there will be an auction held in the main hall of the building. Light snacks and refreshments will be available. Talk-in will be provided by GW1NRS on S22. The money raised will go towards training young people in line with Project YEAR.

July 9: The 1989 Droitwich Strawberry Rally will take place at the High School, Droitwich. There will be trade stands, a Bring & Buy, family entertainment and strawberry fields (weather permitting). There is both free entrance and car parking. Details from: **Derek Batchelor G4RBD. Tel: Worcester 641733.**

***July 15:** The Cornish Radio Amateur Club rally will be held at Richard Lander School, Truro. There will be the usual trade stands, a Bring & Buy, computer displays/demos and refreshments. There is plenty of free parking as well as attractions for all the family. More details from: **Rolf Little. Tel: (0872) 72554.**

***July 16:** The Sussex Amateur Radio & Computer Fair will be held at Brighton Racecourse from 10.30am to 4.30pm.Free shuttle to Brighton sea-front for the family, trade stands, bring & buy, refrshments and car park.

July 16: The Pontefract & District ARS are holding their rally at the Pontefract Racecourse & Park. Doors are open from 11am to 5pm. There will be traders, RSGB bookstall, bring & buy, refreshments and bar, boating, putting, etc., for the family. Large free car park with admission 50p per prize programme. Talk-in on S22. Details from: **C.A. Mills G0AAO. Tel: (0977) 43101.**

July 23: The Burnham Beeches and Maidenhead & District ARC's are staging the sixth McMichael Rally at the Haymill Centre, Burnham, near Slough. Doors open at 10.30am (10.15 for disabled visitors). The CAMRA bar will again be attending. Tea, coffee and food will also be available. There's ample car-parking on site and the car boot sale will be staged again this year. Attractions include radio controlled cars, ATV groups, packet station and the h.f. station GB4MR. Entrance fee is £1 and the car boot area will be £5 per car and driver for the day. Contact: **Bob Hearn G0BTY on (0494) 29868.**

July 28-31: Dataspace '89 (incorporating the RSGB Data Symposium and the AMSAT-UK Colloquium) will be held at the University of Surrey. Full details and booking forms for tickets and accommodation from: **Ron Broadbent G3AAJ, AMSAT-UK, London E12 5EQ** or **RSGB HQ, Lambda House, Cranborne Road, Potters Bar EN6 3JW.**

July 30: The Hilderstone Radio Society are holding their rally at Hilderstone College, St Peters Road, Broadstairs, Kent. There will be trade stands a Bring & Buy, a talk-in station, raffle, refreshments, a licensed bar, etc. Contacts are: **Alan on (0832) 593072** or **Ron (0304) 812723.**

***July 30:** Scarborough ARS are holding their annual rally at the Spa, on the South Shore Seafront, Scarborough. This is close to the beach and all the entertainment, so there will be something for all the family. Doors open at 11am. There will be trade stands, bring & buy, refreshments and bar, with talk-in on S22. Details from: **G4UQP on (0723) 376847.**

July 30: The Rugby Amateur Transmitting Society are holding their Amateur Radio Car Boot Sale at Lodge Farm, Walcote, Nr Lutterworth. Apparently, that's less than 2 miles east from junction 20 of the M1. Talk-in will be on S22. Pitches are available for £5 and entrance to buyers is 50p per car. The event opens at 10am. More details can be obtained from: **Kevin G8TWH. Tel: (0203) 441590** or **David G4DDW. Tel: (0455) 52599.**

***August 13:** Hamfest '89 will be held at the Flight Refuelling Sports Ground, Wimborne, Dorset. Gates open at 10am and there's free car parking as well as overnight camping facilities. The day will feature radio and electronics trade stands, field displays and a craft and gift fair. More details from: **Bob G6DUN. Tel: (0202) 479038.**

August 13: The annual Derby Radio Rally will again be held in the Lower Bemrose School, St Albans Road, Derby. All the usual attractions will be there including their Monster Junk Sale. More details from: **Martin G3SZJ. Tel: (0322) 556875.**

August 20: The West Manchester Radio Club's Red Rose Summer Rally will be held in the Sports & Leisure Centre, Silverwell Street, Bolton. More details from: **D.R. Camac on (0204) 24104.**

August 27: The Galashiels & District ARS are holding their open day at the Focus Centre, Livingstone Place, Galashiels at 11am. There will be trade stands, a bring and buy and all the usual activities. Light refreshments will be available. Talk-in will be on S22. For more details, contact: **John Campbell GM0AMB. Tel: (0835) 22686.**

August 27: The BARTG rally will be held at Sandown Park Racecourse, Esher, Surrey. Talk-in on S22 and SU22 by GB4ATG. Admission is £1 for adults and 50p for children and OAPs (babies are admitted free). Doors open at 1030 and close at 1700. Details from: **Peter Nicol G8VXY. Tel: 021 - 453 2676.**

August 28: The Huntingdonshire ARS are holding a junk sale at The Medway Centre, Coneygeare Road, Huntingdon. Doors open from 10.30am to 5pm. Food and drink will be available all day and you can rent a table to get rid of all your junk for £5. The contacts for the day are: **G1YVS on (0487) 830212** or **G8LRS on (0480) 56772.**

If you are organising a rally and would like it mentioned in *Short Wave Magazine*, drop us a line, preferably as soon as you have fixed the date but no later than 6 weeks in advance (mark the envelope "SWM Rally Calendar") and we'll do the rest. Please ensure that you include all details, including such essential information as venue, starting time, special features and a contact for further information.

GRASSROOTS

Lorna Mower

Acton, Brentford & Chiswick ARC meet 3rd Tuesdays, 7.30pm at Chiswick Town Hall, High Rd. June 20 is Station Accessories. W. G. Dyer G3GEH at 188 Gunnersbury Ave, Acton, London W3 8LB.

Midland ARS have a Treasure Hunt on June 20. Thursdays are Natter Nights, Wednesdays Morse, 1st Tuesdays are Committee, 2nd Tuesdays and last Mondays BBC Computer Nights, 4th Tuesdays Birmingham RAYNET group. All meetings begin at 7.30pm, apart from Wednesdays at 7pm. Unit 16, 60 Regent Place, in the Jewellery Quarter. Paul O'Connor G1ZCY on 021-443 5157.

Cheshunt & District ARC have Natter Nights on June 7/21 and Open Air meeting - Baas Hill Common on the 14th. Wednesdays, 8pm in the Church Room, Church Lane, Wormley. Roger Frisby G4OAA on Hoddesdon 464795.

Wirral ARS meet 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arrowe Park Rd, Birkenhead. June 21 is A Capaciometer G3EGX. Alec Seed G3FOO on 051-644 6094.

Verulam ARC have an Informal/ Activity evening on June 13 and a lecture entitled RAYNET by G4XUJ on the 27th. 2nd & 4th Tuesdays, 7.30pm at RAF HQ, New Kent Rd, St. Albans. George Christofi G0JKZ on 01-427 4800.

Bath & District ARC meet Wednesdays, 8pm at Englishcombe Inn, Englishcombe Lane. Eric G4GEV on Combe Down 832156.

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at the Railway Enthusiasts Club Premises, off Hawley Lane (by M3 bridge). Tim FitzGerald G4UQE on Camberley 29231.

Chelmsford ARC have a club meeting on June 6. 1st Tuesdays, 7.30pm at Marconi College, Arbour Lane. Roy G3PMX on Chelmsford 353221 ext. 3815.

Ipswich RC meet at 8pm in the Red Lion, 284 Bramford Rd. June 8 is Morse test at Ipswich and the 17th is Annual QRP day. Jack Toothill G4IFF on Ipswich 464047.

South Dorset RS meet 1st Tuesdays, 7.30pm at the Pensylvania Castle Hotel, Portland. Further details from Geoff Gwilliam G4FJO on Weymouth 781164 after 6pm.

Sutton & Cheam RS have a committee meeting at 20 West Farm Ave, Ashtead on May 30, a Natter Night on June 5, Visit to Mercury Comms Satellite Earth Stn at Tackley, nr Oxford on the 14th and Inter-Club Quiz (No. 2) S&C v CATS at home on the 16th. 3rd Fridays, 7.30pm in Downs Lawn Tennis Club, Holland Ave, Cheam. Natter Nights, 1st Mondays in Downs Bar. John Puttock G0BWV on 01-644 9945.

Biggin Hill ARC meet 3rd Tuesdays, 7.30pm at Victory Social Club, Kechill Gdns, Hayes. June 20 is G2MI Souvenirs. Geoff Milne G3UMI on 01-462 2689.

Yeovil ARC meet Thursdays. 7.30pm at The Recreation Centre, Chilton Grove. June 8 is Robots G5JJ, the 15th is Aerial Directivity G3MYM and the 22nd is Sky Wave Absorption G3MYM. David Bailey G1MNM at 7 Thatchem Cl, Yeovil BA21 3BS.

Dunstable Downs RC meet Fridays, Room 3, Chews House, 77 High St South. June 4 is Decription G8XTW and the 18th is d.f./treasure hunt. Tony Kelsey-Stead G0COQ on Luton 508259 (24hrs).

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas St, Radford. May 26/June 9 are Nights on air & Morse tuition, June 2 is night on air - out "Portable" and the 16th is a Canal Trip. Jonathan Ward G4HHT on Coventry 610408.

Kirkby ARC meet Wednesdays, 7.30 at the Kirkby Sports Centre, 17 Valley Rd, Westvale, Kirkby, just off M57. Details from Paul Moran at the above address.

Keighley ARS have Programmable Devices talk G3YEE on May 30 and Natter Nights on June 6/13/ 20. Clubroom, rear of Victoria Hall, 8pm. Kathy G1IGH on Bradford 496222.

Stourbridge & District ARS have a Natter/on-air night on June 6 and Summer Surplus Sale on the 20th. Meetings held twice monthly at Robin Woods Centre, Beauty Bank. C. Brunn G1WAI on Hagley 885602.

Halifax & District ARS have a Visit to HMS *Ceres*, Yeadon on June 20. 1st & 3rd Tuesdays, 7.30pm at Running Man Public House, Pellon Lane. 1st Tuesdays are informal Noggin and Natter nights. David Moss G0DLM on Halifax 202306.

Dragon ARC meet 1st & 3rd Mondays, 7.30pm at the Four Crosses, Pentraeth Rd, Menai Bridge. June 5 is a talk on Aerials GW3YNM and the 19th is Security in the Home and Shack GW3WC. Tony Rees on Bethesda 600963.

Loughton & District ARS have Aylmer's Farm Weekend GB2LRS on May 26-28 and The Birth of a Multi-band Receiver G3OPA on June 2. Room 20, Loughton Hall, 7.45pm. John Ray G8DZH on 01-508 3434 (after 7pm).

Colchester RA's have a Constructors Contest on June 22. Room 15, Ground floor, 'C' Block, at Gilberd School, Brinkley Lane, Highwoods, 7.30pm. Mike Griggs G4YJN on Layer-de-la-Haye 348189.

Thornbury & District ARC meet 1st & 3rd Wednesdays, 7.30pm in the United Reform Church, Chapel St. June 7 is a Foxhunt G4ZOG and the 21st is Project evening. Tom Cromack G0FGI at Rose Cottage, The Naite, Oldbury-on-Seven, Bristol, BS12 1RU.

Lothians RS have their AGM on June 14. 2nd & 4th Wednesdays, 7.30pm at Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. P. J. Dick GM4DTH at 21 West Maitland St, Edinburgh EH12 5EA.

Fylde ARS meet 2nd & 4th Thursdays at South Shore Tennis Club in Midgeland Lane. June 8 is an informal & field day inquest and the 22nd is Visit to British Nuclear Fuels, Salwick, 7.30pm. F. Whitehead G4CSA on St. Annes 720867.

Brighton & District ARS meet 1st & 3rd Wednesdays, 8pm at the Roast Beef Bar, Brighton Race Course. June 21 is briefing for Sussex Mobile Rally. Harold Lunson G3WR on Brighton 501100.

Bedford & District ARC meet at the Allen's Club, Hurst Grove, 8pm. June 6 is Council Antenna Planning by Mr Edgley and the 20th is Visit to DTI Monitoring Station at Baldock, 7pm. Glen Loake on Bedford 266443.

Todmorden & District ARS have Simple Electronics for Simple Folk G4HYY on June 5 and a Natter Night on the 19th. Meeting place and time from Mrs Esde Tyler G0AEC on Halifax 882038.

Mid-Warwicks ARS have DX Foxhunt and Bar B-Q on June 13. 2nd & 4th Tuesdays, 8pm at the Warwick Ambulance Centre, 61 Emscote Rd. P. A. Brown G0HIH on Marton 632370.

Wimbledon & District ARS have a Quiz with Coulsden ATS on May 26 and Microwaves G8KQW/ G8CUX on June 9. 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd. Nick Lawlor G6AJY on 01-330 2703.

Norfolk ARC meet Wednesdays, 7.30pm at The Norfolk Dumpling, The Livestock Market, Harford. June 7 is inter-club quiz with Leiston ARC, the 14th is an informal/committee meeting and the 21st is Domestic Satellite Television G3PXT. Craig Joly G0BGD on Norfolk 485784.

Derby & District ARS have Japanese Morse - an illustrated talk G3CSG on May 31, a Junk Sale on June 7, 144MHz direction finding practice - Allestree Park on the 14th and Barbecue - Drum Hill on the 21st. 119 Green Lane, 7.30pm. Kevin Jones G4FPY on Derby 669157.

Spen Valley ARS meet Thursdays, 8pm at the Old Bank Working Mens Club, Old Bank Rd, Mirfield. 1st & 3rd Thursdays are formal, the other Thursdays being Noggin and Natter nights. June 1 is Bowling at Mirfield Park 7pm and the 15th is a Construction Contest (Swindon Cup). Russel Wilde G0FOI on Cleckheaton 875038.

South Manchester RC meet Fridays, 8pm at Sale Moor Community Centre, Norris Rd, Sale. May 26 is G8APB on Confessions of a Safety Engineer, June 2 is Technical Topics - Your Questions Answered, the 9th is Analogue Simulation G8UQC and the 16th is Maritime Mobile and Radio Navigation G4TZT. David Holland on 061-973 1837.

Special Book Offer

To *SWM* readers - a special pre-publication offer on the 9th Edition of the *Guide to Facsimile Stations*, compiled by Joerg Klingenfuss.

Save £2.80 off the normal price of £12.75 inc P & P.

Over the years the *Guide to FacsimileStations* has become the basic reference book for all radio enthusiasts who are interested in facsimile reception.

The *Ninth Edition* is just about to be published and, by taking advantage of our special offer this month you can save yourself money whilst having your own copy at the very start of its life.

As with the other guides published by Klingenfuss, the *Guide to Facsimile Stations, Ninth Edition*, is the result of painstaking listening and logging by Joerg Klingenfuss himself.

The frequency, callsign, name, ITU country/geographical symbol and technical parameters are given for each FAX station listed.

A large part of the book is taken up with sample charts, taken off-air, of a wide variety of FAX pictures. All frequencies listed in the book have been measured to the nearest 100Hz.

The *Guide to Facsimile Stations, Ninth Edition*, (ISBN 3 924509 68 9) is in paperback, 240 x 169mm and will be published by Klingenfuss Publications. The special pre-publication offer price to *SWM* readers is £9.95 including post and packing. (Books are zero-rated for VAT).

HOW TO ORDER

Complete both coupons in ink, giving your name and address clearly in block capitals. Coupon (2) will be used as the address label to despatch your book to you.

Send the coupons with your cheque to: *Short Wave Magazine*, Book Offer (June), FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP. If you wish to pay by credit card (Access, Mastercard, Eurocard or Visa only), please fill in your card details and sign the coupon where indicated.

Available to readers of *SWM* in England, Scotland, Wales, N. Ireland, the Channel Islands and the Isle of Man. Orders are normally despatched within 28 days, but please allow time for carriage. **The closing date for this offer is 7 July 1989**

(1)

To: SHORT WAVE MAGAZINE, Book Offer (June), FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP

Please send me.....Guide to Facsimile Stations *Ninth Edition* **@ £9.95**

Name.....

Address.....

.....

.....Post code.....

❑ I enclose cheque/PO (Payable to PW Publishing Ltd) £.....

❑ Charge to my Access/Visa Card the amount of £.....

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Valid from ..... to .....

Signature.....Tel:.....

(2)

Name.....

Address.....

.....

.....

.....Post Code.....

Guide to Facsimile Stations Ninth Edition

If you do not wish to cut your copy of *SWM* you must send the corner flash with full details and remittance.

PW Publishing Ltd., Poole, Dorset (Reg. No. 1980539, England)

BOOK OFFER SWM JUNE 1989

When you are ready to graduate to real listening
Look to Lowe

The R-5000 from Kenwood

The R-5000 has established itself as one of the world's outstanding receivers, and a glance at the photograph will tell you what a range of facilities are on offer. The photograph of course only tells you what is on the front panel, but behind it is the engineering skill of Kenwood. The Kenwood engineers, widely acknowledged to be the best in the business, have made the R-5000 into one of the finest receivers you could wish to own. Not only in sheer performance but in the ease of use which is the hallmark of their careful approach to total design.

The R-5000 will satisfy the most demanding applications, whether in winkling out the weakest rare amateur DX, or listening to Radio Hanoi under conditions in a heavily congested Broadcast band. The combination of operating facilities means that the operator can match the performance of the receiver to the prevailing conditions on the air. The result — total satisfaction.

Am I alone in being so enthusiastic? I don't think so. Read what Angus McKenzie said in his review (Amateur Radio magazine). "I was most impressed with the front end, as it is far superior to much of the competition. The selectivities of the various filters on CW, SSB, and AM were excellent. . ." In "Short Wave Magazine", Ken Michaelson remarked "I used the R-5000 for some weeks and was impressed with its performance . . . . I was able to resolve signals which when I first tuned them in seemed too weak to decipher." These comments give you some idea of the listening satisfaction which can come from a truly top class receiver.

The R-5000 scores on quality of construction as well as performance. Rainer Lichte says in his review:—"The entire electronics are housed in a sturdy metal cabinet. This outer barrier and elaborate shielding of critical inside parts combine to form an RF-tight enclosure. Excellent workmanship is evident everywhere, the finish is outstanding." Ken Michaelson said much the same thing:— "In passing, I must comment on the finish of the interior. The whole assembly, when the top cover was lifted off, was a picture. Gleaming plated screening and circuit boards and components all having the appearance of being carefully put together. Quite different to some I have seen."

I think that there is little doubt that the R-5000 is one of the really classic receivers of the future, but having bought it, you will then find that you can extend its usefulness by adding the internally fitted VHF converter, giving you 108 – 174 MHz coverage in addition to the normal 30kHz – 30MHz range, with the VHF frequencies read out on the main receiver display. All the HF modes are available on VHF as well – AM, USB, LSB, CW, FM, FSK. There is also a selection of high specification optional filters for special needs, and even a voice synthesiser option which will announce the frequency in English (and Japanese if you prefer. . .)

As Rainer Lichte concludes:— "The multitude of functions puts the R-5000 almost in a class by itself. Undoubtedly this is the best receiver ever offered by Kenwood." Well, he likes it, Ken Michaelson likes it, and Angus Mckenzie likes it. I just think it's terrific and I'm sure you will agree when you try an R-5000 for yourself at one of our branches or your nearest Kenwood approved dealer. By the way, just to keep the record straight, the ONLY Kenwood approved dealer in London (apart from our own branch at Eastcote) is Radio Shack Ltd. Anyone else trying to sell you an R-5000 has no connection whatsoever with the UK sales and service organisation, and should be treated with due caution, even if you may be getting "Forty quid off, John."

In the words of Dr Samuel Johnson when he referred to London:—
"Prepare for death if here at night you roam,"
"And sign your will before you sup from home."

Caveat Emptor.

John Wilson.
G3PCY/5N2AAC

R5000 **£875** inc VAT
VC20 **£167** inc VAT

FREE

Send **£1** to cover the postage and we will send you, by return of post, your FREE copy of "THE LISTENER'S GUIDE" (2nd edition), a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in a "good read" but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

LOWE ELECTRONICS LIMITED

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482

25 YEARS IN SHORTWAVE

There has never been a more exciting time for the VHF listener than right now. With the leading manufacturers making VHF and UHF receivers, and using microprocessor control which would have been impossible even five years ago, the keen listener can carry in his pocket the kind of receiving power that used to take up a nineteen inch rack, and consume enough electricity to light a small house.

We at Lowe Electonics have made it our task to seek out the best of these amazing radios, and bring them to you at attractive prices. We are the sole factory appointed importers for Signal, AOR, and WIN; all of whom represent the very best in scanning monitor receiver design and manufacture, and we show a small selection on this page. Not only do we stock and sell all these radios, we also offer you the best advice in the business, and we carry a full range of listeners' accessories from a humble egg insulator to RTTY and Morse decoders.

Let's start with what is acknowledged to be the finest wide range monitor receiver ever made; the AR-2002 from AOR. This receives in all modes, on frequencies from 25 to 550MHz, and also from 800 to 1300MHz, so there isn't much you cannot receive: airband both VHF and UHF, marine, amateur, FM broadcasts and TV sound, cellular radio, land mobile radio and so on. The AR-2002 is in use in professional installations all over the world, but is available at a price that the amateur can afford.

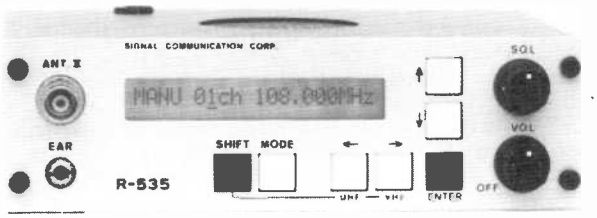
Coming very soon is the incredible AR-3000. 100kHz to 2036MHz — with no gaps, and in all modes including SSB. Watch this space.

AR-2002..... **£487**

Brand new from AOR is the AR-900; a delightful hand held scanner with more than a hint of airband in its specification. AM/FM reception in the bands 108-136MHz, 137-174MHz, 220-280MHz, 300 – 380MHz, 406-470MHz, and 830-950MHz, give the AR-900 a wide appeal, particularly to the UHF airband listener. New slim and elegant styling, an attractive price, and a wide range of facilities including 100 memory channels make the AR-900 unbeatable in the market.

AR-900..... **£235**

Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the Signal range is the R-535, which covers not only the VHF airband from 108 to 136MHz (also 136 to 143MHz), but also the UHF airband from 220 to 380MHz. No less than 60 memory channels can store any frequency within the range of the receiver, and scanning takes place at very high speed, so you don't miss any of the action.

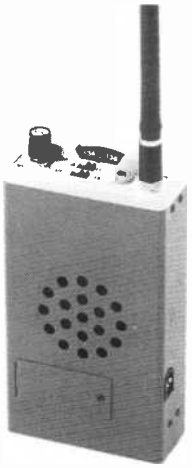


R-535..... **£249**

Signal also make the ideal starter receiver, the R-537S, which combines fully tunable operation for seaching around the VHF band and two channel crystal control for spot-on accuracy when you need it. A special version of the R-537S is in use by most parachute clubs where the instructor can talk directly to a falling pupil — helps to advise them that they should have opened the 'chute.

Our most successful airband receiver has been without doubt the WIN-108. Designed to incorporate all the features asked for by UK users over the years, the WIN-108 is the most convenient, powerful, and feature packed dedicated VHF airband receiver ever made available. Simply cannot be described in this space, but details of the WIN-108 and all our other models are available on request, enclosing £1 to cover post and packing. You will also receive our "Listeners' Guide" and "Airband Guide" free of charge.

Send right away, and see why you should "look to Lowe" for all your listening requirements.



R-537..... **£69.51**

WIN-108..... **£175**

25th Anniversary Prize Draw

Congratulations to Mr Cole of Poole, and Mr Dicker of Dunmow who were winners in our January and February prize draw. To celebrate our 25th year in Short Wave, anyone making a purchase of £5 or more will automatically be included in that month's draw for a substantial prize — for example a WIN-108. All mail order sales are included automatically; all shop sales will be recorded on cards given to you by the manager.

Shops in **GLASGOW** Telephone 041-945 2626, **DARLINGTON** Telephone 0325 486121, **CAMBRIDGE** Telephone 0223 311230, **BARRY** Telephone 0446 721304, **LONDON** Telephone 01-429 3256, **BOURNEMOUTH** Telephone 0202 577760
All branches are closed all day Monday.

LOWE HF-225 HF RECEIVER

John Wrightson

Many h.f. general coverage receivers on the market today have impressive looking front panels adorned with switches, buttons, and l.e.d.s galore. The HF-225 from Lowe is rather different though, with a functional rather than flashy appearance. John Wrightson was very pleased with what he found.

If you're after a "world band radio" to receive the occasional foreign station, then any of the many impressive looking receivers available in the high street would probably satisfy your needs. However, connect one of these to a decent outdoor antenna and the limitations in performance start to show up. The signal you're trying to listen to is often wiped out by other strong stations on adjacent frequencies, all adding together to form an indecipherable "mush". The enthusiastic short wave listener then sees the light and progresses to a dedicated communications receiver with better strong signal handling performance.

The designer of the HF-225 had one purpose in mind - to design a receiver offering the technical performance of the very best but at a price to suit the enthusiast. The midnight oil was burnt on sorting out matters such as overload and intermodulation rejection characteristics, as well as the reduction of synthesiser noise which causes reciprocal mixing - meaning the ability to receive weak signals without interference from other, much stronger, signals also present in the crowded short wave spectrum.

Features

The receiver covers the entire h.f. spectrum from 30kHz to 30MHz, a tuning knob together with 1MHz up/down buttons on the front panel being used for frequency selection. An optional keypad for direct frequency entry plugs into the rear of the set and will set you back an extra £39.50.

Reception modes provided are c.w., u.s.b., l.s.b. and a.m., with internal i.f. filters of 2.2, 4, 7 and 10kHz being fitted. In normal use an appropriate filter is automatically selected for the mode in use, but a different filter width may be switched into use by pressing the appropriate front panel buttons. The c.w. buffs will be pleased to know that a switchable, audio bandpass filter is fitted, with a 200Hz audio bandwidth centred on a c.w. note of 800Hz. A further, optional, unit, (£39.50 extra) may be plugged-in inside the set to give f.m. and synchronous a.m. (a.m.s.) reception (more of this later), a fixed 12kHz width i.f. filter being used for f.m. reception, with a pre-set squelch adjustable from the rear panel of the set.

The receiver is quite compact, measuring 253 x 109 x 204mm, and weighing just under 2kg. It operates from a nominal 12V d.c. supply with a plug-in mains unit being provided to power the set from the 240V a.c. mains supply.

Tuning

Tuning is performed in 8Hz synthesiser steps on c.w., s.s.b. and synchronous a.m. when fitted, in 50Hz steps on a.m., and in 125Hz steps on f.m. when fitted, giving 1.6, 9 and 25kHz respectively for a complete rotation of the tuning knob. Two digital v.f.o.s are provided, together with 30 memory channels, each storing any given frequency. A line of five front panel buttons are used in "primary" and "secondary" function modes to switch between v.f.o.s, memory channels, filter widths and so on, a rotary knob selecting the actual reception mode. Two more rotary knobs are used for the On/Off/Volume and Tone controls, the latter providing either l.f. or h.f. audio frequency cut depending on its position. A small speaker is fitted underneath a grille on the top panel of the set, and a front panel socket is provided for either mono or stereo headphones.

The clean lines of the new HF-225 communications receiver.

Frequency is shown, to the nearest kilohertz, on a large liquid crystal display, alternating with the memory channel number, filter width and so on in "secondary function" mode, indicated. The l.c.d. is backlit and used in "reverse mode", i.e. the backlight shines through the displayed figures to give a matching effect to the dark section of the front panel. A backlit, analogue, signal strength meter is also provided, to indicate the relative strength of received signals.

For use in strong signal areas an internal 20dB r.f. attenuator can be switched in from the front panel, and an audio noise blanker acting on the i.f. signal is in circuit at all times to give a degree of noise suppression. The set can be used portable with an optional carrying case (£23.86) and internally fitted NiCad battery pack (£49.50). If required a plug-in telescopic whip antenna and switchable, internal pre-amplifier may be added for a further £19.50. This gives an impedance match from the whip antenna plus a degree of r.f. gain and could be useful if you're using the set with a short indoor wire or loft mounted antenna.

On the rear panel an SO239 socket is provided for either a coaxial plug from an antenna or the plug-in telescopic whip. Next to this are two terminals for a long wire antenna and earth connection. A small, 3-position, slide-switch selects between the 600Ω wire antenna, 50Ω coaxial input and the whip input. Further sockets are fitted on the rear panel for an external speaker, a tape recorder, and the 12V d.c. power source. Again, an optional extension speaker and lead is available at £49.50, the receiver giving a maximum audio output of 2W r.m.s. into 4Ω.

In Use

The HF-225 was unpacked and was receiving signals on the 7MHz amateur band within a few minutes, the straightforward tuning system being very simple to use. I certainly didn't have to spend long hours reading the instruction manual. Switching in the second functions, such as memory and filter selections, did however need the odd reference to the manual, so I sat down and had a read. It gave well-written operating details together with complete circuit diagrams. The review set also came with the *Lowe HF Listener's Guide* giving some very readable advice on antennas and general h.f. reception, together with receiver technical parameters.

Armed with a copy of the latest *World Radio and Television Handbook*, I started tuning in the multitudes of h.f. broadcast stations. Although tuning was speeded up by the set stepping in larger increments when the tuning knob was rotated quickly, I found the optional keypad supplied with the review set was far easier to use for large frequency shifts. Being separate from the receiver, I found it handy to have this on the table top next to the receiver. This position, together with the standard telephone-type key layout, let me select frequencies very quickly.

Memories

The memories can be used for a selection of pre-set channels. The frequency of each memory channel may be checked without

altering the tuned frequency, the tuning knob acting as a "memory channel" knob in this mode. A press of the memory "recall" button then switches over reception to the selected memory frequency. Alternatively, it is possible to step thorough the memory channels, receiving each frequency in turn. This was quite useful for storing several of the alternative broadcast frequencies used by individual stations, switching between these for the best reception under the prevailing propagation conditions. As it was possible to tune away from each memory after recall, this facility could also be used to change bands, each memory storing the centre frequency of an amateur or broadcast band for example. However, the memory channels store only the frequency, other parameters such as reception mode being omitted.

Synchronous AM

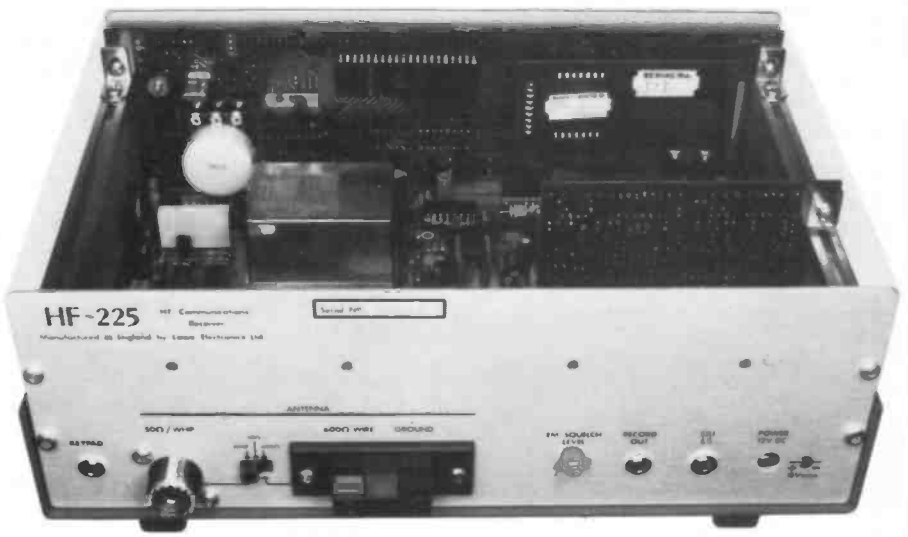
Many listeners to the h.f. broadcast bands will have heard selective fading, where the carrier level of an a.m. signal drops in level but leaves the sideband levels unchanged, giving bad distortion whenever the signal fades. Synchronous, or phase-locked, a.m. reception can help a lot here. Inside the receiver, a carrier signal is generated and phase-locked to the incoming a.m. carrier signal, which it now replaces. When locked in this way, the internal signal is at exactly the same frequency as the received carrier and fading makes no difference to the signal detection, provided that the carrier level is high enough for the internal oscillator to lock onto.

Testing this on-air with the set's short whip antenna certainly produced excellent results, often of a quality like the local medium wave station. Gone were the shouts from the XYL of "switch it off, it's giving me a headache" when listening to h.f. broadcast stations in the living room! I found that tuning in this mode was best done by starting in "a.m." mode, then switching to "a.m.s." and carefully tuning for "lock". Likewise, when recalling a frequency from memory, selecting "a.m.s." mode, followed by careful tuning, again usually resulted in perfect reception.

Amateur Bands

Connecting the set to an outdoor antenna gave it a good test in terms of signal handling. Listening to the 7MHz amateur band at night presented none of the usual blocking problems and the like caused by the proximity of high-powered broadcast stations. I did sometimes find a soft "click" from the speaker, mainly on very strong stations, each click occurring at the beginning of a c.w. character or s.s.b. speech peak after a pause in transmission. This I put down to the effect of the a.g.c. attack time. Switching in the attenuator, though, gave perfect reception. Apart from this, I never needed to use the attenuator, and try as I might I couldn't find any blocking problems from the closely-spaced, multi-megawatt, broadcast stations.

Connecting the receiver audio output to a KAM all-mode terminal unit gave excellent results, all manner of interesting stations being demodulated. I found the tone control on the receiver was useful in reducing low audio frequencies when receiving data signals such as packet, but I would have preferred the facility for adding a narrower i.f. filter,



Rear panel of the receiver showing the antenna sockets.

such as 600Hz, for digital modes or c.w. This could certainly give better performance in crowded band conditions, but then the low cost of the receiver must be borne in mind.

Leaving the set switched on for over 24 hours showed hardly any shift in the reception frequency. I found I could leave the set monitoring a given data channel for several hours, with the received information downloaded automatically to the computer disc drive whilst I was away from the house. I did however find that standing the set on top of my h.f. mains-operated transceiver sometimes induced a slight "warble" in the tone of received signals. A more critical test, when listening to normal s.s.b. with the set's mains supply placed underneath the receiver, showed this to be due to induced a.c. fields getting into the receiver v.c.o. circuitry, but taking care with the positioning of the receiver resulted in no further problems.

Circuitry

A double conversion superheterodyne line-up has been used, with a first i.f. of 45MHz and a second i.f. of 455kHz where demodulation takes place. The technical boffins amongst us may be interested in the following, but those without degrees in advanced electronics may skip onto the next section!

The r.f. input signal is first passed through a switchable 20dB attenuator, then a 30MHz low pass filter, followed by automatically selected band filters depending upon the frequency in use. No r.f. amplifier stage is used (apart from the optional whip amplifier when fitted), the band-filtered signal being passed straight to the first mixer which uses an SL6440C i.c. The 1st local oscillator injection from the synthesiser is varied in 1kHz steps, the 2nd local oscillator being varied between 44.545 and 44.544MHz in 128 steps to provide interpolation between the 1kHz synthesiser increments. This is performed using a digital-to-analogue converter controlling the voltage on the 2nd local oscillator Varicap. A pair of 45MHz filters of 15kHz bandwidth are used for initial "roofing", further filters at 455kHz providing close-in selectivity. The noise blanker samples the i.f. signal after it has been passed through the filters, muting the audio amplifier when signals of a level of 12dB above the normal carrier level are detected.

A dedicated microprocessor system is used to control most of the receiver switching functions, together with controlling the synthesiser frequency using serial data. A further control i.c. is used to drive the liquid crystal display, and a memory chip, with lithium battery backup, provides storage of memory and v.f.o. frequency information when the set is switched off. An "interrupt" system is used where the microprocessor is placed in "sleep" mode until an operator control change is made, preventing excessive "mush" from the digital circuitry interfering with reception.

Laboratory Tests

Testing the close-in dynamic range of the set was more a test of the capabilities of the measurement equipment used, the performance of the set being so good. The synthesiser performance and close-in interfering signal rejection were excellent, while the reciprocal mixing performance was better than many other higher priced receivers on the market. Other parameters such as the i.f. and image rejection, and blocking performance at higher frequency separations were quite good, and certainly few problems should be encountered in practice from strong adjacent signals. Interference such as signal splatter, is most likely to be due to a faulty transmitter rather than limitations in this receiver.

Conclusions

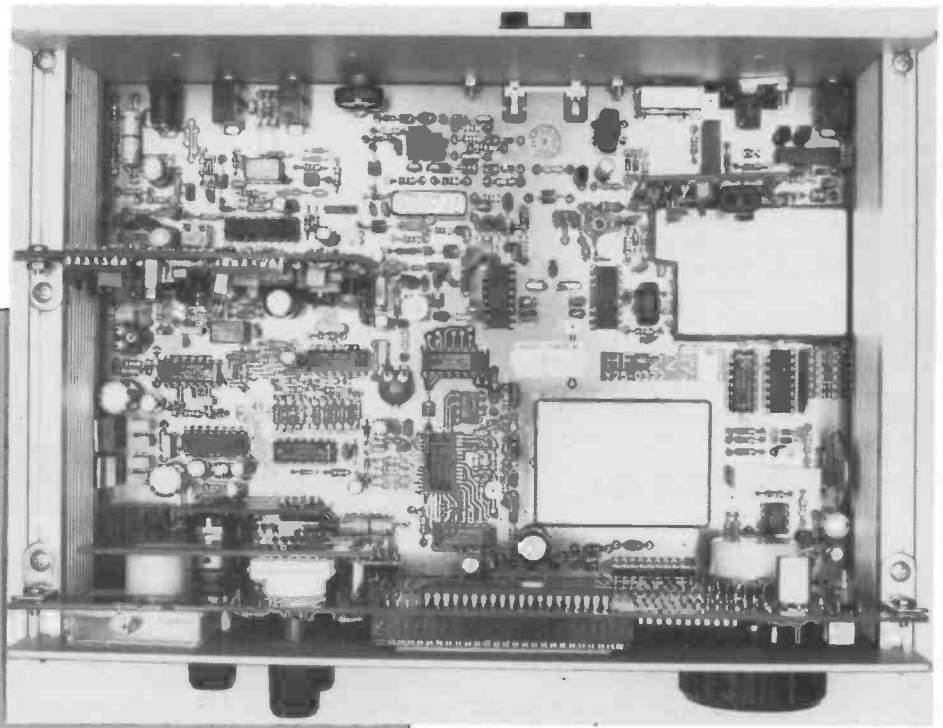
The HF-225 doesn't look very impressive from the outside, which is a pity because its electrical performance is excellent for its selling price, it outperforms many other higher priced sets. The basic receiver cost is £395, with the keypad and f.m./synchronous a.m. detector options fitted this becomes £474, which still represents good value if you want performance rather than knobs, buttons galore, timers and the like. In use on the broadcast bands the set performed very well, the synchronous a.m. option giving excellent results. The set also worked well on the

LOWE HF-225 HF RECEIVER

amateur bands, the good reciprocal mixing performance permitting weak amateur signals to be received in the presence of very strong interfering signals.

A wolf in sheep's clothing could be a very apt description!

My thanks go to **Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (0629) 580800** for the loan of the review set. □



Internal view of the HF-225 showing the construction based around the main printed circuit board.

SPECIFICATIONS

Sensitivity:

60kHz - 2MHz:
a.m. <1.2µV
s.s.b. <1.0µV
f.m. <0.6µV

2 - 30MHz:

a.m. <0.9µV	(0.86µV @ 1.8MHz)	
	(0.62µV @ 30MHz)	
s.s.b. <0.5µV	(0.41µV @ 1.8MHz)	
	(0.30µV @ 30MHz)	
f.m. <0.9µV		

Selectivity:

IF Filter (kHz)	Bandwidth (kHz) @ -6dB	@-60dB	Shape Factor
2.2	2.3 (2.27)	3.4 (4.23)	1:1.5
4	5.9 (5.56)	9.8 (9.41)	1:1 7
7	12.9 (7.73)	12.9 (12.74)	1:1.5
10	21.5 (10.53)	21.5 (17.54)	1:1.2

Dynamic Range:

Reciprocal mixing effects (2.2kHz filter)
>80dB @ 5kHz from wanted signal (84dB)

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

Spurious responses:

Image rejection:

+90MHz	>75dB (>75.5dB)
+910kHz	>90dB

Fixed response rejection:

45MHz	>85dB (>85dB)
455kHz	>100dB
22.5MHz	>75dB

Power supply:

10 to 15V d.c. @ 300mA (200mA quiescent)

Dimensions:

253 x 109 x 204mm

Weight:

1.9kg (2.6kg with batteries)

Measured values in parenthesis.

Abbreviations	
a.c.	alternating current
a.g.c.	automatic gain control
a.m.	amplitude modulation
a.m.s.	synchronous a.m.
c.w.	continuous wave (Morse)
d.c.	direct current
dB	decibel
dBm	decibel referred to 1 milliwatt
f.m.	frequency modulation
h.f.	high frequency
Hz	hertz
i.c.	integrated circuit
i.f.	intermediate frequency
kg	kilogram
kHz	kilohertz
l.c.d.	liquid crystal display
l.f.	low frequency
l.s.b.	lower sideband
mA	milliamp
MHz	megahertz
mm	millimetre
r.f.	radio frequency
s.s.b.	single sideband
u.s.b.	upper sideband
V	volt
v.f.o.	variable frequency oscillator
µV	microvolt
Ω	ohm

GIVE THIS A QUICK SCAN!

YAESU FRG-9600

FRG-9600 (Std) 60-905MHz	£499.00
FRG-9600 Mk 2 60-950 MHz	£545.00
FRG-9600 Mk 5 0.1-950 MHz	£699.00

Please include £10 post/packing/insurance

FREE ROYAL 1300 DISCONE AND MAINS PSU WORTH £79.95 WITH MK 2 AND MK 5 MODELS!.

Your '9600 brought up to Mk 2	£40.00
Your '9600 brought up to Mk 5	£129.00

Modification prices **include** return carriage.

Here at Raycom the Yaesu FRG-9600 has always been a favourite. We have taken the '9600, fine tuned it, added our own modifications and turned what has always been a good scanner into a unit offering unmatched versatility for it's price.
The standard model covers 60-905 MHz with AM/FM/SSB, and our Mark 2 mod extends this to 950MHz and has an 'N' connector fitted. Our Mark 5 mod fits an active front end to increase coverage to 100KHz to 950MHz with a display mod to give a correct frequency readout. These mods can also be fitted to your '9600! 'Phone us for details.

SCANNER CORNER

Bearcat 100XLT	£199.99
Bearcat 70XLT	£139.99
Bearcat 55XLT	£94.99
Sony AIR-7	£229.95
Sony PRO-80	£299.95
Sony SW1-S short wave kit	£239.95
Sony ICF-7600DS	£149.95
MARC II 0.15-950 MHz	£375.00
AOR AR2002	£469.00
STANDARD AX700R Pan Display	£529.00
ROYAL 1300 discone (AH7000)	£59.95

We hold extensive stocks of accessories for scanners and antennas. Please call us or send SAE for our accessories catalogue. 73

CHALLENGER BJ200

BJ200 Scanner Package
Challenger BJ200 HF/VHF/UHF Scanning Receiver

- ✧ 26-30, 60-88, 115-178, 210-260, 410-520 MHz
- ✧ 16 memories, search scan priority and delay function
- ✧ **FREE Raycom air-band antenna**

~~£229.00~~ **£199.00**
plus £10 post/packing

ICOM IC-R7000

Listen in on public and private radio communications: weather, fire, coastguard TV, airband and many, many more. Wideband frequency coverage provides you with all the channels you need to become a VHF and UHF listener. Turn on the infra-red remote control (optional) for 'armchair copy'.
Frequency coverage is guaranteed to 1300MHz, starting at 25MHz, but may extend on individual units to 2GHz! Features include:

- O USB, LSB, FM, FM-N, AM
- O 99 memory channels, keypad entry
- O optional infra-red remote control
- O variable speed scan and delay
- O optional voice synthesizer
- O six tuning steps
- O sensitivity < 0.3µV for 10dB SINAD (SSB)

Raycom package deal including FREE Royal 1300 discone worth £59.95!

~~£989.00~~ **£925.00**
(save £64) plus £10 post/packing

Bearcat 200 XLT

the best VHF/UHF hand-held scanner you can get!

Check out these features against any other handheld scanner available today and see for yourself if the 200XLT comes out head and shoulders above the rest. *STOP PRESS - spare nicads in at £34.95!*

Check these features!

- ✓ *200 memory channels*
- ✓ *broadband helical*
- ✓ *nicad included*
- ✓ *mains charger*
- ✓ *display backlight*
- ✓ *fast scan - 15 ch/sec*
- ✓ *fast search - 25 ch/sec*
- ✓ *selective delay*
- ✓ *auto lockout*
- ✓ *auto priority channels*
- ✓ *track tuning*
- ✓ *keypad lock*
- ✓ *12 band coverage*
- ✓ *direct channel access*

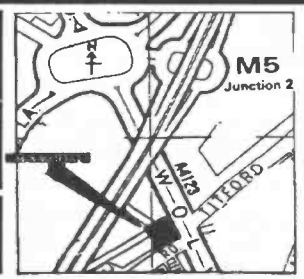
FREQUENCY CHECKLIST

6 & 10 METRE HAM RADIO	✔
CIVIL AIRCRAFT	✔
VHF/UHF HAM RADIO	✔
PMR LAND MOBILE	✔
MARINE	✔
CELLULAR PHONES	✔
RADIO CONTROL MONITOR	✔

~~£259.99~~ **£229.99** (save £30)
plus £10 post/packing/insurance

RAYCOM COMMUNICATIONS SYSTEMS LIMITED, INTERNATIONAL HOUSE, 963 WOLVERHAMPTON RD, OLDBURY, WEST MIDLANDS B69 4RJ. TEL 021-544-6767, Fax 021-544-7124, Telex 336483 IDENTI G.

RAYCOM
COMMUNICATIONS SYSTEMS LIMITED



RAYCOM gives you more BUYING POWER

ALL MAJOR CREDIT CARDS ACCEPTED. BC, ACCESS, DINERS. INSTANT CREDIT UP TO £1000 (SUBJECT TO STATUS) WITH RAYCOM CREDIT CARD (APR 29.5%). FREE CREDIT ON CERTAIN ITEMS AT MRP. CALL NOW FOR MORE DETAILS.

ORDERING INFORMATION

WE STOCK ICOM, YAESU, BEARCAT, MFJ, BUTTERNUT, CUSHCRAFT, AEA, TONNA, NAVICO, TEN-TEC AND WELZ AMONG MANY OTHERS. CALL FOR FULL LIST.

TEL: 021-544-6767

PHONE BEFORE 4PM FOR NEXT DAY DELIVERY. MAIL ORDER PLEASE INCLUDE £10.00 P/P. PLEASE ALLOW TIME FOR PERSONAL CHEQUES TO CLEAR. MANY OTHER ITEMS IN STOCK. PLEASE CALL FOR MORE INFO AND FOR **EXTRA SPECIAL DEALS!**

INFOLINE 0836-282228 5-9pm (weekdays)

OPENING HOURS 9-5.30 MON TO SAT, LATE NIGHT FRIDAY 'TIL 7 PM. 73 DE RAY G4KZH, JIM G8ZMP AND RON G6ZJN.

AIRBAND

Godfrey Manning G4GLM

Congestion in the London terminal manoeuvering area (t.m.a.) seems to be a topical problem. The t.m.a. is a defined area of controlled airspace which covers Heathrow, Gatwick, Stansted and Luton and lies at the confluence of various airways such as A1, A2, A20, B3, B4, G1, R1 and many others. Its height varies from place to place but always starts well above ground level. However, surrounding each airport, there is a smaller special rules or control zone extending from the surface up to the local base of the t.m.a.

Presently, aircraft are brought in to the t.m.a. from the airways by London Airways control at the London Air Traffic Control Centre (LATCC) which is sited at West Drayton immediately north of Heathrow. Flights are then handed off to an approach radar controller at the destination airport and are guided through the t.m.a. (via any holds or "stacks") to descend down to the airport's own local control zone boundary. Soon after this point the Tower controller (in the visual control room at the airport) takes over. Hence each airport within the London t.m.a. is taking aircraft from LATCC and performing its own radar approach control.

The National Air Traffic Services (NATS), which is a joint Civil Aviation Authority (CAA) and military organisation and which runs LATCC, proposes an alternative technique that aims to increase the capacity of the t.m.a. This is the Central Control Function (c.c.f.) in which aircraft remain under the control of LATCC radar right up to the moment of contacting the tower at the destination airport. There will no longer be separate approach radars at individual airports. Better definition of approach routes for each terminal will enable different traffic streams to remain separated, and the holds will be moved to points further away from their respective airports. All this is expected in the early part of next decade.

You Write

Lucky **Graham Hewitt** (Coventry) has an office overlooking the centre section of Birmingham's runway 15/33 which he says is "very distracting" - wonder what the boss

At the time of writing, the strong south-westerly wind is bringing most of the Heathrow traffic for Runway 23 past Godfrey's window. But he's hoping that better weather will be helping you have an enjoyable airshow season by the time you get to read this!

makes of it! Graham's first aeronautical interest was as an ops clerk (SAC) at RAF Bruggen, Germany. To answer your question, the VOLMET transmissions originate at some of the sites used as relays by LATCC (see below). I'm not sure where the Birmingham a.t.i.s. (automatic terminal information service) is broadcast from, but being on 113.65MHz it's in the v.o.r. beacon and i.l.s. band (i.e. is below 118MHz) so is being transmitted from a beacon away from the airport.

Welcome to **John G3XLL** and **Simon Lockwood** (Gislingham, Suffolk). John's interest started over 30 years ago, he is involved with the Air Training Corps and is a Flying Officer in the RAF Volunteer Reserve. Simon, his son, is a Cadet Corporal in the Air Training Corps. If there's something specific that you'd like to contribute to "Airband" then please do send it along.

With regret I must again apologise for being unable to reply directly to readers. This column is sufficiently successful that I couldn't cope with the workload that this would entail! Instead, all queries are answered in the magazine as best I can. This also gives the chance for other readers to share the information.

Frequency and Operational Information

Looking first at the CAA's *General Aviation Safety Information Leaflet* 3/89 the London t.m.a. is being extended at its south-eastern corner near the Detling v.o.r. beacon. If you are a pilot, NOTAM A103 gives the details. This *Leaflet* also reminds pilots to press the transmit button, pause ever so briefly, and then to speak - in that order! Otherwise, the first word of the transmission gets clipped.

First time correspondent **Peter Finn** (Milford Haven, Dyfed) sends a list of the LATCC relay stations which should interest Graham Hewitt. They are: Birdlip (Gloucestershire), Chedburgh (Suffolk) Clee Hill (Shropshire), Daventry (Northamptonshire), Davidstow Moor (Cornwall), Grantham (Lincolnshire), Great Dunfell (Cumbria), Greenford (Middlesex), Kelsall (Lancashire), Preston (Lancashire), Snaefell (Isle of Man), Swingfield (Kent), Trimmingham (Norfolk), Ventnor (Isle of Wight) and Warlingham (Surrey). Peter also has a question: are the Shanwick v.h.f. frequencies relayed, and if so, from where? An example would be the organised tracks transmitted on 133.8MHz.

Information Sources

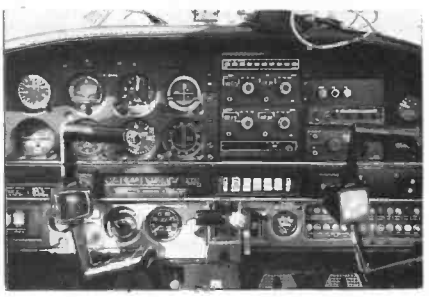
From the Midland Counties Aviation Society comes the latest annual edition of *Airport Timetables UK* priced at £7.50 from 27 Highwood Croft, Kings Norton, Birmingham B38 8ET. This year's edition includes foreign airlines at Heathrow.

For really urgent problems and for arranging visits to my Museum you can contact me by 'phone most weekday evenings from 1900 to 2300 local time on 01-958 5113. Very few readers have taken advantage of a visit to the Museum; why not use the opportunity to see some of the instruments that enable the pilot to carry out the controller's instructions with accuracy?

Follow-Ups

In the April "Airband" information was requested on the Liberty reporting point. **Malcolm Wayland** (Alconbury), an airline pilot well known to this magazine, tells me that it is on the approach to Lakenheath. Defined as being 37nm d.m.e. away from the

☞33



▲ A closer view of the Warrior's comprehensive instrument flying fit.

◀ Godfrey takes the controls of Piper PA-28-161 Cherokee Warrior G-BNXU.

Godfrey's flight in a Piper Cherokee Warrior. No crevice is safe from inspection with Godfrey doing the pre-flight checks. **(Photographs Christine Mlynek)** ▶

GROVE SHORTWAVE DIRECTORY

One of the best shortwave reference books available.

The book includes an up-to-date frequency listing from 10kHz right up to 30MHz, which is cross referenced with sections covering all kinds of utility transmissions from worldwide weather stations to spy networks and Army, Navy & Air Force, making the identification of stations all the easier.

Also included is a glossary of terms and abbreviations commonly heard on the shortwave bands. Three pages have been set aside for use as a log-book, but with all the information packed into this book you will require a considerably larger amount of log-sheets in a very short time (see below).

Price £12.95 + £1.00 p&p UK or £1.75 overseas

World Radio TV Handbook 1989	£17.95 + £1 p&p
Communication Satellites	£13.25 + £1.25 p&p
Worldwide Maritime FAX	£9.95 + £1 p&p
Guide to Number Stations	£9.75 + £1 p&p
Guide to Utility Stations	£18.75 + £1 p&p
Listeners Log Sheets	£1.50 + £0.55 p&p

Two or more books postage free in UK

ASK FOR OUR FREE CATALOGUE OF ALL BOOKS

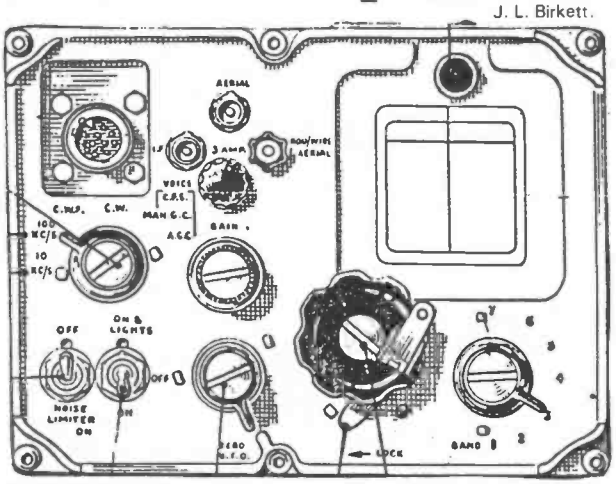
INTERBOOKS

SM69, 8 ABBOT STREET, PERTH PH2 0EB, Scotland.
Tel: 0738-30707

J. BIRKETT

RADIO COMPONENT SUPPLIERS

25 The Strait
Lincoln, Tel. 20767
(LN2 1JF)
Partners: J. H. Birkett.
J. L. Birkett.



EX-MILITARY COMMUNICATIONS RECEIVER R210. Frequency 2 to 16MHz in 7 switched bands AM, CW, SSB, FCo, Aerial inputs 80 ohm balanced line, long wire or whip, CW filter, BFO, Noise blanker, complete with 240 volt AC power pack, loudspeaker, headphone jack and pair of lightweight headphones.

Price £79.80 carr. Mainland only £8.00.

EX-MILITARY COMMUNICATION RECEIVERS TYPE R210
unconverted £50 (carr £6.00).

Special receiver type GPO40A. Battery/mains covering 133kHz – 33MHz. Callers only £195.00.

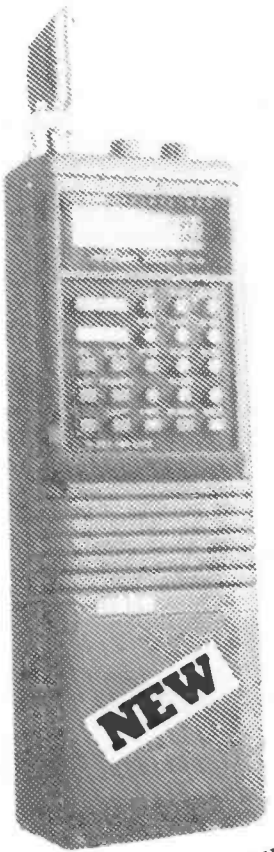
Pye Westminster W15FM. 80 – 110 MHz. 10 channel £15.00 (carriage £3.00).

Dymar 25W. 16 channel FM 80 – 110MHz £15.00 (carriage £3.00).

ACCESS AND BARCLAY CARDS ACCEPTED.

ARE COMMUNICATIONS

The new BEARCAT 200XLT is an unbelievable scanner with incredible features!



- 200 programmable memory channels
- 12 band coverage
- Automatic search
- Priority channel
- Selective scan delay
- Illuminated display
- Automatic lockout
- Track tuning
- Direct channel access

Frequency range 29.4 – 54MHz 10m FM & 6m Amateur Band
118 – 136MHz (aircraft) 136 – 144MHz (military land mobile)
144 – 146MHz (2m Ham band) 146 – 174MHz (High band)
406 – 430MHz (UHF High band)
430 – 440MHz (70cms Ham band) 440 – 512MHz (T band)
806 – 956MHz (SHF Cellular telephone band)

In our opinion, the BEARCAT 200XLT is the most exciting product to be offered from the UNIDEN/BEARCAT organisation. Indeed, it makes most other handheld scanners available on the market, redundant.

Available ex-stock £229.00 carriage free, including ac charger, nicad pack and carrying case.

Opening hours Monday - Friday 9.30-5.30 Saturday 10.00-1.00.

ARE Communications Limited, 6 Royal Parade, Hanger Lane, Ealing, London W5A 1ET, England
Fax 01-991 2565
Tel 01-997 4476

BANDSCAN

Peter Laughton

Peter Laughton has been investigating the problems of taking your short wave receiver abroad with you on holiday, particulary if you are flying. The advice he got from the various airport security services in several European countries is both conflicting and confusing!

Radio Luxembourg has announced its plans for expansion as we approach 1992 and are we about to see the end of metres on our dials? Read on.

Summer Blues

Over the Easter holiday warnings appeared on the British CEEFAX service under the travel news section. Passengers leaving UK airports, including Heathrow and Gatwick were advised not to take electronic apparatus of any kind. If you remember, it was a bomb hidden in a radio-cassette recorder that blew up the Pam Am jumbo above Lockerbie back in December. Shortly afterwards, the British Transport Minister was reported as saying that in reponse the carriage of radios and other electronic equipment might be restricted on civil aircraft. Paradoxically, everytime there's a major crisis in a particular country, the British Foreign Office makes use of the BBC's World Service to offer evacuation advice to British subjects in the region. Libya and Lebanon are two recent examples. That is not going to be of much use if travellers leaving Britain are to have their s.w. radios confiscated.

The British Airports Authority which runs airports in the UK is naturally reluctant to talk about its security measures. I called Heathrow and asked a spokeswoman to explain precisely what they meant by their new policy, which is still in force.

She explained that if you are taking a radio through a British airport you should pack it in the hand luggage and not the main suitcase. You have to make sure there are fresh batteries in the radio so you can demonstrate that it works. Maybe even take a screwdriver that fits the screws holding the back of the radio, just incase, and check in 30 minutes early. These measures are peculiar to Britain though.

I rang eight other European airports and got different pictures. This next report is typical. Rick Hiers is the official spokesman for the Dutch National Police Force Aviation Branch. He told us that Amsterdam Schiphol airport was not planning the same move against travellers with s.w. radios. You should pack a radio in the suitcase and not the hand luggage, he told us, making sure, of course, that it is your radio. Never accept any luggage from anyone else. All this conflicting advice is rather confusing isn't it? If you've encountered problems at an airport while trying to take a radio with you, I'd like to hear from you.

NDXE Is History

Bob Horvitz of ANARC reports that the US Federal Communications Commission in Washington has finally revoked the construction permit for NDXE, the "world's first stereo s.w. broadcasting station". Alabama-based Dickson Norman is the man behind countless promotions for a station that has had a listener club before a transmitter. The FCC normally lets you have one year to construct a station, and only grants extensions if you can show that circumstances beyond your control prevented completion of the station.

According to the FCC's letter to Mr Norman, cancelling the NDXE permit, the last communication received from NDXE's legal representative was dated 29 May 1986, and "because no evidence that construction of the station has actually begun, the application for extension of time is hereby dismissed".

However, Dixon Norman has immediately filed a petition for reconsideration, as well as an amendment to his original licence application. He also has asked time to explain himself at this years Association of North American Clubs, meeting in Florida.

Atlantic 252

You may remember plans by Radio Telefis Eeran, the Irish state radio, and Radio Luxembourg, to launch a 500kW l.w. commercial radio station later this year. Travis Baxter is the station manager of Dublin based Radio Tara, and he expects the station to start testing in July, with an on-air date in late September 1989. The organisation is called Radio Tara, but listeners will know it by another name "Atlantic 252". In fact Atlantic 252 will actually start on 254kHz l.w., and then in line with an international agreement, move to 252kHz in February of next year. Atlantic 252 will play a European version of contempory hit music, aimed at the 16 - 34 year old. The station is advertising for presenters in American trade magazines, and planning a £1.5 million initial publicity campaign to tell the target area they are there.

Deutschlandfunk Magic!

On the southern edge of Cologne, West Germany are two huge radio buildings. The 31-storey black building belongs to Radio Deutschewelle, familar to s.w. listeners. It targets its foreign language programmes to areas outside Europe, but right next to Radio Deutschewelle's headquarters is the 16-storey complex of Deutschlandfunk. Although the two organisations share a common canteen, they are entirely separate radio stations. Deutschlandfunk puts out a 45 minute English programme beamed to the UK each day at 1815UTC on 1.269MHz. It carries a mixture of news and views about West Germany, as well as comment about what goes on in the East. When it started in 1962, the 600kW m.w. transmitter at Neumunster, up near the Danish border, covered Europe easily. But with increased congestion on the dial, reception is clearly a problem for the station.

A new l.w. transmitter is being constructed for Deutschlandfunk, and when complete, a reshuffling of services may lead to improved reception. In the meantime DLF have manufactured what they call a "magic disc" to help improve reception. It is the same size as a traditional 12 inch LP record cover. There's a green plastics sheet inside the cover, and on the sheet they've etched a coil of copper foil, 15 turns in all. A tiny fixed capacitor is soldered on the back, and that is all there is to it. The construction is a compact m.w. loop antenna, and if you place a radio on top of the magic loop, reception of 1.269MHz is significantly enhanced. In fact there are two versions of the loop because DLF also has m.w. transmissions in other languages on 1.539MHz. The people at DLF told us they're giving away these magic disc antennas to anyone who writes a letter with a good enough reason for wanting one. Stocks are limited, and remember the loop is fixed in frequency. DLF's address is Box 640, D-5000 Cologne 51, West Germany

Two other organisations have offered a similar cheap reception solution in the past. Evangeliums Rundfunk in Germany designed one for listeners to their religious programmes via Monte Carlo, and in the past Vatican Radio has sold a tunable m.w. loop.

All this then is part of an effort to attract listeners back to the m.w. or a.m. broadcast band. In North America various schemes have been tried to make the m.w. more appealing in other ways. Stereo m.w. broadcasting has been tried in the US and Australia, but it seems a.m. stereo is now virtually written off as a failure. The Federal Communications Commission is currently examining new national standards to improve both the audio quality and reception of a.m. stations in the USA. Some a.m. stations will certainly have to clean up their act to conform. There's to be more m.w. in the future, as the band is slightly extended beyond the current 1.600MHz

Namibia

At the time of going to press, UN forces were currently in the north of Namibia trying to persuade SWAPO guerrilla fighters in the area to surrender their arms and return to Angola. Since the start of April the withdrawal programme has been proceeding rather slowly, but there's a curious radio twist to all this. For many years SWAPO has broadcast to Namibia by using s.w. airtime from Angola, Tanzania and Ethiopia. Part of the programme was aimed at the general public in the country, another part as a morale booster for guerrillas fighting the South African military bases in the country. So, when the multi-national United Nations came in April they used airtime on the SWABC in Windhoek to appeal to SWAPO to lay down their arms. However, SWAPO leaders in Luanda said the effort was a waste of time as their guerrillas did not have any radios. So how did they hear the SWAPO Voice of Namibia then?

BANDSCAN

Luxembourg - Big Plans

Radio Luxembourg's s.w. transmitter on 6.090MHz is heard in many parts of the world despite only really being designed for European reception. They also run a rather obscure s.w. service in French towards the Canadian province of Quebec, but because the power on 15.350MHz is only around 10kW, and it is not possible to vary the frequency of the ancient transmitter, this operation is more of a gesture rather than a specific service.

The CLT - la Compagnie Luxemburgeoise de Télédiffusion which simply means the "Luxembourgian Broadcasting Company "- has a number of other plans for broadcasting in Europe. The CLT, one of the biggest media concerns in Europe, already owns the most popular radio station in France, RTL Radio.

RTL Radio's profits in 1988 exceeded £100 million, and over the past few years, RTL Radio has introduced its programming on France's f.m. and m.w. stations. In West Germany, the CLT also owns the largest national commercial station. They plan to offer a package programme to local and regional stations, with RTL acting as a main network. The CLT has already applied to the governments of West Germany's various federal states for the necessary permits. With the year 1992 looming on the horizon, when all internal borders within the Community will disappear, the CLT is adopting an aggressive expansion policy to establish itself throughout the EEC. One of the CLT's flagships will be a radio station, broadcasting exclusively classical music. This will broadcast via satellite to cable networks, initially in the Netherlands, but later also in West Germany, France and other countries. Classical music radio stations don't attract as many listeners as other radio stations. But the CLT wants to show that their interests don't stop at pop radio!

Vatican Discs

Meanwhile at the Vatican, the external radio service is going through a severe financial crisis. The latest issue of the station's programme guide includes a request for donations which is unusual. The station has also started selling compact discs! An article in the *Catholic News Service* hints that Vatican Radio and the Vatican newspaper, may be expendable if the overall budget gets any tighter.

Actually those compact discs cost around £8 each. There are five in the series at the moment. I wouldn't be surprised if there'll be some enthusiasts that buy them, not because of the superb classical music they contain, but because there's a Vatican Radio logo in the middle of the silver disc.

Veritas Anniversary

The Cardinal of Manila, Archbischop Jaime Sin, recently marked the 20th anniversary of the catholic radio station Radio Veritas by announcing that the station will start s.w. broadcasts to Siberia. During the ceremony, which was also attended by the President of the Philippines, Corazon Aquino, Archbischop Sin described Radio Veritas as "The Voice of Christianity in Asia". Located just outside Manila, Radio Veritas built a 250kW s.w. transmitter back in 1986 to broadcast to what it terms as the "silent" churches in Korea, China, Vietnam and Burma. The same transmitter will also be used for the new broadcasts to Siberia. Radio Veritas, funded largely by Catholic communities in West Germany, broadcasts in 15 languages with religious programming, music and news. At the ceremony, Mrs. Aquino thanked the station for its support during 1983-86 in her fight to overthrow the government of former President, Ferdinand Marcos.

Consolidation In Boston

At the end of March, the Christian Science Monitor sent termination notices, effective at the end of April, to all but a handful of the 61 full-time employees working at Monitor Radio and the s.w. World Service.

Despite having just opened a third s.w. transmitter site, the financial burden of developing the daily television news programme has led the Boston based organisation to considerably trim its radio operations. They have told employees that they intend to announce a smaller number of redefined radio jobs in the very near future. The Washington office of Monitor Radio is expected to close soon, with the rehired employees moving into the TV programme's office space. As from May 1 a new consolidated radio programme commenced. It runs simultanously via the transmitters in Maine, South Carolina and Saipan. The KYOI station in Saipan is now fed by satellite for the entire period it is on the air, not just part-time as was formerly the case.

The Monitor organisation is also said to be planning to revive the sale and distribution of a five minute hourly radio news show to domestic US stations, although with an increasing trend for US stations to demphasis news coverage, such a service may be difficult to re-launch.

Storm Hits Radio Australia Site

Over the last year, three 10kW transmitters have been moved from Lyndhurst, Victoria to a new site on Australia's East Coast at a place called Brandon. At the start of April, Radio Australia announced that one of the transmitters was testing on 6.020MHz with a log periodic antenna beamed towards Papua New Guinea. However, two days after the announcement, terrific winds blew parts of Queensland off the map (almost at least). The new Brandon transmitter site suffered damage to the antenna and didn't resume testing until late May 1989.

Abbreviations

a.m.	amplitude modulation
FCC	Federal Communications Commission
f.m.	frequency modulation
kHz	kilohertz
km	kilometre
kW	kilowatt
l.w.	long wave
MHz	megahertz
m.w.	medium wave
s.w.	short wave
UTC	Co-ordinated Universal Time (=GMT)

All India Update

More now on the expansion plans of All India Radio. At the start of February we mentioned that a 10kW s.w. transmitter was getting ready to start transmitting from the Andaman Islands which belong to India. Manosij Guha in Jamshedur telexed us with the news that All India Radio Port Blair now seems to be testing irregularly between 1200 and 1730UTC. The transmitter on 4.760MHz simply relays Port Blair's m.w. service on 684kHz. Every so often the relay is interrupted with an announcement that the s.w. relay is on test. This transmitter has been designed to serve the outlying islands in the Union territory of Andaman and Nicobar Islands. Another scheduled transmitter on 7.180MHz has not yet been heard.

Meanwhile a 50kW transmitter at Shillong, Meghalaya has been testing daily since April 4. The frequency is 3.255MHz between 0130 and 0230UTC, and again 1300 to 1600UTC. The transmitter either carries continuous music, or a relay of All India Radio's Shillong m.w. service on 1.197MHz. No proper station identification has yet been noted.

Goodbye Metres?

There are still s.w. stations on the air announcing both the frequency in kilohertz, and the equivalent wavelength in metres. Back in the early days of broadcasting in Europe, Africa and Asia, the dial position was almost exclusively referred to in metres. Conversion between wavelength and frequency is possible if not rather unwieldly for the beginner. Take the speed of electromagnetic waves (usually said to be 300000km per second), divide it by the wavelength in metres and you'll get the frequency in kilohertz.

Dr Kim Andrew Elliott, Director of Audience Mail Research at the Voice of America in Washington has been researching into receivers in the developing parts of the world. He reports that recently made receivers in those areas no longer have metres prominently marked on them. One of the largest international broadcasters is the BBC World Service in London. In the evenings here in Europe you can hear some of their relay stations come on the air with references to wavelengths. Andrew Piper is the BBC's planning and development organiser and he explained that the BBC still makes passing references to metres.

But what would you say if radio stations dropped references to wavelengths altogether? Drop me a line. We'll pass your comments on to the stations concerned. In fact, come to think of it, it seems surprising that those parts of the world that are still non metric never thought of expressing their wavelength in feet and inches! □

ANTENNAS

F. C. Judd G2BCX

Part 6

This month Fred Judd looks at further antenna types, starting with the popular discone before moving on to the collinear

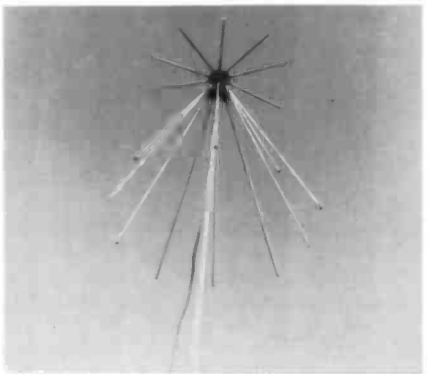


Fig. 6.1: Experimental discone omni-

Developed from the bi-conical antenna, the discone has gained popularity as a very wide band vertical omni-directional antenna highly suitable for use with v.h.f./u.h.f. scanner receivers. It can also be used for transmitting. However, to cater for a total frequency range from, say, 50Ω to 1000MHz, two or possibly even three would be required. The one shown in Fig. 6.1 was designed and constructed by the writer, largely for investigating performance and measurement of the vertical radiation pattern. These antennas have unity gain and the vertical radiation is at virtually 0°, parallel to the ground as in Fig. 6.2.[11]

Broad Band Active Antenna

In effect this is a short conducting element coupled to a high gain, low noise pre-amplifier. A high gain figure is achieved but this refers to the pre-amp and not the passive section of the antenna. Because of the wide band-width the omni-directivity gain is probably about equal to that obtained from a discone. However, these "active" antennas cannot be used for transmitting.

Collinear Antennas

Horizontal collinear arrays for v.h.f./u.h.f. operation usually consist of a large number of half-wave elements, all driven in phase, providing bi-directional radiation with considerable directivity gain. Such arrays may also employ a large plane reflector for uni-directional operation. Antennas of this kind were used for v.h.f. radar systems during the last war, but being physically very large they are hardly used for amateur radio purposes.

Vertical collinear antennas for v.h.f./u.h.f. use are omni-directional and, depending on the number of half-wave elements (two or more), can provide a useful although not particularly high degree of directivity gain. The elements are normally "close spaced", as in Fig. 6.3, and driven in phase by means of quarter-wave stubs inserted between each. It is worth mentioning that some commercially made collinears of this type use inductive phasing methods, but if poorly designed these can cause distortion of the vertical radiation pattern and loss of directivity gain; the specification for "gain" is often exaggerated or given in such a way as to be misleading. An accurately calculated or measured vertical radiation pattern, similar to that shown in Fig. 6.4, is a good indication that a vertical collinear has been well designed.

The directivity gain more likely to be obtained with vertical collinears having close-spaced elements is as follows: with two elements 1.8 to 2dBd; three elements 3.2 to 3.5dBd; four elements 4 to 4.5dBd. About 3.5dBd can be obtained with two elements and 6dBd with four elements, but the spacing between each must be at least 0.4λ Each element has to be separately fed and in such a way that the current in each is in the same phase.

Two-Element Collinear, Extended Spacing

Full constructional details of this 2m amateur band antenna are to be published in *Practical Wireless*. It has been developed from an h.f. antenna known as the "double extended Zepp" to form a two-element vertical collinear

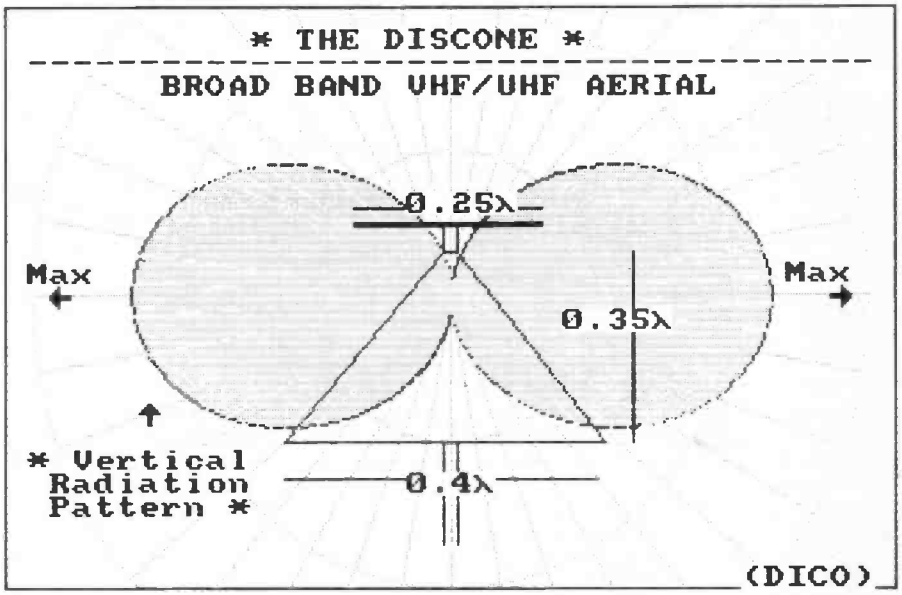


Fig. 6.2: Typical vertical radiation pattern and dimensions for a discone antenna.

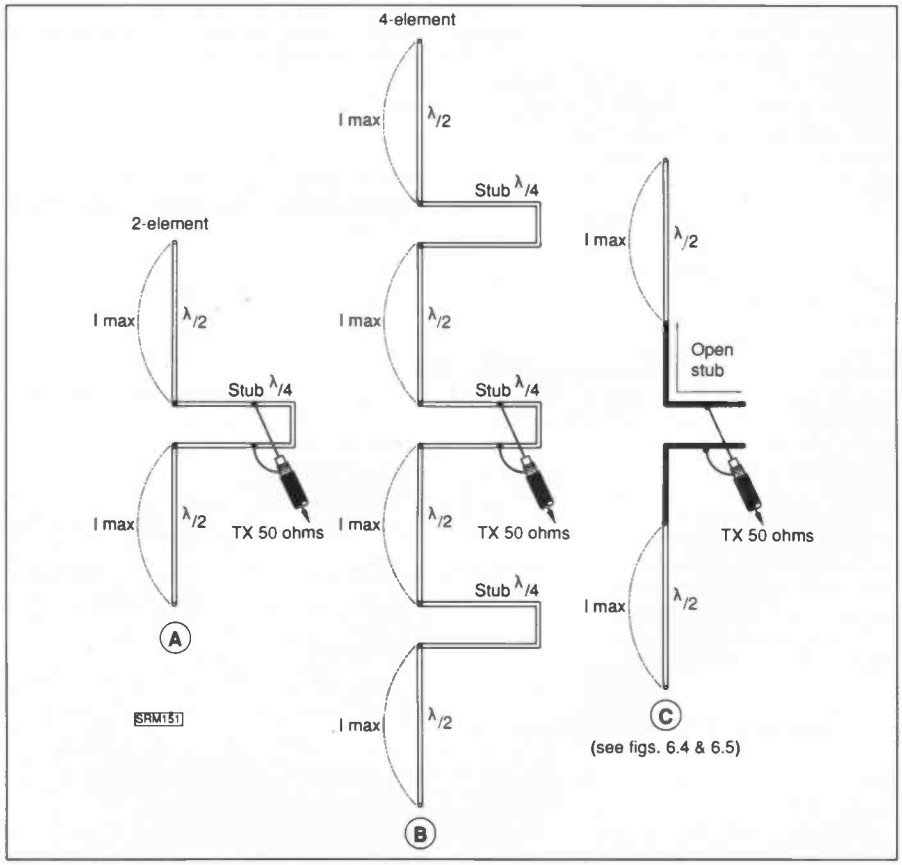


Fig. 6.3: Vertical collinear antenna configurations: (A) two close-spaced elements; (B) four close-spaced elements; (C) extended electrical spacing between two elements to obtain greater directivity gain.

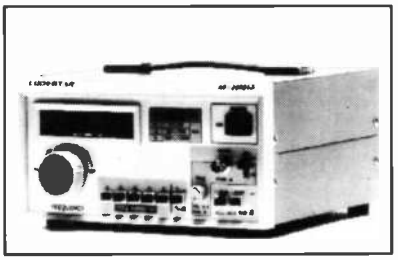
☞23

Piezo Buzzer now only 56p 43-27203

Cirkit NEWS

MAY 1989

YOUR CHANCE TO WIN...



Once again, you'll need all your wits about you to identify the six items we've picked from the catalogue, and a Lodestar audio signal generator worth more than £180.00 is waiting for the sender of the first all-correct entry drawn in this season's competition.

Second and third prizes are top-of-the range multimeters from Cirkit's outstanding new range, offering frequency and capacitance measurement and transistor test, and valued at £55.00 each.

Fourth and fifth prize-winners will receive recently published books to the value of £30.00.

Cirkit Distribution Ltd
Park Lane
Broxbourne
Herts
EN10 7NQ
Telephone (0992) 444111
Fax (0992) 669021

Also at

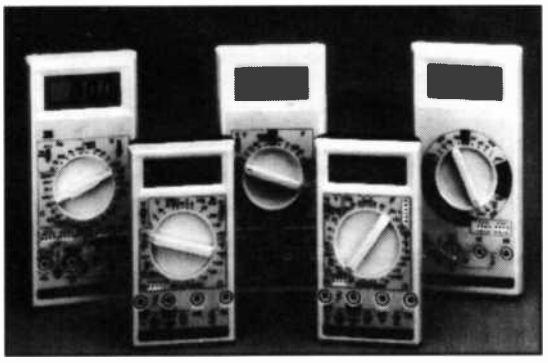
53 Burrfields Road
Portsmouth
Hants
PO3 5EB
Telephone (0705) 669021
Fax (0705) 695485

NEW CATALOGUE OUT 25th MAY

Over 3,000 product lines feature in the Summer 1989 edition of the Cirkit Constructors' Catalogue, available from most larger newsagents or direct from the company priced at £1.50. The latest books, an RF frequency meter, two new PSU designs and a 3.5MHz converter are among the innovative new kits this issue, while our construction project - a 2 Watt stereo amplifier - is bound to prove an absorbing activity for dedicated constructors. In the test equipment section there's a whole new range of multimeters, a bench DVM and a triple output PSU.

For eagle-eyed readers who enjoy a challenge of a different sort, there is the opportunity of winning an audio signal generator worth more than £180.00 In the latest fiendish competition. All prices now include VAT for quicker, easier ordering; and Cirkit's same-day despatch of all orders, combined with value-for-money discount vouchers, makes the line-up even more attractive.

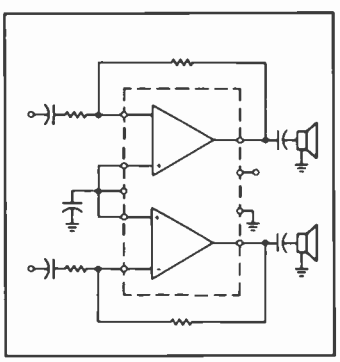
D-MM GOOD VALUE!



Cirkit's six new digital multimeters are packed with sophisticated extra facilities: capacitance measurement, frequency measurement up to 20MHz, temperature reading, transistor test and logic test in addition to the usual volts, current (DC and AC) and resistance measurement - and all unbeatable value with prices ranging from **£20.00** to **£55.00!**

FEATURE PROJECT: 2W STEREO AMP

Our construction project this issue is for a straightforward but very effective 2 Watt stereo amplifier. Based on the LM1877, it is the perfect amplifier for a 'Walkman' cassette deck and equally suitable for AM/FM radios or mixer desks. Featuring 2W per channel and 75dB channel separation, it operates from a 10-26 volt supply, making it ideal for in-car applications. The catalogue includes full details of this economical kit.



THIS IS TWO EMMA TOC

Joan Ham
Part 2

At the end of Part 1 we left P.P.Eckersley reciting his famous rhymes into the 2MT microphone. Joan Ham concludes the story with his time at the BBC as their first Chief Engineer and his many contributions to broadcasting as we know it today.

The 2LO station was set up by Marconi in 1922, and in November the BBC took over its operation. Capt.Eckersley joined them as Chief Engineer at a salary of £800 per year. He rapidly became responsible for some notable innovations, developments and philosophies, laying the foundations on which the BBC edifice of the future was to rise.

As early as 1923, he had a policy of covering the whole of the country with broadcast programmes, and then to offer the choice of a second programme put out simultaneously on the same wavelength, based on the regions. He set up relay stations, linked by Post Office cables, and was responsible for the installation of the high power long wave transmitter at Daventry, against opposition by the Post Office. Capt. Eckersley studied his subject in depth, making observations of the service areas of stations, studying the design of transmitting antennas with his brother Thomas Eckersley FRS, and H.L.Kirke. Britain's pioneering national system of broadcasting was one of his schemes, as was the Regional scheme, for which he designed the first BBC London Regional transmitter at Brookman's Park, Potter's Bar which was in use until 1962. The central control room for transmissions was another of his introductions - all a far cry from the primitive hut at Writtle which was a transmitter, laboratory, studio and research department. He was able to see far into the future of broadcasting and initiated the Union Internationale de Radiodiffusion in 1925 to try to sort out the wavelength chaos and allocate the limited usable frequencies of the time. This organisation preceded the ITU which is in being today.

Bugbear

One of Capt. Eckersley's greatest ambitions was to develope quality both of design and reception, which he felt that the public wasn't getting. A real bugbear was the oscillations caused by reaction which was picked up on sets for miles around. His war against poor quality and bad practices soon gained him the nickname "Capt. Don't-do-it Eckersley" because he repeatedly warned listeners not to play about with their sets -

"Please, PLEASE, I implore you, don't interfere with the pleasure of others. Please, don't do it!"

He told a radio club during a talk on "The romance of wireless" in 1924, that his ideal was to give everybody good signals, "...even the man who utilised a damp clothes line, a knife and a piece of cheese." His strong views on broadcasting inevitably brought him into conflict with others and he thought, and said, that the Governors of the BBC should have a wider education and background in the arts, rather than simply be administrators drawn from the ranks of public service. He greatly admired Reith, who had invited him to become the BBC's Chief Engineer, but thought him too dogmatic. He was very keen on competition, not at all in favour of a BBC monopoly, and wanted to see commercial radio introduced to provide choice and keep broadcasting on its toes.

"I criticise a policy, not individuals" he said.

Much has been made of the choice of the Marconi TV system over that of Baird. Reith had asked him as chief engineer to assess them both and each had a trial period. Baird's mechanical system, he thought was impracticable. Nothing could be moved around once set up, not even the camera; 30 lines limited the capability of the system severely and would not give the viewer a quality picture; worst of all, the equipment was not built to a very high standard - a basic flaw in Capt. Eckersley's eyes. He told Baird to go away and re-think it all, paying attention to the best possible design. The touchy inventor never really forgave him, although the scrapbook contains a 1932 Christmas card from Mr and Mrs Baird, but it was clear that electronic scanning and the cathode ray tube being developed by Marconi had more potential.

Rediffusion

Capt. Eckersley's head teemed with ideas and developments in the field of broadcasting. In his relentless pursuit of quality, he dreamt up the notion of "wired wireless" in 1931. He saw it as a domestic service in the same sense as gas, water and electricity. He proposed a system of transmitting high frequency current for broadcast programmes over the national grid. The customer "would have an apparatus to pick up one or the other. The system would have the advantage of providing many different programmes." A great additional benefit was that, unlike a transmitter, it would not re-radiate and the signal would be constant and strong. He had originally proposed it to the BBC, but it was decided to leave it to private enterprise, so Capt. Eckersley initiated Rediffusion Ltd. on the lines of a public company. The first installation, with 1600 subscribers, was set up in Nottingham, chosen particularly because it suffered badly from trolley-bus interference. It was inaugurated in 1931 by the Lord Mayor. In 1934, 1935 and 1936 there were demonstrations by The Wire Broadcasting Co. through the electricity mains with the co-operation of the Chief Engineer of Liverpool Corporation Electric Supply Co.

Sir M. Sueter asked the Post Master General, Major Tryon, whether his officers were investigating Capt. Eckersley's system. Major Tryon said that the proposal was under consideration, the mains system would put it in reach of more people than the telephone lines, also under consideration, and encourage people to install electricity. There was a statutory ban on electricity companies using the wires for purposes of transmitting communications but this could be legalised at short notice by a one clause bill.

Capt. Eckersley was in the gallery to hear the question, as his ticket for the Distinguished Strangers' Gallery is included in his scrapbook. The Wire Broadcasting Co. had a share capital of £15000 and he was a shareholder, seeing wire broadcasting as an economical use of frequency space. The year was 1939, and war pushed the whole scheme into the backwaters of history. Debate continued in the technical papers during the war and concern was voiced about post-war broadcasting, but the increased capacity of manufacturers brought about by the war, and the experimenting with f.m. which was going ahead, diverted attention to new possibilities. Wired wireless was no longer viable. The name "Rediffusion" was an inspiration of Capt. Eckersley's. One idea which came out of all this was single sideband (s.s.b.). The Eckersley papers include a patent and detailed specifications dated 17 October 1934, for "Assymetric Sideband Broadcasting".

Hectic Activity

It is astonishing to realise that all this hectic activity occupied no more than six years of his life as Chief Engineer of the BBC. In 1931, he became the tenth expert to join the exodus from the Corporation. The *Daily News*, in its article on his resignation, named him as the "Pioneer of British Wireless" and "The man who made Radio possible. He is responsible," it continued, "for every development in Britain, including the new regional system shortly to be inaugurated. In fact, every listener owes to him the unrivalled service now supplied by the BBC."

Capt. Eckersley, gallantly referring every question about his reasons for leaving back to the BBC, joined TMC at St Mary Cray, as their general manager, but he was retained as a consultant.

Capt. Eckersley was a fluent and frequent writer, putting pen to paper in the form of technical articles, popular pieces for *Radio Times* and *Popular Wireless*, explaining in delightfully simple imagery, problems, new developments and how programmes were broadcast, and mountains of letters to listeners. He lectured to the Institute of Electrical Engineers, and little radio clubs alike with great enthusiasm and humour. He had the gift of making the obscure and complex, understandable to the merest beginner, and his lectures were accompanied by gales of laughter which regularly rocked his audiences. He loved looking into the future of broadcasting and was the author of several

This photograph was possibly taken at the Ideal Home Exhibition as a newscutting on the same page of his scrapbook referred to it. Capt. Peter Eckersly is in the centre.

spacetech

AUTHORISED DISTRIBUTORS NRSC NATIONAL REMOTE SENSING CENTRE

L. E. Hornby, 21 West Wools, Portland, Dorset DT5 2EA. Tel: 0305 822753

THE SPACETECH
ARCHIMEDES WEATHER SATELLITE PODULE

★★ *Moving Pictures from Space with photographic clarity and Colour* ★★

If you are looking to upgrade from your existing framestore or computer based system, the Spacetech expansion card for the Acorn Achimedes offers an unbeatable specification. At last for an affordable price, the amateur or enthusiast can install a truly professional system. Here are a few of the many features that you may like to compare with existing packages:

★ 256 colours on screen *at the same time.*
★ 84 grey levels on screen *at the same time.*
★ Smooth and fast pan and scroll over *entire* image in *maximum* resolution.
★ Automatic calibration from satellite data.
★ Maximum memory usage of available machine configuration up to 3.7Mb.
★ Animation of up to *200* compressed frames.
★ Animation of up to *58* High resolution frames.
★ Analogue zoom feature.
★ Entirely new digital signal processing techniques in software and hardware utilise the new RISC technology to its full capability.
★ Automatic data collection and update of animated sequence.
★ Hands off system — all hardware including receiver, fully software controlled.
★ Mono and colour printer dumps.
★ Data may be exported to utilities and art packages, e.g. Artisan.
★ Introductory price only **£259.95.**

The package sets an entirely new standard both for Weather Satellite decoding and for real time data handling. If you know of any system that comes anywhere near the Spacetech specification, for any less than twenty times the price — we would certainly like to hear about it!

DEMO DISCS £5.00: Interactive, animation or carousel (all 3 £10)

Our ATARI ST system will soon be on line: a picture is worth a thousand words — write or phone for our interactive demo: **£5.00 refundable.**

Systems also for the BBC	And for the I.C.S. Amigafax
DEMO £3.00	**DEMO £5.00**

Please write or phone for spec. sheets on our **ENTIRELY NEW** receivers
★ WXR1690 METEOSAT Receiver with remote control option ★
★ WXR137 VHF Satellite receiver with scanning ★

We have a large range of space-science resources and publications: books, satellite atlases, prints, videos, slides, posters, SWL equipment, etc. Write or phone for lists.

spacetech: The space-science and remote sensing specialists
Call us to discuss your requirements

RAYCOM

COMMUNICATIONS SYSTEMS LIMITED

APPROVED SONY SHORTWAVE CENTRE
TEL: 021-544-6767

SONY HANDHELDS

AIR-7 LW/MW/FM/AIR/PMR/MARINE £229.95
PRO-80 0.15-224MHz AM/FM/SSB £299.95

SONY MINIATURE TABLETOPS

ICF 5100 AM/FM+7 SHORT WAVE BANDS £77.95
ICF 7600DS 0.15-30MHz AM/SSB+VHF/FM £149.95
ICF SW1-S BRIEFCASE SHORTWAVE KIT £239.95

SONY TABLETOPS

ICF 2001D 0.15-30MHz AM/SSB +VHF +AIR £299.95

SONY ACTIVE ANTENNAE

AN 3 VHF FOR AIR-7 ..... £51.95
AN 1 SHORT WAVE £57.95

- ✔ WE HAVE A LONGSTANDING ASSOCIATION WITH SONY
- ✔ WE ARE AN APPROVED SHORTWAVE CENTRE
- ✔ ACCESS & BARCLAYCARD WELCOMED
- ✔ ORDER BEFORE 3PM FOR NEXT DAY DELIVERY
- ✔ ACCESSORIES & FREQUENCY GUIDES ALWAYS IN STOCK
- ✔ WELL EQUIPPED SERVICE WORKSHOP FOR BACKUP

RAYCOM COMMUNICATIONS
963 WOLVERHAMPTON ROAD
OLDBURY, WARLEY, W. MIDS B69 4RJ

ORDER HOTLINE
021-544-6767

NEVADA

THE UK's SCANNER SPECIALISTS

BLACK JAGUAR MkIII

The new Mark III is probably our most popular handhold scanner with 16 channels of memory and a sensitive receiver. Selectable AM or FM reception and the facility to power the set from the mains or car using one of the many accessories now available.
Frequencies: 28-30 MHz, 50-88 MHz, 115-178 MHz, 200-280 MHz, 360-520 MHz.

£199 NEW LOW PRICE

Black Jaguar Accessories

(suitable for all models, BJ200, Challenger etc.)

Mobile Mount £6.95
Base Mount £5.95
BJ1 Car Supply (Mk III version only) £14.95
BCA6 Mains Slow/Fast Charger £14.95
Airband Rubber Duck Antenna £6.00
SA7 UHF Stub Antenna £4.95

We are the UK Distributors for Bearcat Scanners

Handheld Scanners

Bearcat 55 XLT £99.00
Bearcat 70 XLT £149.99
Bearcat 100 XLT £199,99
Bearcat 200 XLT (including 900 MHz) £249.00

Base/Mobile Scanners

Bearcat 175 XLT £169.99
Bearcat 210 XLW £179.99
Bearcat 950 XLT (including 900 MHz) ..... **new low price** £229.00

NEW MODELS

Standard AX 700 - ***Just Arrived!***
This exciting new scanner with panoramic display and much more! * Frequency 50 - 905 MHz * 100 memory channels * 10 search channels
£575.00 (PSU Extra)

AOR 3000
Probably the most comprehensive scanner we have seen. Covering 100 KHz to 2036 MHz all modes:- USB, LSB, CW, NFM, WFM. And with 400 memory channels. An RS232 port allows connection to a computer
£765.00

Cobra SR925 -
Comprehensive base scanner covering
29-54MHz 118-174MHz 406-512MHz £149.00

OTHER MODELS

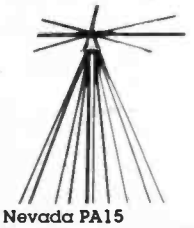
AOR 900 h/held with 900 MHz £235.00
AOR 2002 base with full coverage £487.00
Sony Air 7 handheld - airband £249.00
Sony pro 80 handheld - wideband £349.00

NEW LOW LOSS JAPANESE COAX

For best performance with wideband UHF scanners. We have directly imported this cable which has exceptional low loss.

Frequency	5D	8D	10D
Loss/mtr @ 100 MHz (dB)	0.055	0.039	0.031
Loss/mtr @ 400 MHz (dB)	0.121	0.085	0.068
Loss/mtr @ 1 GHz (dB)	0.187	0.130	0.105
Price per meter	£0.56	£1.40	£1.99

DISCONE ANTENNAS - *New British Made Antennas*



Nevada WB1300
(25-1300 MHz)
Wideband Top of the range stainless steel
£59.95

Nevada Discone
(50-700 MHz)
High Quality
8 Element
£24.00

Nevada PA15
Base Antenna 100-960 MHz. A new Colinear Ant with over 9dB gain at 900 MHz **£49.95**
(+£4.60 P&P)

NEW BUMPER CATALOGUE £2 Includes £20 worth of vouchers

USE YOUR CREDIT CARD FOR IMMEDIATE DESPATCH
***HOTLINE* (0705) 662145**

NEVADA COMMUNICATIONS
189 London Road, North End,
Portsmouth PO2 9AE. Telex: 869107

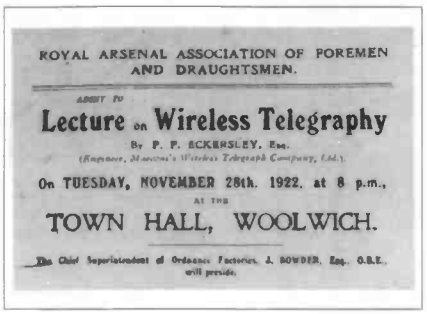
THIS IS TWO EMMA TOC

pieces on the subject. In 1925, he wrote for *Radio Times* an article entitled, "A dream of the future." In his dream, the BBC had gone. The British Branch of International Broadcasting had replaced it. No school was without a wireless, and the elderly Chief Engineer (himself) took him to a vast concert hall where the first edition of the news was being broadcast as instantaneous moving pictures and sound in stereoscopic reality from New York. Broadcasts by unpopular public figures were often jammed by their opponents using triangulating airships, but this could rapidly be coded out by the engineers. Home sets ranged through what individuals could afford, from stereoscopic sound and picture sets to the "old fashioned people" owning multi-valved sets with loud speakers.

Cherished Dreams

It was inevitable that a man like Peter Pendleton Eckersley would be critical of the BBC, an attitude which he maintained until 1945. He wrote *The Power behind the Microphone*, in 1941 which stated his views very clearly, views which he was not backward in bringing to the notice of the BBC itself. Twenty years later, he wrote to them again, congratulating them on their high standards of technical achievement and programme content.

He lived long enough to see many of his


ROYAL ARSENAL ASSOCIATION OF FOREMEN AND DRAUGHTSMEN.

ABOUT TO

Lecture on Wireless Telegraphy

By P. P. ECKERSLEY, Esq.

(Engineer, Marconi's Wireless Telegraph Company, Ltd.)

On TUESDAY, NOVEMBER 28th, 1922, at 8 p.m.,

AT THE

TOWN HALL, WOOLWICH.

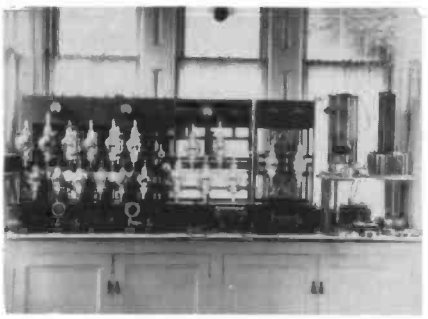
The Chief Superintendent of Ordnance Factories, A. BOWDEN, Esq., O.B.E., will preside.

Ticket for a Lecture on Wireless Telegraphy given by Capt. Eckersley in November 1922.

own cherished dreams made fact, including the introduction of commercial TV, and served on the Pilkington Committee. In spite of his early reservations about TV giving its customers a quality service, he enjoyed it very much in its later stages.

The surprising thing is, that whilst so many of his friends and colleagues from those early days reaped the rewards of their work, Capt. Eckersley, with all his achievments and public service, including the founding of the national broadcasting network which we enjoy today, should only be remembered if at all, as the humourous voice of "Two Emma Toc."

I am most grateful to Myles Eckersley and Joan le Grand for allowing me to see and use material in the family scrapbook, and for


Was this P. Eckersley's own private laboratory at Hendon?

talking to me about their father.

For those interested in reading more about the life of this remarkable man, I suggest the following books:

The Power Behind the Microphone. P.P.Eckersley

2MT Writtle. The Birth of British Broadcasting. Tim Wander. Capella Publications, 1988.

Sequel

As reported in *SWM* April 1989, Capt. Peter Eckersley has now been commemorated by a plaque erected in the Chalk Pits Museum Wireless and Communications Exhibition and unveiled by his son, Miles and daughter, Joan Le Grand. □

ANTENNAS

18☞

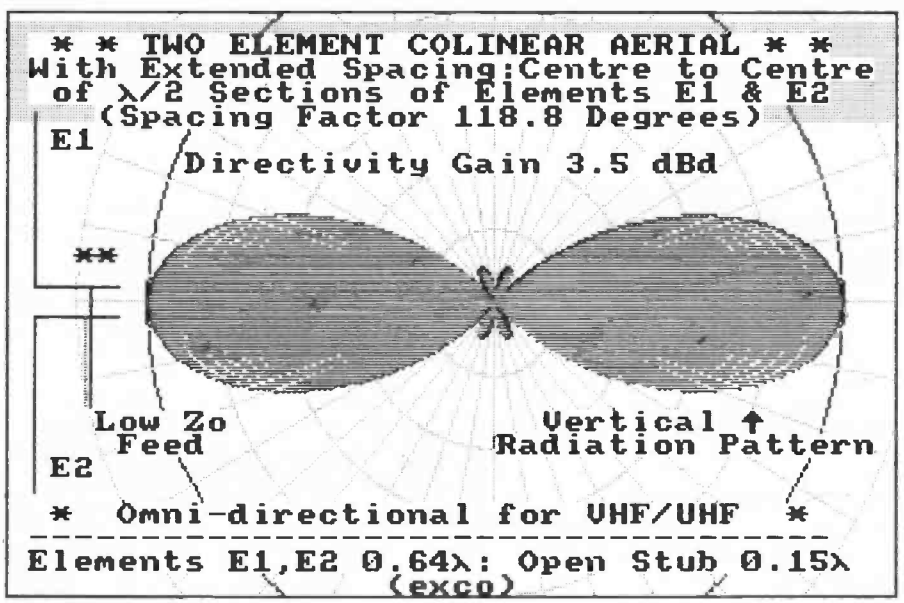


Fig. 6.4: Vertical radiation pattern of 2-element collinear with extended electrical spacing between centres of half-wave sections (0.66λ, 118.8°).

with greater electrical spacing between each half-wave element, as shown in Fig. 6.3(c). The vertical radiation pattern is shown in Fig. 6.4 - which is similar to that obtained from vertical collinears with close-spaced elements. However, because of the effective wider spacing between the 2 half-wave portions of the otherwise 0.64 wavelength elements 1 and 2, the directivity gain is 3.5dBd.

The prototype of this antenna, shown in Fig. 6.5, is mounted on a horizontal support. This is to avoid interaction occurring if it is


Fig. 6.5. Prototype of 2-element collinear with extended half-wave element spacing, see text.

Abbreviations	
dBd	gain relative to a half-wave dipole
h.f.	high frequency
λ	wavelength
MHz	megahertz
m	metre
u.h.f.	ultra high frequency
v.h.f.	very high frequency

mounted on a metal mast, as was the prototype when initial tests had been completed.

Next time we will consider broadside and endfire systems, and the cubical quad. □

References

[11] *Wires and Waves*, PW Publishing Ltd.

PHILIPS D-2999 WORLD RECEIVER

Mike Richards

The new D-2999 all-band receiver from Philips is a very attractive looking piece of equipment with the styling being a unique combination of communication receiver and portable radio. The frequency coverage included v.h.f., long and medium wave broadcast plus continuous coverage from 150kHz to 29.99MHz. With such an interesting design Mike Richards was intrigued to see just how well it performed.

The D-2999 arrived very well packed and included several items of documentation to help the new owner get going.

The operating manual comprised an A5 booklet printed in eight languages including English, French, German, Dutch, Spanish, Italian, Swedish and Norwegian. This meant that each language had about six pages of information. The standard of English was quite readable but a little odd in places, showing that it was a translation rather than original text. Despite the small number of pages in the manual, I found the instructions to be quite clear. The only diagrams used were contained on one fold-out sheet showing three different views of the D-2999. Each of these diagrams had all the controls numbered to help identification from the text.

In addition to the operating manual there was an interesting A4 sized booklet, again in eight languages, titled *World Receiver*. This book contained three pages of English text and explained some of the theory of short wave listening. Topics covered included: broadcast bands, propagation, amateur signals and bands, s.s.b. reception and antennas. Although it's not possible to give much detail in such a small space the information was quite interesting and well presented.

For the technically minded a circuit diagram was included, which seems to have been standard practice with Philips equipment for some years. Although small print was used for the diagram, the type face was very clear so the diagrams were readable with no problems.

The final information supplied was a set of four postcards addressed to Radio Canada, Swiss Radio, Radio Netherlands and Radio Sweden respectively. The object of these cards was that, if you fill in your name and address, the radio stations will send you a free programme schedule. This seems to be quite a good idea, at least for the broadcast band enthusiast.

Having unpacked everything and glanced through the manuals I was obviously keen to get powered-up and working. The power supply options seemed to be very versatile. If you are operating at home you can use a mains supply via the built-in mains unit which can accept 110/127 volt or 220/240 volt at 50/60Hz. The two supply voltage options being selected via a switch next to the mains lead socket.

If you are away from a mains source then battery power can be used in the form of six D cells or equivalent, which fit into the battery compartment in the base of the D-2999. If you have a local supply of 9-14 volt d.c. available, this can be utilised via the external power socket on the side panel.

As with most modern receivers which have clocks and programmable memories a back-up power supply is required to keep the clock running and preserve the memory contents when the main power is turned off. The D-2999 uses three AA cells which are required regardless of which power source is used for the receiver. The life of these back-up batteries is very dependant on how much the receiver is used, but Philips quote two months if the receiver is not used at all and about a year under "normal" usage.

With all the power options sorted out the next thing to look at was the antenna. As the set is designed as a portable unit is has antennas built in for all its operating modes. For v.h.f. and short wave a telescopic antenna is used which has two length settings. The shortest is 780mm which is optimised for v.h.f. use while the longer 1.6m setting is intended for short wave listening. Long and medium wave reception is achieved using a conventional feritte rod antenna, giving the advantage of compact size whilst providing some directionality to minimise interference. One snag was that there was no means for turning the ferrite antenna without turning the whole receiver, which is not always convenient.

Although the internal antennas are fine for portable use, in order to obtain optimum performance, especially on short wave it is important to use an external antenna. With the D-2999 this was achieved via two sockets on the rear panel, one for v.h.f. and the other for the remaining frequencies. The sockets used were 75 ohm DIN types which are not very common in the UK but as two solderless connectors were supplied with the receiver this should not prove to be too much of a problem. Before these sockets could be used, the appropriate ext. antenna switch had to be operated in order to cut-off the internal antennas. The provision of these switches is essential if the interference rejection qualities of an external antenna are to be fully realised. My earlier criticism of inconvenience of having to turn the receiver to eliminate interference from adjacent stations can be resolved by connecting an external loop antenna to the appropriate external antenna socket.

In addition to the power and antenna connections there were a few other facilities worthy of mention.

There was a five-pin DIN and phono socket on the rear panel, wired in parallel, carrying the audio output of the D-2999 extracted before the volume control. This was ideal for connection either to an external amplifier, tape recorder or utility station decoding equipment.

Still with audio signals, there was a standard DIN speaker socket which could be used to connect an external 4 ohm speaker. When a plug was inserted the 175mm internal speaker was disabled, but the 75mm speaker remained on. When in this condition the front panel speaker switch enabled selection of either the 75mm only or the 75mm plus the external speaker.

The final external connection was the provision of a headphone jack on the front panel. This was a standard 6.3mm type and was wired to accept normal 8-16 headphones. Incidentally when a jack is inserted in this socket all internal and external speakers are disabled.

Operation

With all the interconnections sorted out the next step is to discover what all the controls do! As you can see from the photograph most of the controls are mounted on the top panel of the D-2999, although when used in its intended operating position this panel becomes the front panel!

The centre piece is the S-meter and frequency display. The frequency display is a conventional l.c.d. unit with the main digits being about 10mm high which should prove easy to read for most people. The S-meter is a conventional moving coil unit but is cleverly styled and backlit to match the l.c.d. unit.

Powering-up the D-2999 simply consisted a single press of one of the chrome buttons which run the full length of the front panel. The only thing I felt was missing here was a timer function which can be very handy for recording programmes when you are busy. As the D-2999 contained a clock I would have

PHILIPS D-2999 WORLD RECEIVER

thought that this would have been a comparatively easy feature to include.

The audio section is provided with plenty of controls to allow the best reception of a wide range of signals. The basic controls comprised volume, treble and bass which were all grouped together for convenience. One rather unusual feature was the inclusion of two speakers, a 75mm unit of the front panel and a larger 175mm unit on the top panel. The 75mm was the main speaker but using one of the chrome buttons on the front panel the 175mm unit can be switched on as well. The beauty of this system was that you could choose the appropriate speaker combination for the type of signal you were receiving.

Having sorted out the audio, it was time to try tuning around. One thing I was very pleased to see was a nice 30mm rotary tuning knob. Perhaps I'm just old fashioned, but I still find this type of control far easier to use than the UP and DOWN buttons used by many receivers.

In addition to this rotary control, there was a direct entry keypad. This was very effective for rapid frequency changes or alternatively if you know the exact frequency of the station you want to monitor. Personally I find the combination of direct entry and rotary tuning to be ideal for short wave listening. Frequency entry using the keypad was very simple and the logic used automatically inserted trailing zeros, saving a lot of time.

Still on the subject of frequency entry, no modern microprocessor controlled radio would be complete without a set of programable memories and the D-2999 is no exception. On the Philips these memories are called presets and there are a total of 16 available. These are arranged as four groups of four numbered A to D, 1 to 4. As with manual frequency entry, storing frequencies in these presets was very easy. All you do is tune to the frequency you want to save, press the STORE button and select the preset to use with the separate preset keypad. It was so simple I even managed to work it out before I read the manual!

As well as the tuning methods I have described so far, the D-2999 includes band selection for all the main broadcast bands. The fourteen band selection buttons were all mounted along the top of the front panel. Pressing one of these immediately changed the operating frequency to the low frequency end of the selected band which was quite convenient. In addition to eleven short wave bands there were buttons for l.w., m.w. and f.m. The actual frequency coverage was rather wider than quite a few other all-band radios and extended from 150kHz to 29.99MHz

For the keen short wave listener there were one or two other facilities designed to make life easier. The first was the provision of a bandwidth switch with two settings - wide or narrow. Having studied the supplied circuit diagram, I discoved that this switch actually altered the i.f. bandwidth by selecting either a single or dual filter for the second i.f. I was pleased to see that Philips had done the job properly as there are some sets about where this bandwidth switching occurs at audio which is nowhere near as effective.

Any regular listeners will no doubt have experienced the problems of receiver overload due to the high signal strengths that can occur sometimes. The D-2999 is provided with two methods of reducing this problem. The first is a simple diode switched attenuator marked LOCAL/DIST which should prove adequate for most situations. If however, you require more control, you can defeat the internal a.m. automatic gain control and use the manual gain control on the front panel.

Last, but by no means least, the utility and amateur enthusiast will be pleased to hear that the D-2999 is fitted with a b.f.o. The b.f.o. is enabled by a push-button and then tuned by a rotary control on the front panel. For those of you who are not sure of the significance of the b.f.o., it allows the reception of single sideband signals used by amateurs and a number of commercial services. The b.f.o. also opens up the world of utility station listening provided the operator has a computer and suitable software.

Performance

My first impressions of the D-2999 were that the physical size was just about right, i.e., big enough to look impresive whilst not being so large as to be cumbersome! I started the review by evaluating how well the set performed using the internal antennas and I was pleased with the results. The f.m. reception was very good, but then I only live about 48km from the main transmitter. I subsequently tuned around and found many DX stations which were resolved very well. Incidentally, the telescopic antenna has click-stops to control both its vertical and horizontal movement. I found this very convenient as you could set the antenna at virtually any angle and it would stay there!

Whilst listening to high quality f.m. signals the additional 175mm speaker came into its own, giving a very pleasant sound quality indeed.

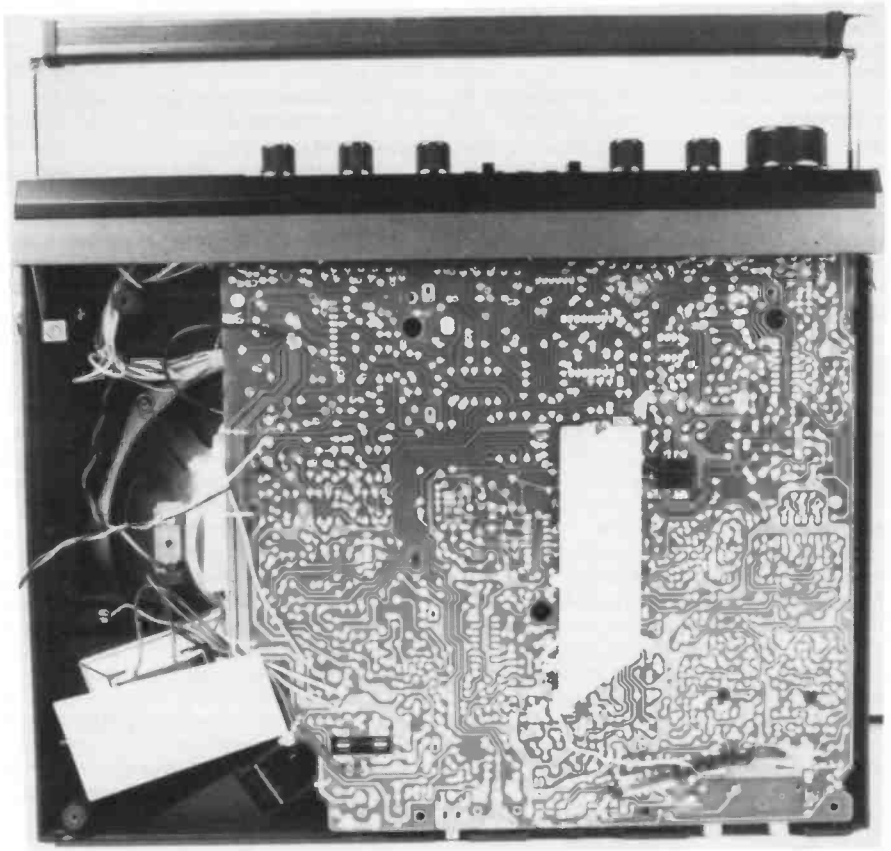
Moving on to l.w. and m.w., again the performance was fine using the internal ferrite rod antenna, though for serious DXing I would recommend using an external directional antenna.

When getting onto the short wave bands I discoved an extremely practical built-in feature. It involves the small l.e.d.s next to each of the band selection buttons. I assumed, incorrectly, that they were just wired up to the switch to give an indication that the button had been pressed. The truth was much more interesting! They give an at-a-glance indication of where you are in relation to the broadcast bands.

If you are tuned to a station in a broadcast band then the appropriate l.e.d. will light, however if you tune outside the band two l.e.d.s will appear indicating which two bands you are between. I found this extremely helpful as I'm always forgetting the band limits when tuning around. This system overcomes the problem as you get a very clear indication when you are tuned outside a broadcast band. Well done Philips!

Another feature was that the rotary tuning control remained active regardless of which frequency selection method was used. This was particularly useful with the presets. If, for example, you listened to the 14MHz amateur band regularly you could store 14MHz in a preset and effectively use it as a band switch.

The minimum frequency steps when using manual tuning was 1kHz on the short wave bands and 9 or 10kHz for long and medium wave, depending on the switch settings on the bottom panel. One important point about the manual tuning was that there



☞56

INTRODUCTION TO DX-TV

Keith Hamer & Garry Smith

Part 18

In this article, some of the more unusual types of propagation which effect DX-TV reception are discussed. Keith and Garry also examine the irregularities of the many African openings which were encountered during Solar Cycle 21.

There are a number of other propagational modes we haven't yet discussed in this series of articles which will support TV reception over long distances. In many respects these have limited appeal to the beginner since they are much more obscure and harder to recognise than the more familiar types such as Sporadic-E and enhanced tropospherics. However, it's best to be forewarned about the more elusive types of propagation since it would be a pity to dismiss such reception as insignificant if by chance you experienced it without realising it!

Trans-Equatorial Propagation

Trans-equatorial propagation (t.e.p.) is associated with the break-up of the F1 and F2 layers which occur towards sunset when they begin to form a single layer some 400km above the surface of the earth. It is during this breaking up process that signal scattering occurs and allows the reception of Band I transmissions to occur over considerable distances.

This type of propogation normally favours a north-south signal path although east-west paths have been known to occur around the equatorial regions. Reception via t.e.p. normally occurs within a limit of 40 degrees north and south of the equator but increased sunspot activity can modify the range of signals thus greatly extending their range. Occasionally these find their way into the UK although there are times when Sporadic-E propagation gives a helping hand.

In the UK, most reported instances of reception have been confined to the lower portion of Band I around 50MHz although in other areas of the world, especially those which lie closer to the equator, transmissions on the higher Band I frequencies are common.

Reception via t.e.p. is normally experienced from mid-afternoon onwards, although the optimum time seems to be between 1700-1900UTC. The most favourable times of the year to witness such propagation is around the vernal and autumnal equinoxes, namely, March-April and September-October. There is also increasing evidence that t.e.p. is possible even during low periods of solar activity. For instance, Zimbabwe was still being received in the UK (via a combination of Sporadic-E and t.e.p.) during the summers of 1983/84.

Due to the rotation of the sun, there is a tendency for any propagation activity to recur after approximately 27 days.

Auroral Propagation

During magnetic storms which occur in the sun's photosphere, auroral activity increases and extends a greater distance from the earth's polar regions than normal. This activity is also responsible for the sometimes spectacular and colourful visual effect known in the northern hemisphere as the Aurora Borealis or "Northern Lights". The optimum times of the year for auroral activity to occur is around the equinoxes during March or September, although it can occur outside these periods.

From the North

The ionised reflecting plane, or auroral curtain, is formed vertically and signals travelling towards the polar regions will return often at very narrow angles. Sometimes the signal penetrates the curtain some way before reflection actually takes place. In the northern hemisphere, antennas should be directed towards the north for maximum signal pick up. Auroral activity is experienced more towards the polar regions so consequently DXers in Scotland will encounter this mode of propagation more frequently than someone located in the south of the United Kingdom.

Auroral activity is usually experienced in two phases - one during the afternoon and another during the evening. Either phase can be the stronger and there is a tendency for activity to recur after 27 days. Depending upon the severity of the magnetic storms, auroral propagation can be repeated daily for anything up to a week.

Recognising Auroral Activity

A rapid flutter tends to modulate the signal causing humbars on pictures which may severly distort the image. The modulation effect can make audio carriers totally unintelligible, although there are times when they seem perfectly clear. In addition, the carriers can be rough and noisy producing an effect not unlike a loose and intermittant antenna connection! Listening within the band usually confirms the presence of auroral activity. Apart from the effects just mentioned, a characteristic sleigh-bell sound is often present coinciding with the various carriers. This is quite a

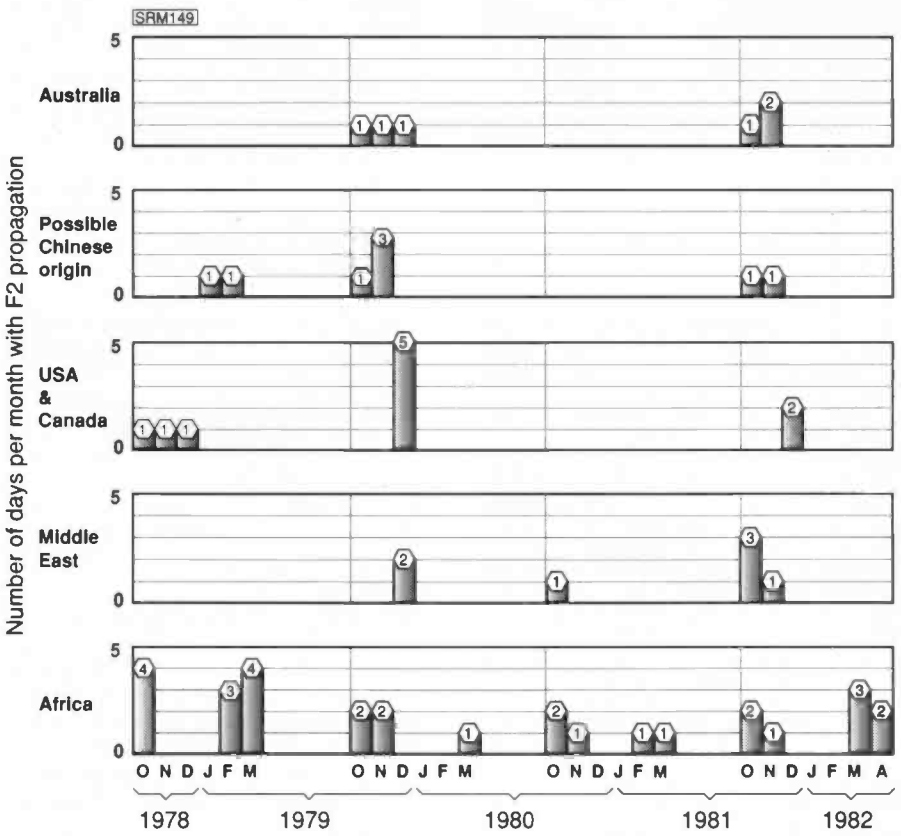


Fig. 1: Instances of TV reception from the various areas throughout the world (excluding USSR).

pleasant but mysterious sound to experience, but once heard it is never forgotten!

Occasionally Band III frequencies are affected by auroral propagation, although the effects become noticeably weaker towards the upper end of the band. Several years ago, one of the authors located various carriers which corresponded to the American Band III channel frequencies. Unfortunately the distortion was so overwhelming that video information could not be deciphered.

Lightning Scatter

The main ingredient for lightning scatter to occur is, not surprisingly, a jolly good thunderstorm! Experience has shown that a storm approaching from the Continent, rather than a local one, produces the desired effects. Distant storms can be initially detected by listening to the resultant crackle on the long-wave band.

The lightning strike tends to ionise the surrounding atmospheric layers which in turn refracts signals leaving the earth. Pictures of brief duration are experienced which tend to resemble meteor-scatter DX reception. In many cases the signals are fairly short-skip. It is not uncommon for u.h.f. channels to be propagated by such means and there have been examples of Dutch and Belgian transmitters identified during storms. One word of warning - although it may be tempting to operate the receiving equipment during a severe thunderstorm, especially if you've already had some success with this type of reception, it is best to resist. Unplug all the equipment and just hope that the antennas and mast-head amplifiers survive!

Aircraft Reflection

Enthusiasts living close to a flight path often experience bursts of short-skip DX reception where signals have been intercepted and reflected back to earth by an aircraft progressing along a high-altitude flight path. Observations may occur at specific times of the day which may coincide with certain flights or routes. Transmissions at v.h.f. and u.h.f. frequencies are affected and again the reception strongly resembles meteor scatter propagation.

Another Type of Propagation?

Recently, Joop Prosee (a DX-TV enthusiast in the Netherlands) prompted a discussion as to whether Sporadic-E reception consisting of more than a single-skip distance is, in fact, feasible. As we've mentioned several times in the past, a single-skip distance is typically 1800km (1100 miles) but occasionally signals romp in from more than twice that distance which is naturally explained by the double-hop or multi-hop theory.

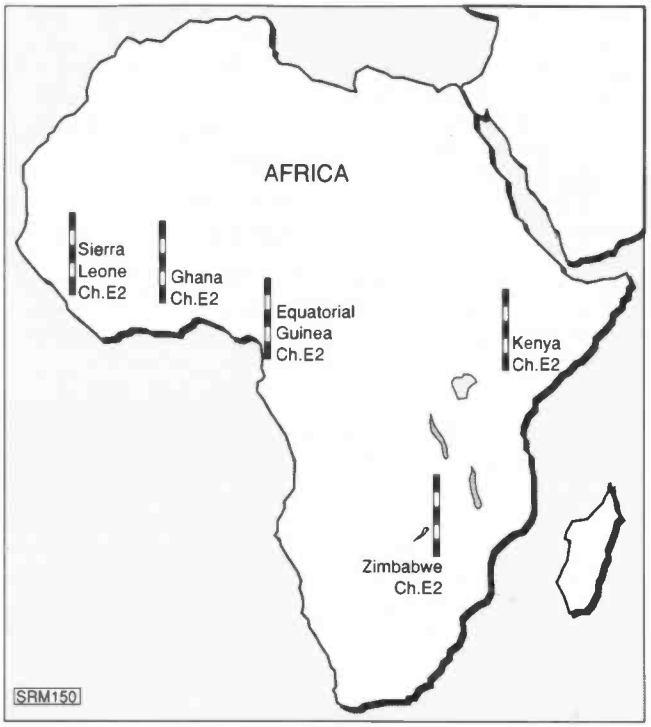


Fig. 2: Although few Channel E2 transmitters are operating in Africa, widespread F2/t.e.p. conditions meant that signals were regularly observed.

Some of the supposedly double or "multi-skip" DX reception has lasted for a fair length of time, maybe half an hour or more. Although examples of such reception are infrequent, the double or "multi-skip" theory sounds rather dubious when one considers the various "chance" aspects involved, namely, two refracting layers and an earth reflection is necessary to complete the process. On top of this, both the refracting layers would have to remain stable for a considerable time for sustained reception to occur - and this is not one of Sporadic-E's strong attributes! According to the correspondent, if double-hop Sporadic-E did occur, the received signal strength would be in the order of "moonbounce" quality and would not be detectable by the relatively simple arrays normally used by TV DXers. As a consequence the likelihood of triple-hop Sporadic-E would be zero!

In reality the signals which we assume to have arrived by double-hop sporadic-E propagation can be fairly strong and sustained. This implies that if double-hop Sporadic-E does not exist then a single-hop of up to 5000km (3100 miles) or even another form of propagation (or a combination of modes) must be responsible.

Maximum Skip

There has to be a maximum skip distance because of the limits which are imposed by the height of the refracting region and the curvature of the earth. A point is eventually reached where a very shallow angle of refraction will permit a signal leaving the earth at a tangent to arrive at a tangent, namely, with zero radiation and reception angles.

Mystery Propagation

But what about reception over distances that are obviously in excess of the extreme single-hop suggestion? The correspondent also speculates that a form of propagation, previously unexplored, could be the cause of some of the exceptionally long reception paths encountered at v.h.f. frequencies between 40 and 100MHz. He offers the theory that such propagation could be of a "tropospheric" nature rather than the ionospheric category into which Sporadic-E propagation falls. However, it is not to be implied that the propagation is directly connected with the normal-range tropospheric type of reception with which DX-TV and amateur radio enthusiasts are familiar with on the upper v.h.f. and u.h.f. bands.

Strange Event

On 6 June 1988, radio amateurs and DX-TV enthusiasts throughout northern Europe witnessed a truly fascinating

trans-atlantic opening lasting several hours with an m.u.f. (maximum usable frequency) approaching 80MHz. Signals were first discovered around 2200BST and were still evident, albeit weaker, at 0100. Reception on the higher USA TV Channels A4 and A5 produced reasonably clear pictures but vision signals on the lower Band I Channels A2 and A3 were virtually impossible to decipher because several stations were present at once. Signals were remarkably constant for much of the time. Stations which were identified from the audio channel offset frequencies were found to be spread along the east coast of the USA from South Carolina to Newfoundland, located off the Canadian coast! This means that reception distances ranged from 3600km to almost 6800km.

When the time of reception, the vast spread of the transmitter locations and the signal stability are all taken into account then Sporadic-E propagation does seem unlikely. Joop Prosee offers the following arguments in favour of the propagation encountered on June 6 being of a "tropospheric", rather than an ionospheric, nature:

1. Tropospheric reception paths of thousands of kilometres do exist over both the Atlantic and Pacific Oceans (Hawaii to California is one example).
2. Tropospheric reception of Iceland has been possible on Channels E3, E4, E6 and E7 in the Netherlands and Belgium via a long sea path.
3. The areas on both sides of the Atlantic affected by reception such as occured on June 6 & 7 are too extensive to be due to normal ionospheric propagation such as sporadic-E.
4. All known trans-atlantic reception, e.g., 1974, 1982, 1987 and 1988, has ocurred in June and July of those years.
5. The optimum time for reception seems to be in the late evening around 2200UTC which is not a favourable hour for normal ionospheric reception.
6. On June 6, the higher frequencies, for example, Channels A4 and A5 were better propagated than the lower ones - a typical characteristic with most tropospheric modes.
7. The extremely long duration of some trans-atlantic reception - a 12-hour opening once occurred.
8. The m.u.f. on June 6, which he estimates was almost 90MHz at times, is considered to be extremely high for ionospheric reception.

Joop Prosee concludes by saying "Proving the 'tropospheric' theory seems not too difficult since this type of propagation is effected by weather conditions - usually anticyclonic systems. Therefore, if weather reports concerning eastern North America, the north Atlantic and western Europe pertaining to the day of reception are examined and they show major similarities it is then inevitable that the propagation was a tropospheric phenomenon".

Solar Cycle 21 Observations

We now continue with the observations made in the United Kingdom during Solar Cycle 21 which peaked around 1979/1980. Virtually all the extreme distance east-west reception during the period 1978-1982 could be attributed to F2-layer propagation. Unfortunately African reception wasn't as cut and dried and there may have been other types of propagation involved, such as t.e.p. as we discussed earlier in this article.

African Encounters

ZTV-Zimbabwe from the Gwelo transmitter on Channel E2 was frequently received in the United Kingdom and at unexpected times of the day. The best months for reception were October, November, February and March - see

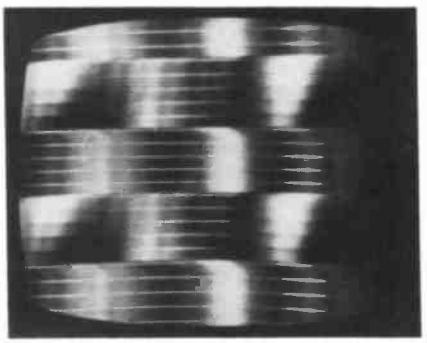


Fig. 3: Chequerboard test pattern from Zimbabwe on Channel E2.

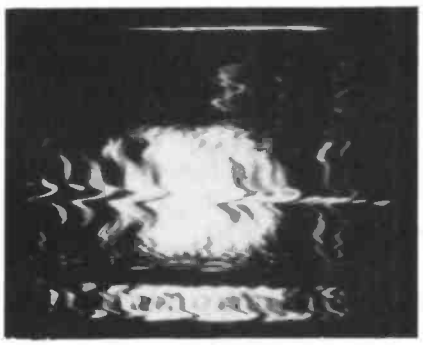


Fig. 4: An African identification caption observed on 25 October 1980 on Channel E3. The transmitter is thought to be located in Nigeria.

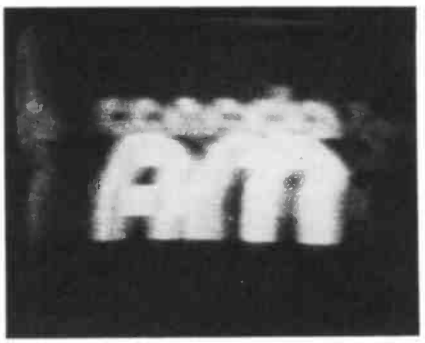


Fig. 5: A clearly readable *Breakfast TV* caption from Canada, observed on Ch. A2 (55.25MHz) via F2-layer propagation during Solar Cycle 21!

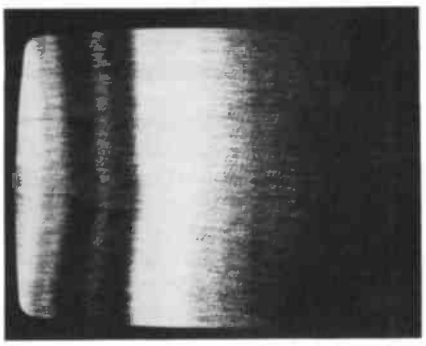


Fig. 6: A pulse and bar test pattern received on Channel E3 on 18 October 1981. Despite its relative clarity the source of transmission was never identified.

Fig. 7: Unidentified YL presenter seen during an F2 opening on 15 January 1989 on Channel E2. The time of the opening, between 0840 and 0920UTC, suggests that the signal could have originated in a country as far east as Malaysia.

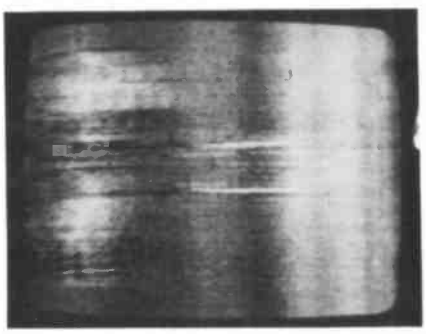


Fig. 8: A caption seen during the same opening. The two lines of text in the centre of the picture resemble Arabic script.

Fig. 1. During these months, it was logged almost daily in the east of the UK where extremely low-level signals could be detected in the absence of a British Channel B2 local to hinder reception. Unfortunately, the authors had to contend with the problem of sound-on-vision interference from the BBC-1 transmitter at Holme Moss on channel B2 - its sound carrier coincided with the E2 vision frequency.

With low-level E2 video it was possible to detect the vision buzz intermingling with the Holme Moss sound, even though the video information could not be resolved. This provided an accurate and reliable method of knowing when low-level signals were present on this channel. A method of phasing out the Holme Moss sound channel was eventually discovered, thus leaving the frequency clear for incoming channel E2 video signals.

Very Weak Signals

Band I reception from the African Continent was, on the whole, notably far weaker than that normally encountered from the east or west. Signals were virtually at "noise level" on numerous dates even when using i.f. stages with reduced bandwidth. Of course, such signals were almost undetectable on a normal receiver with wideband i.f. stages.

It is thought that most of the weaker signals might have been due to an alternative mode of propagation, such as t.e.p., or a combination of F2-layer and t.e.p. This might explain why many of the African transmitters were logged from mid-afternoon onwards (and sometimes as late as 1800UTC) rather then around mid-day bearing in mind the theory about noon occurring at the midway point as discussed in the previous articles.

Occasionally, strong signals did emerge, usually around noon, which exhibited all the typical characteristics of F2-layer propagation. There were very few instances of African transmitters on channel E3 being received, although on 25 October 1980, very strong signals from the south-west were observed.

Unidentified African Reception

Test transmissions from unidentified African countries were regularly observed during the mid-afternoon period. Simple test patterns composed of thin vertical stripes or sets of frequency gratings similar to a multiburst pattern were frequently resolved but there was never any follow up in the form of a conventional test card or station opening sequence. It is thought that many of these signals could have originated in Ghana since the receiving antennas had to be directed to the south-west.

In Retrospect

From experience gained by other enthusiasts around the world during the late 1950s sunspot maximum, it was expected that *any* televsion transmission would suffer from multiple-image distortion and that signals would exhibit a characteristic smearing effect. This indeed was usually the case during Cycle 21 on channels below 50MHz from Russian, Asian, African and Australian television services. Some of the clearer pictures were noted during the initial phase of the F2-layer opening and this proved to be the optimum time for identifying reception.

Also, it was found that signals on higher frequencies from the USA and Canada appeared more like steady Sporadic-E reception with some, but not excessive, ghosting especially during the initial reception phase. As with Sporadic-E propagation, the clearer and more consistent results tended to occur on the higher channels which lie closer to the m.u.f.

With other forms of propagation such as Sporadic-E or tropospheric, the reception of very low-power television transmitters is not uncommon. Unfortunately with signals originating mainly from unknown transmitters during the F2-layer openings it was impossible to ascertain whether reception from low-power transmitters occurred over vast distances.

It was initially assumed that most of the transmitters would be of reasonable power with e.r.p.s in the region of 10-100kW but the variety of other communication signals received via F2 propagation indicates that signals from very low-power sources can be present. For example, USA amateur radio operators on the 50MHz band were frequently noted at high strength during solar cycle 21. Within the last couple of years, UK and European amateurs have worked distant countries such as Namibia on frequencies around 50MHz via F2 or t.e.p., although transmission powers are not known. During recent F2 openings at the beginning of 1989, cordless telephone systems operating around 46MHz have been received via F2 propagation with e.r.p.s estimated to be no greater than between 5-10W.

Widespread Activity

Propagation via the F2-layer was found to affect an extremely large area and, unlike Sporadic-E propagation, reception was not localised or confined only to one small area. The number of sightings and the relatively few channel E2 transmitters operating in Africa suggests that this must be the case, especially when the relatively large number of encounters are taken into account - see Fig. 2. In some respects it is disappointing that the various African countries do not make greater use of channel E2 but on the other hand too many transmitters sharing the same channel would only result in a severe jumble of signals during F2-layer conditions.

The Future

The next opportunity to exprience broadcast television transmissions via F2-layer propagation on a grand scale should present itself over the next year or so. Initially, there were conflicting predictions as to whether the m.u.f. would rise high enough to support television broadcast frequencies. However, the instances of reception in the United Kingdom since the end of October 1988 suggest that we could be in for a real treat!

Should the inevitable happen and the forthcoming solar cycle peak turns out to be a damp squib, despite the latest optimistic predictions, we may have to wait another eleven years or more before there is another chance to experience world-wide reception on such a grand scale. No doubt by then, the various broadcasters and governments may decide that television at v.h.f. frequencies should be abandoned in favour of u.h.f. or satellite broadcasting.

Solar Cycle 22 Update

Further examples of F2-layer reception have occurred since the end of 1988 with activity mainly confined to channel E2, the lowest Band I channel, with signals from the Middle East and possibly Malaysia. On January 13, pages of Arabic text were noted on Channel E2 prior to the station opening. The signal is thought to have originated in Dubai since the service is known to radiate pages of text before programmes commence.

January 15 has been the most spectacular day so far with channel E2 video from, we suspect, Malaysia between 0840-0920UTC followed by USSR signals on channel R1 from 1000UTC onwards. During the afternoon there was a report of very weak 525-line signals on Channel A2 (55.25MHz) for well over an hour. □

Abbreviations	
BST	British Summer Time
e.r.p.	effective radiated power
i.f.	intermediate frequency
km	kilometre
kW	kilowatt
MHz	megahertz
m.u.f.	maximum usable frequency
t.e.p.	trans-equatorial propagation
u.h.f.	ultra high frequency
UTC	Co-ordinated Universal Time (=GMT)
v.h.f.	very high frequency
YL	young lady

GAREX THE SCANNER SPECIALISTS

POPULAR SCANNERS

AOR900UK inc UHF Airband	£235
BJ200 MkIII wide coverage	£199
Cobra 925 Economy Base	£149
Uniden 200XL inc 900MHz	£249
Uniden 50XL FM handy	£99

AOR 2002

* Covers: 25-550MHz, 800MHz-1.3GHz
* AM & NFM & WFM on all bands
* Computer interface socket
* 20 memories
* Compact size
* 12V dc operation
* Up/down step control knob

£487

REVCO RS-3000

THE COMPACT SCANNER

* Size only 6"×2"×8"
* Covers: 26-32MHz, 60-90MHz, 118-180MHz, 380-512MHz
* AM & FM all bands
* Liquid crystal display
* 50 memories
* Scan, search, priority

£225

AOR 800E

THE SMALLER HANDY-SCANNER

* Covers: 75-106MHz, 118-175MHz, 406-496MHz, 830-950MHz
* AM & NFM programmable on all bands
* Full scan & search functions are available
* 20 memories
* Measures only 2.5"×5.5"×2"
* Nicads, charger & BNC whip antenna included in the price

£199

JIL SX-200N

THE SUPERIOR SCANNER

* The choice of the professionals
* Proven reliability
* Covers: 26-88MHz, 108-180MHz, 380-514MHz
* AM & NFM on all bands
* Positive action keyboard
* 16 memories
* 12V dc & 240V ac

£325

NEW IMPROVED REVCONE

The British made REVCONE already renowned throughout the world has now been improved with a new exclusive feature. The addition of a vertical element to a discone has been shown to improve the performance on a selected band

Now the REVCONE offers YOU the choice of band

All new REVCONES supplied by us now incorporate a mounting stud for an optional vertical whip for the band of YOUR choice. Whips may be chosen for any frequency from 27 to 950MHz from the standard REVCO range.

Basic REVCONE, excellent value at £32.75
REVCONE with N-type socket £35.95
Add-on whips from £3.90 to £10.75
Remember this British product carries no overseas freight or Import Duty!

BROADBAND PREAMPLIFIERS

REVCO PA3 inline masthead model, with special mains psu. DC-1GHz min. 13dB gain £49.95
PA3I instrument or back-of-set version for 12v DC operation, BNC connectors (SO239 or N-type options) £35.50

GAREX ELECTRONICS

VISA

MAIN DISTRIBUTOR OF REVCO PRODUCTS. PRICES INCLUDE UK P&P and 15% VAT. **Ask for details of our interest free credit.**

Extensive range of PYE radiotelephone spares — S.A.E. for list.

7 NORVIC ROAD, MARSWORTH, TRING, HERTS. HP23 4LS.
Phone 0296 668684. Callers by appointment only.
Ask for our secondhand scanner bargain list.

Component Centre

LISTEN INTO THE WORLD

WIN 108 Scanning Airband Receiver	£175.00
SAB 9 POCKET AIR BAND—MW LW FM	£21.50
MBR 7—9 BAND INC SW Air Marine Mains/Batt	£59.95
R537S TUNABLE AIR BAND—118-136MHz + 2 CRYSTAL CONTROLLED CHAN	£73.00
BLACK JAGUAR MKIII Hand Held Scanner with Air Band	£225.00
AUDIO TECH AT 9560 Electric Cond Lapel Radio Microphone 100HT Range 88.108M Tunable	£52.80
PORTASOL GAS SOLDERING IRON 25-60watt Variable	£19.95
ANTEX SOLDERING IRON Type CS 18 watt	£5.95
ANTEX SOLDERING IRON Type CX 25 watt	£5.95
SOLDERING IRON STAND ST4	£2.95
N TYPE CONNECTOR For RG58U	£2.95
N TYPE CONNECTOR For URM203	£2.95
N TYPE CONNECTOR FOR RG8/RG213	£2.95
RG58 Cable	25p per Mtr
RG213/UR67 Cable	75p per Mtr
BFO Built & Tested	£19.95

Sony Radios	
ICF 5100	£69.95
ICF 7601L	£89.95
ICF 7600DA	£129.95
ICF 7600DS	£159.95
ICF SW1S	£249.00
ICF SW1E	£149.95
AIR 7	£229.95
ICF 2001D	£299.95
PRO 80	£299.95
Radio Antenna AN3	£44.95
Radio Antenna AN1	£49.95

ALL SETS GUARANTEED. PRICES INCL VAT & P/P EXCEPT PLEASE ADD £2.00 P/P ON RADIOS
CALLERS WELCOME MONDAY, TUESDAY, THURSDAY, FRIDAY, SATURDAY, 9.30-5.30

COMPONENT CENTRE
7 LANGLEY ROAD, WATFORD, HERTS WD1 3PS
Tel: WATFORD (0923) 245335

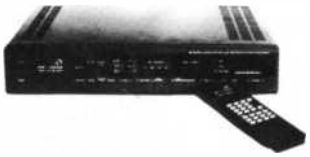
RYEDALE SATELLITE SYSTEMS

SUPERB QUALITY AT AN UNBEATABLE PRICE

THE MASPRO SRE 90R
FIXED SYSTEM

MASPRO SRE 90R 50 CHANNEL RECEIVER • TRAC 65cm DISH INCLUDING INTEGRAL FEEDHORN AND FERRITE POLARISER • MASPRO SCE 975 HEMT 1.6dB max HEMT L.N.B.

£292



ECHOSTAR SR4500 RECEIVER ANTENNA POSITIONER £559

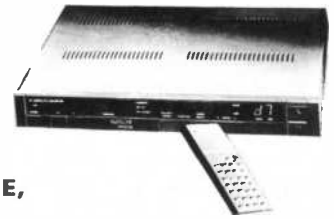
Motorised System comes complete with 90cm Offset Dish, Offset Feed with Magnetic Polariser, 1.3db L.N.B. Actuator Arm.

FREE — DIY INSTALLATION VIDEO SAVE ££!
ALL PRICES EXC VAT

SKYSCAN K1 MODIFIED

Motorised System comes complete with 90cm Offset Dish, Offset Feed with Magnetic Polariser, 1.3db L.N.B. Actuator Arm.

£445



245 CASTLEGATE, MALTON, N. YORKSHIRE, Y017 OEA.

MAIL/TELEPHONE ORDERS. CHEQUE/PO £10 P&P
Tel (0653) 697989. 48 HR DESPATCH

SCANNING

Alan Gardener

New Products

News reaches me of an interesting sounding active antenna offering a frequency coverage of 20-1300MHz. Made by a company called Maldol and called the HS1300B the actual antenna element is enclosed in a tubular shroud with the amplifier housed in a tubular, finned, heat-sink at the base of the unit. The overall size is 800mm long, 60mm in diameter and weighs in at around 400g. Power is supplied to the unit by means of the coaxial connecting cable. Performance is said to be good, with few problems of overloading on strong signals. However, as with all types of active antenna systems, you may have to be careful if you live close to a transmitting station. The price - around £86. Contact: Lee Electronics, 400 Edgeware Road, London W2 for further details. Tel: 01-723 5521.

It seems that legal problems are preventing importation of the continuous coverage hand-held scanner I mentioned in last months column. The receiver is manufactured under the name Yupiteru and is called the MVT5000. Certain aspects of the design are said to infringe patents held by another large manufacturer so it may be some time before a settlement is reached or the offending circuits are redesigned.

Talking of interesting new scanners did you see the Barecat Flexiscan review in the April edition of a magazine that shall remain nameless within these pages?

Yet Another AOR Scanner?

Several readers have drawn my attention to a scanner currently available in America and being sold under the AOR name. Called the AR-2515, it bears a remarkable resemblance to the AR-2002 with the addition of an increased frequency range of 5-1500MHz, 2000 memories and an incredible scan speed of 36 channels per second.

The introduction of such a model when the AR-3000 has only just been launched may seem a little strange, however the story behind it is quite interesting. It would seem that the AR-2515 is actually produced by a company called ACE Communications, they take a basic AR-2002 and replace the AOR Microprocessor control board with a new unit. This provides the extra memories, extended frequency coverage and, very cleverly, the improved scan speed.

In most scanners the maximum speed is limited by the time it takes for the frequency synthesiser circuits to settle after being tuned to a new channel. This can be quite fast if the jump in frequency is not too great, for example when doing a frequency search where each frequency change is quite small. However when memories are scanned it is possible to have a situation where, for instance, 27MHz CB channels are mixed in amongst 934MHz CB channels. In this case a much larger jump in frequency is required which necessitates a much longer settling period. This is why most scanners can search at a faster rate than they can scan. It is in order to allow for the large jumps in frequency encountered when scanning memories. The AR-2515 gets around this problem by sorting the memory contents into frequency order so minimising the number of large frequency jumps.

It seems unlikely that the AR-2515 will make it across the Atlantic as the price difference between it and the AR-3000 will probably not be great enough to make it worthwhile. However stranger things have been known to happen - particularly if professional users keep on snapping up all the AR-3000s they can get their hands on.

This month the column starts with a look at a new active antenna and answers some questions posed by readers.

Antenna Assortment

Experimenting with different antennas seems to be very popular amongst readers. **A Jarvis** of Cardiff asks me about the headphone/antenna circuit I featured in the January 1989 column. He wonders how I managed to cram all the components into the barrel of a 3.5mm jack plug. Well actually it was a 2.5mm jack plug! Only the types with a metal body are large enough. I have made up one or two of the circuits for friends and I must say that it doesn't get any easier. The whole job usually takes about an hour to complete, by which time my eyes are about as red as my burnt fingers! One tip is to throw away the plastic insulating sleeve supplied with the jack plug and insulate the circuit by wrapping PTFE plumbers tape around the finished circuit before refitting the metal plug body.

The inductors were Siemens type B78108T Stock no. 8T10, and came from Electrovalue, 28 St Judes road, Englefield Green, Egham, Surrey TW20 0HB. Tel: (0784) 33603. The capacitors were small resin dipped types available from several suppliers, but if you want really tiny ones try some of the surface mount types, for example Siemens type Z5U Electrovalue stock no. 42.01. Be warned you will need tweezers, a magnifying glass and torch to use these components - the torch is to help you find them when they shoot out of the tweezers onto the floor.

The thin coaxial cable and connector are a little less easy to track down but cheap ones can usually be found at amateur radio rallies amongst boxes of odd r.f. leads. The earphones are probably the easiest item - even W.H. Smith sell some - so take a look at the audio section of the shop when you have finished reading this column - in fact why not consider buying *SWM* instead of putting it back on the shelf now you have read the most interesting bits!

G. Henfield of Preston has been trying a new telescopic antenna sold by Tandy (Cat no. 20-006) for use with hand-held scanners. He finds that it gives better results at u.h.f. than the helical antenna supplied with his BC200 but is disappointing at the v.h.f. end of the spectrum. I have examined one of these antennas which features a moulded loading coil half way along the telescopic section and have found a reason for this. It would appear that they have been designed primarily for the American market where a large percentage of users operate in the 30-40MHz band. As a consequence the loading coil is designed for operation in this band - one which is not often used in Europe.

However you can improve the performance by rewinding the coil (see Fig. 1). Unscrew the end caps on the loading coil, desolder one end of the coil and unwind, rewind an 180mm length of the wire back onto the former, leaving about 3mm between adjacent turns. Resolder the new end back, and discard the remaining wire. All that is left is to screw the end caps back on the coil. You should now find the antenna works better on most of the UK bands of interest. Adjust the length for the best results on each band. Incidentally I would not advise using this antenna for transmit despite what it says in the instruction leaflet, as the joints on the telescopic sections can cause the v.s.w.r. to vary considerably.

B. Fraser of Lairg has constructed a similar type of antenna using a glass fibre fishing rod blank (see Fig. 2). Most fishing tackle suppliers are likely to have a few broken rods they are willing to dispose of - try and avoid the types with carbon filaments added to the material as a strengthener because these affect the r.f. performance. One end of the rod is attached to a suitable connector and glued in position. Thin wire is then run up the inside of the rod from the connector to a hole at the start of the section forming the loading coil. The coil is wound on the outside of the rod and the end of the winding fed back into the centre of the rod through another hole. The wire then continues to the end of the rod where it is secured with epoxy resin. A coat of varnish or length of heat-shrink tubing over the coil completes the antenna. A 5/8 over 1/4 design of collinear is one of the best types to use with a scanning receiver as it provides some gain at u.h.f. and still works reasonably well at other frequencies.

Discones

Paul Hawkins of Gloucestershire asks if any one has experimented by adding extra vertical elements to the top section of a discone - like the Icom/Diamond super wideband model. In particular he wonders about adding a Sandpiper mobile antenna in order to improve the performance. Well Paul, I touched on this subject in the April 1988 column. At the time I had been experimenting with discones and was a little disappointed with the results that I had been obtaining. I found that you could add elements to the top of the discone in order to improve the low frequency performance of the antenna but that this caused unpredictable dips in the gain at other frequencies. I tried adding an antenna similar to the Sandpiper design and found that it did indeed improve the performance at 50, 145 and 433MHz but worsened it by as much as 10dB over the band 60-100MHz and to a lesser extent at 120-130MHz and 250-280MHz. This is because of the varying phase relationship of signals being received by each active part of the antenna. If the signals add in-phase the signal is enhanced, if they add in anti-phase the signal is degraded. Not only does the resonant frequency of the extra element play a part in this, so too does the method of construction as stray capacitance and inductance can create spurious resonances at frequencies other than those intended by the designer. Only by very careful design optimisation can the interaction between elements be minimised - a little beyond the capabilities most of us, unless

SCANNING

you know someone who has access to the appropriate research facilities of course.

My advice is that if you want to use an antenna with more gain than that of a discone then chose one dedicated for the band of interest. If you listen to a broad range of frequencies then consider something like the Create range of log-periodic antennas sold by Waters & Stanton.

A Good Read

Alan Gale writes from Lancashire with details of a book that he believes may be of interest to scanner owners. Although intended as a reference book, he says that he found it very easy to read and explained many aspects of modern communications systems in laymans terms.

Chapters include a brief history of radio communication, modes of operation, radio spectrum regulation and licensing, digital technology and finally a genearal look at present and future systems.

The book is called *Mobile Radio Telephones in the UK* and is written by Dr R.C.V. Macario. Published in 1988 by Glentop Press Ltd, Bath Place, High street, Barnet EN5 5XE. ISBN 1 85181182 6.

Computer Control

A reader from Sussex wonders if anyone has managed to control an AOR-2002 by means of a computer connected directly to the socket on the rear of the receiver without using an interface such as the RC pack or Aircastle Scanner Computer. I must say that at first sight this seems a little difficult to achieve as the data sent to the scanner would have to be in a serial format recognisable by the microprocessor used as the receiver controller. All the interpretation of commands and returned data would have to be achieved in the computer program which almost certainly would have to be written in machine language in order to achieve a fast enough operating speed. Both the RC Pack and particularly the Aircastle unit are very sophisticated control units which could be considered as computers in their own right. Which is why they cost several hundred pounds each. The only real need for another computer to be connected to them is as a terminal unit in order to be able to feed-in instructions and display the results.

However, I am sure that at least one reader may have experimented along these lines so perhaps they would like to share their findings.

The end of another column I'm afraid. Not quite enough space to do justice to the next segment of the radio spectrum in the "What can I hear?" feature, but I hope to be back on course next month.

Keep your letters coming to PO Box 1000, Eastleigh, Hants SO5 5HB.

Until next month - Good listening. □

Abbreviations	
CB	Citizens Band
dB	decibel
g	gram
MHz	megahertz
mm	millimetre
RC	Radio Control
r.f.	radio frequency
u.h.f.	ultra high frequency
v.h.f.	very high frequency
v.s.w.r.	voltage standing wave ratio

AIRBAND

14☞

Lakenheath (LKH) TACAN on the 065 degrees radial it is passed at FL180 on the descent so spotting from here will be disappointing unless binoculars are used and the sky is clear. The geographical location is Hoveton, to the north-east of Norwich. From Liberty, the published procedure is to track 245 degrees and descend to 3700ft (altitude, i.e. on QNH) at 17 d.m.e. and then 1300ft altitude at 7 d.m.e. which is also the Aardvark reporting point.

Also in April I asked you about my ICAN altimeter and **G.L. Davies** (Thames Ditton, Surrey) has come up with some answers. Many thanks. The altitude shown by this early instrument is only correct when calibrated against a standard atmosphere. Corrections are applied by using a dedicated circular slide rule calculator. The altimeter assumes that sea level pressure is 1013.2mb (the same setting used now to obtain flight levels on modern instruments); the decrease of pressure being 1mb per 30ft. The ICAN law assumes a sea level temperature of 15°C and a lapse rate of 1.98 degrees centigrade per 1000ft up to 36090ft where the temperature will thus be minus 56.5°C. The pointer is adjusted by the knob for a known height (e.g. on the ground) and subsequent readings must be compensated by the slide rule since the outside air will differ from the temperature assumed by the standard atmosphere. One problem with early instruments is the radioactive Radium 226 contained in luminous paint applied prior to about 1950. From then on, Tritium paint, a much safer alternative, was used; this glows orange under ultra-violet lighting. The historic ICAN type altimeter can be obtained from Parkhouse Aviation with prices from around £5. Contact Barry Parkhouse for current availability and price on (0276) 33067.

That's it for another month; thanks for your letters, from both new and regular readers. □

Abbreviations	
a.t.i.s.	automatic terminal information service
CAA	Civil Aviation Authority
c.c.f.	central control function
d.m.e.	distance measuring equipment
ft	feet
ICAN	International commission for Aerial Navigation
i.l.s.	instrument landing system
LATCC	London Air Traffic Control Centre
mb	millibar
MHz	megahertz
NATS	National Air Traffic Service
NOTAM	NOTifications to AirMen
nm	nautical mile
QNH	altitude
TACAN	Tactical Air Navigation

SPECIAL NOTICE TO READERS

Although the Proprietors and staff of *Short Wave Magazine* take reasonable precautions to protect the interests of readers by ensuring as far as practicable that advertisements in *Short Wave Magazine* are *bona fide*, the magazine and its Publishers cannot give any undertakings in respect of claims made by advertisers, whether these advertisements are printed a part of the magazine, or are in the form of inserts.

While the Publishers will give whatever assistance they can to readers having compliants, under no circumstances will the magazine accept liability for non-receipt of goods ordered, or for late delivery, or for faults in manufacture. Legal remedies are available in respect of these circumstances, and readers who have complaints should address them to the advertiser or should consult a local Trading Standards Office, a Citizen's Advice Bureau, or their own solicitor.

STARTING OUT

Brian Oddy G3FEX

The basic role of a converter is to change the frequency of an incoming signal to another pre-determined frequency, which may be either above or below the original frequency. This is achieved by heterodyning the incoming signal (fc) with a locally generated oscillation (fo) in a mixer stage (sometimes referred to as a frequency changer) so that sum and difference frequencies are produced, namely (fc + fo) and (fc - fo). The process which results in the sum frequency is usually referred to as up-conversion and the difference process as down-conversion. These processes do not alter the inherent characteristics of the signal, so the output from the mixer will be an exact replica of the original signal at the new frequency.

Down-Converters

When a suitable converter is installed ahead of a receiver it will be possible to receive signals outside its normal tuning range. A down-converter would enable a signal above the receiver normal tuning range to be received on a selected frequency within its range. Similarly a signal below its normal range may be received by up-converting it to a selected frequency within its range. If the tuning of the oscillator and the signal input circuit to the mixer in the converter can be varied, it will be possible to heterodyne any incoming signal within their range to any desired output frequency. By keeping the tuning of these circuits in step whilst maintaining a constant frequency difference between them, any chosen incoming signal, irrespective of frequency, will be converted to a constant output frequency to which the main receiver must be pre-tuned. In practice the tuning is kept in step by employing ganged tuning capacitors along with pre-set trimmers and padders to ensure that they track correctly. A calibrated dial and slow-motion drive would complete the main tuning assembly.

Although the tuning range of an existing receiver may be limited, it may be possible to extend it by either making or purchasing an external add-on unit known as a converter. Adding a converter can also result in a marked improvement in the high frequency performance of some receivers.

The noise generated by the low gain mixer stage in a converter may tend to mask the weaker signals, so many high frequency converters of this type employ a tuned r.f. amplifier ahead of the mixer. Although r.f. amplifiers also generate noise they are generally high-gain devices and can therefore improve the signal-to-noise ratio. The added selectivity introduced by the tuned circuit(s) in the r.f. stage will also help to improve the ratio of the strength of a wanted signal to that of an unwanted signal applied to the mixer, thereby reducing unwanted mixing products. The tuning of the r.f. stage has to be kept in step with the mixer and oscillator, which further complicates the ganged tuning system.

A block diagram of a tunable short wave down-converter with an output in the medium wave band is shown in Fig. 1. An incoming broadcast signal on 25.750MHz for example, would be amplified and then mixed with the output from the local oscillator on 24.150MHz so as to convert it to 1.6MHz, which is within the tuning range of most m.w. receivers. It is essential that a screened coaxial cable be used to link the converter to the set, otherwise broadcast signals on, or close to, 1.6MHz will break through and impair the performance. Any reasonable length of coaxial cable can normally be used between an external converter and a receiver provided proper attention is paid to impedance matching. (Note that a 1.6MHz output could also be obtained by operating the local oscillator on 27.350MHz.)

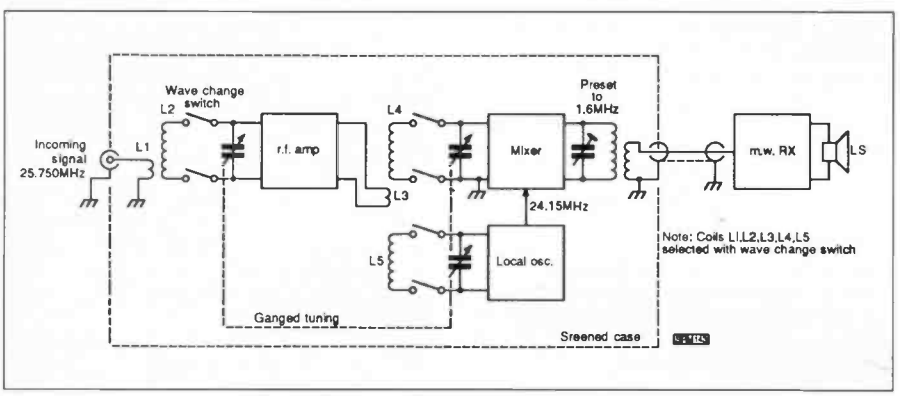


Fig. 1

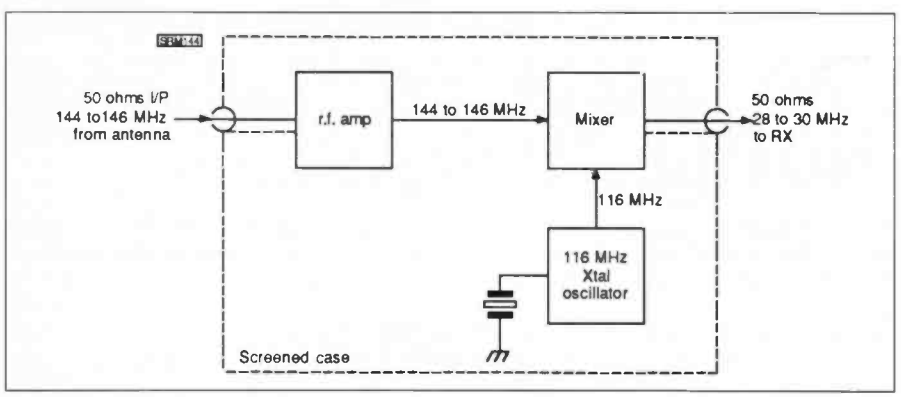


Fig. 2

Stability

Although the inherent stability of some self-excited oscillator circuits is superior to others, it is very difficult to achieve good long-term stability at frequencies as high as 25MHz. It is essential to adopt a very rigid form of mechanical construction, use only high quality components and apply well regulated supply voltages to the circuit. The oscillator should be mounted as far away as possible from heat sources otherwise the short-term stability during the initial warm-up period will be very poor. To improve the long-term stability it may be necessary to apply some form of temperature correction to the frequency determining network, because even small variations in temperature will cause minute mechanical changes which will result in frequency variations, drift and other undesirable effects.

These effects become even more significant as the frequency of operation is raised and it is quite difficult to obtain adequate long-term stability at very high frequencies (v.h.f.) and almost impossible at ultra high frequencies (u.h.f.). The use of a tunable self-excited oscillator in a v.h.f. or u.h.f. converter is therefore best avoided.

Fortunately there is a relatively simple solution to the problem of providing a stable local oscillator signal. Instead of using a variable frequency oscillator, a fixed frequency oscillator controlled by a quartz crystal is employed. The tuned circuits at the input to the r.f. amplifier and mixer stages are broad-banded so as to allow a band of signals to enter the mixer. When they are heterodyned by the output from the crystal oscillator they appear at the output of the mixer as a band of signals, so the tuning of the mixer output circuit has to be broad-banded to accommodate them. The characteristics of each signal in the output band will be an exact replica of each input signal, and any signal within the output band can be received by simply tuning the main receiver to the appropriate frequency. The accuracy of the output frequency will be dependent upon the accuracy of the crystal oscillator frequency.

It is a simple matter to generate a crystal controlled injection signal of 20MHz or below, since a quartz crystal can be resonated at its fundamental frequency in the parallel mode, but complications arise when a higher injection frequency is required. Although a relatively low frequency crystal oscillator could be followed by one or more frequency multiplier stages, it would be necessary to ensure that only the final injection frequency could reach the mixer, otherwise unwanted mixing products would arise. This could be achieved by using adequate screening and filtering and

STARTING OUT

by ensuring that the final injection signal has to pass through a high "*Q*" resonant filter, known as a hi-*Q* break before it enters the mixer. This technique is frequently adopted in u.h.f. and s.h.f. (super high frequency) microwave converters.

Another approach is to employ a special overtone oscillator in which the series mode of the crystal is exploited. Depending on the configuration of the circuit, the crystal can be made to vibrate mechanically at approximately 3 or 5 times its fundamental frequency. There is no output at the fundamental frequency, so the harmonics present are only related to the overtone frequency. To keep unwanted mixing products to a minimum the highest possible oscillator frequency should be employed. Suitable crystals for overtone use are now available at frequencies in excess of 100MHz, but they tend to be expensive.

The block diagram of a typical crystal controlled v.h.f. down-converter is depicted in Fig. 2. In this particular design all incoming signals within the 144 to 146MHz (2m) amateur band are converted to frequencies within the 28 to 30MHz (10m) amateur band, since the 10m band is within the tuning range of many s.w. and most communications receivers. When an incoming signal on 144.000MHz is heterodyned by the 116.000MHz output from the quartz crystal controlled overtone oscillator, a difference signal on 28.000MHz is produced (144.000 - 116.000 = 28.000MHz). Similarly a signal on 145.525MHz will be converted to 29.525MHz (145.525 - 116.00 = 29.525MHz).

Many v.h.f. converters of this type employ a single field effect transistor (f.e.t.) such as the 2N3819 in the r.f. stage, but a better performance can be obtained by using two junction f.e.t.s in a cascode circuit. Another popular device is the dual-gate m.o.s.-f.e.t. (40673), which can provide considerable gain and a good low noise performance even at u.h.f. They also perform well as mixers and require little power from the local oscillator. In order to facilitate the matching between the converter output and the main receiver, some converter designs include an emitter follower stage after the mixer.

Up-Converters

So far, little mention has been made of up-converters. One application, which would suit the owner of a 144MHz amateur band receiver, would be to up-convert the short wave bands to the v.h.f. region. This can best be achieved by employing a crystal controlled type of converter since it will ensure adequate stability, but a number of quartz crystals will be required because the short wave spectrum will have to be converted to the 144 to 146MHz (2m) band in segments 2MHz wide. The r.f. and mixer stages could be tuned by using ganged variable capacitors in conjunction with a bank of short wave coils selected by a wavechange switch, but a series of selectable band-pass filters would simplify matters. It would then be possible to use the scanning facility fitted to some v.h.f. receivers to effectivly search a chosen 2MHz wide segment of the s.w. region. Some multimode v.h.f. receivers have no provision for receiving amplitude modulated (a.m.) transmissions, so the short wave a.m. broadcast signals would have to be demodulated in either the lower sideband (l.s.b.) or upper sideband (u.s.b.) mode.

In another application, signals in the very low frequency (v.l.f.) and low frequency (l.f.) region between 10kHz to 500kHz can be up-converted to a frequency within the range of a s.w. receiver. The tuning at the input to the mixer could consist of a series of switched coils and a very large variable capacitor, but this would be cumbersome since the coils consist of a large number of turns, especially at the low frequency end of the range! A better approach is to employ a low-pass filter with a response which would allow all signals between 10 and 500kHz to pass into the mixer, but prevent those higher in frequency from doing so. As well as being compact, it obviates the need for tuning adjustments. A suitable low pass filter can be constructed around an integrated circuit known as an operational amplifier (op-amp).

The local oscillator will have to operate several megahertz above the incoming signals to produce a short wave output from the converter, so both short and long term stability problems will arise if a self-excited variable frequency oscillator is employed. The best solution is to use a fixed oscillator, controlled by a quartz crystal and tune across the broadband (500kHz wide) mixer output with the main receiver. The block diagram of a typical v.l.f. converter covering 10 to 500kHz with an output between 28.010 and 28.500MHz in the 10m amateur band is shown in Fig. 3. □

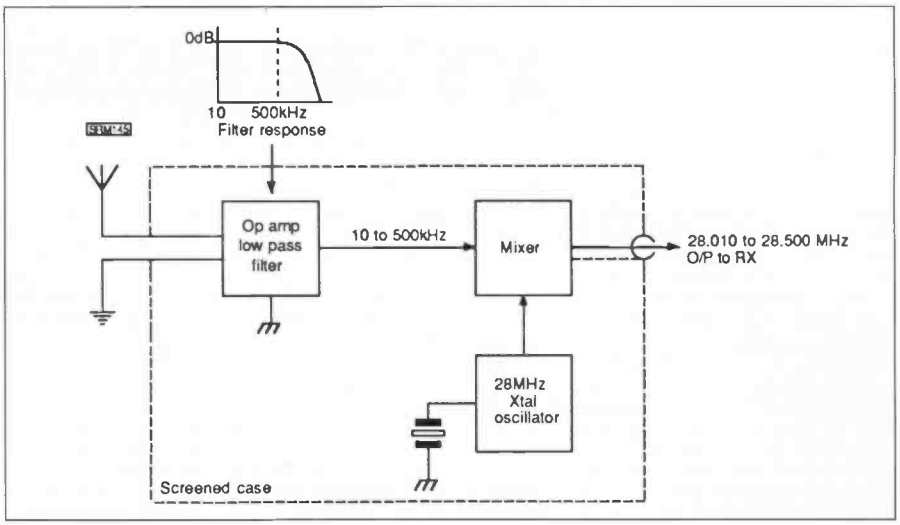


Fig. 3

Abbreviations

f.e.t.	field effect transistor	r.f.	radio frequency
kHz	kilohertz	s.h.f.	super high frequency
m	metre	s.w.	short wave
MHz	megahertz	u.h.f.	ultra high frequency
m.w.	medium wave	v.h.f.	very high frequency

SERVICES

Subscriptions

Subscriptions are available at £17 per annum to UK addresses and £19 overseas. Subscription copies are despatched by Accelerated Surface Post outside Europe. For further details see the announcement elsewhere in this issue. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £28 (UK) and £32 (overseas). Three year subscriptions are also available for SWM at £45 (UK), £50 (overseas).

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past ten years are available at £1.50 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available price £3.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for p.c.b.s, back numbers, binders and items from our Book service should be sent to **PW Publishing Ltd., FREEPOST, Post Sales Department, Enefco House, The Quay, Poole, Dorset BH15 1PP**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Poole (0202) 678558. An answering machine will accept your order out of office hours.

SEEN & HEARD

AMATEUR BANDS ROUND-UP

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

It isn't really necessary to spend a fortune on your rig and antennas if you want to be a topline s.w.l.; which of course is one of the reasons for the phenomenal success of the G-QRP Club. While the "QRP" refers to operation using low power (and quite a few stations have managed to work in excess of 200 countries using under five watts) and simple wire antennas, it is a natural addition to the proposition to find the QRP Club members building and using the simple receivers to go with the simple transmitter and simple antenna. In addition, they welcome s.w.l.-only members.

When Justin Cooper, bless his old white beard, was your columnist, he used to run a ladder based on hearing prefixes. He always said that a starting score of 200 prefixes should be easily achievable by a skilled listener in one concentrated weekend, given any reasonably sensitive receiver and a "not impossible" site. Recently, a simple home-brew receiver was cooked up here from a design originating with the G-QRP Club. I altered it here and there to permit use of what I actually had around. As a test both of Justin Cooper's words and of my own home-brew gear I gave it a concentrated whirl and comparison with the main station. Down came the beam, to be replaced by a wire antenna in the loft firing east and west (at least in theory!). I am, of course, somewhat surrounded by mountains here anyway and the underlying rock structure is not of the kind which could be expected under a "super" site, so I reckon the test was fairly representative of an average s.w.l. set-up.

During the weekend's listening, I split the time equally between the home-brew receiver and the main station, using the same antenna - a simple switching arrangement. As the dipole I had was cut for 14MHz, I stuck to that band.

Interestingly enough, a total of some 330 prefixes were logged in a weekend when conditions were admittedly pretty good, but - and this is what matters - the split between the two receivers was almost equal as far as scoring goes. As always, many of the prefixes logged were in Europe, but splitting them out into DX and Europeans the balance remained pretty good. Listening to a pile-up on s.s.b. was an unmitigated pain on either receiver, and the few hours I spent at the c.w. end was pure pleasure when we compared the operating standards and ethics! But - and this is the whole point - a home-brew receiver which cost me nothing but the time to build it from what I had in the junkbox could stand fair comparison with the main station. And, on balance, I got more fun and satisfaction out of it!

All of which is a very good reason for joining the G-QRP Club even though you do not have a transmitting ticket. The address to write to for details is: G-QRP Club, c/o Rev. G. C. Dobbs G3RJV, St Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE.

DX Events

For this I am, as always, indebted to you all for your letters and comments, as well as input from *The DX Bulletin, DX News Sheet, The DX Magazine,* and CARF's *Canadian Amateur.*

Malyj Vysotskij Island 4J was a new country for everyone a few months ago, and was the first joint Soviet Russia/Finland effort; I now hear they are going to activate the island again, using four stations and operating round the clock between May 22-30. At the time of writing no callsign has been notified.

That DXpedition artist, Ron Wright ZL1AMO is, at the time of writing, operating from Willis Is as FW0AB. QSLs to ZL1AMO.

Another rare bird is Marion Is, who used to be ZS2MI, but nowadays since the change in the ZS prefix regulations the call is ZS8MI. This call only appears when one of the staff on the island happens to be a radio amateur, but since the tour of duty is for another year you can take your time over this one. Try around 14.145MHz, but note that he himself listens around 14.160MHz. For c.w. you can try around 14.010MHz.

I also hear that 5Z4BH has a mind to visit 9U in about eight weeks from the time I write - say, mid-June - and already has a licence.

The Bands

I cannot stress enough how important it is to try and vary one's listening times. For example, quite apart from the question of propagation, just about every active European station will be around in the evening hours; just like us, he likes to spend his spare time in the shack.. If, say a VK or a ZL is on the band at such a time (and they ARE about) then the odds are pretty long that he won't be able to break through the wall of Europeans to reach your receiver. On the other hand, in the mornings around 0800 then on 14MHz, for example, it is hard not to find a VK or a ZL. The signal strengths aren't too much different, but the QRM levels are far lower. Again, the VK heard in the morning here, is an evening operator, while the VK heard here in the evenings is a rarer bird because he is one of the few who rise early enough for a session on the band.

This isn't propagation, its human nature - few of us like getting up! Even if you do, maybe other members of the household don't like being roused to the noise from your loudspeaker; in which case a pair of headphones, of the hi-fi type which look like safety earmuffs are the goods; a slight modification if they are of the stereo type by taking the wire to the "ring" off and fitting it to the existing "tip" connection, leaving the "sleeve" connection as is. The earmuff design keeps sound in quite effectively (and the domestic QRM out!), and if you get into the habit of using the lowest possible volume anyway you will save your ears into the bargain.

So - try a change of listening pattern, and be surprised!

Letters

A. G. Duck (Birchington) is a new starter at the tender age of 83; he now has a Matsui receiver. Shortly after getting it, he had an occasion to call a plumber, who noticed the receiver and gave it a whirl - a local amateur who was able to leave a list of the local callsigns. Initial trials were made with the set's own antenna, but since then a loop has been built and tried in the kitchen; the next move is to get it up in the loft. Incidentally, Mr Duck reiterates the old, old problem, when he mentions the eternal gabbling of callsigns, or worse putting them wrong way round: for the record, the routine is to say GW3KFE this is GW3SWM standing by for you, or just GW3KFE from G3SWM. The aim of putting your own callsign last is so that anyone listening from a faraway place may be sure he knows which end of the QSO is which.

The letter from **D. Peat** (Mansfield) has much of interest; David comments that it is nice to be able to keep your log on a computer but as he says, you must have backup files just in case. The listings show, for example on 3.5MHz there was HG4P, on 7MHz FP5HL (St. Pierre et Miquelon) for a bit of rare DX, plus Europe again, on 14MHz there were 4X6PZ/MM, 6W1AAD, AA1K, BY1PK, HL9OB,J37AH, JR1CSA, JY4YJ, KH6FKG, N2EIO/MM1, NN2Q, NV8A, OY9JT, PP1AE, RF7FO, WM0X. On 21MHz it was 4D0P, HV3SJ, KE3Q, KW8N, WF2R and the usual crop of Europeans. The gear comprises Phillips D2999 and some 30 metres of wire run N-S and coupled by way of an a.t.u.

Nice to hear again from **R. Watters** (St. Austell) who notes how he tried the "new bands" and was quite surprised at the number of stations he logged: On 14MHz VU2QO, OA4OS, OA4BJ, HL5BDS, HL1ASS 9M2CW; on 21MHz ON8LS/5N0; on 7MHz JA5OVU, JA1CPX, on 28MHz VE7SZ, W9LT/I0 and KA2DMI (both YLs); which left the following on 18MHz, KC5UT, W8UPY, N4LBJ, W1ODY, W2AIH working OK1KJA, 9H4W, plus on 24MHz J37AJ, KA7HPJ, N4JQP, and VE3VTC. Not a bad crop of s.s.b. stations on a band supposedly c.w.-only!

D. H. Travis (Guiseley) has continued his listening and mentions VK/ZL/W6/W7 heard on the HF-125, while the Tatung TMR 7602 managed JY5CA/AM (this is an aeronautical mobile) on March 15, Otherwise, alas, it was all UA/UB, UC, YUs and other "locals". Never mind!

Leslie Sargent (Runcorn) seems to be a little lost on the location to be ascribed to a given prefix. The real answer to this one is to lash out a pound on a copy of Geoff Watts' Prefix List from 62 Belmore Road, Norwich. That covers a copy printed on both sides of each sheet; for 25p more you can have a copy printed one side only of each sheet, an advantage if you use the listing heavily. Leslie mentions in particular YB3CEV, YC2EMK, C45A (?), P40V, S79T, JY9LC, FM4EB, TL8WD, J73PP, ZX5C, ZS4TD, L4H (?), A34F, HC2G and PP2ZDD. Leslie noted the two with question marks and cannot identify them. Frankly, I feel fairly sure they are another manifestation of Slim, though I would appreciate any information readers may have on these. An interesting one on 28MHz was KJ1Y heard working through a repeater to ZS3TW; KJ1Y saying he was located some 6km from the Boston (USA) 28MHz repeater.

A return to the fold now, from **Stuart Wilson** (St Andrews, Fife). Now he has his EC 10 and a couple of end fed wires up and running. He demonstrates that he has lost none of the old touch with some 533 prefixes booked in, his collection being from all around the globe.

White Rose Contest

After nine years of devoted work, D. A. Whitaker (Harrogate) has decided to stand down from the arduous job of "driving" the White Rose LF Band SWL Contest, although he assures us that the Club will continue to organise this popular s.w.l. event. The 1989 event showed a large drop in support for Top Band - or maybe conditions were not so hot on that band! Be that as it may, George de Baets from ON-land won the 'phone section for a second time with some 43758 points scored, mainly on 7MHz. David Whitaker came second, nearly making a win for the home side and Mike Ribton was third. On the c.w. side, Don Piccirillo was not just the only UK entrant, but also the winner. In his signing-off notes, David Whitaker notes that Arthur Miller, Norman Henbrey and Jean-Jacques Yerganian from ON have supported this event with their entries in every year since it started. I can imagine well that such support is very heartening indeed for those who put so much time and effort into setting-up and running this or indeed any other such event for our pleasure Thanks!.

Make sure your reports arrive in good time for the column. The next three deadlines are:
June 19, July 17 & August 21

DECODE

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

Readers Letters

I've had the usual bumper postbag again this month so let's get down to business.

First letter comes from **Brian Cole** of Stirchley, Telford. Brian has a slightly unusual set-up which includes a Yaesu FT-290 v.h.f. transceiver for h.f. monitoring. The trick to achieving h.f coverage with a v.h.f. rig is to use an up-convertor. This is a device which converts the incoming h.f. signal up to v.h.f., in this case 144MHz to 146MHz. In order to cover from 1MHz to 33MHz the h.f. band is divided up into sixteen 2MHz wide bands. This technique is particularly attractive for the amateur who has a v.h.f. transceiver and wants to monitor h.f.

Getting back to Brians letter, he is just about to retire to Malta (lucky chap!) and wants to start utility monitoring. On the computing side Brian has a Spectrum computer but no RTTY, c.w. or FAX software. My suggestion is that he contacts J & P Electronics (1) and Pearsons Computing (2) for details of their Spectrum software.

Next letter comes from **Mr G. Griffiths**, Birmingham who uses a Grundig Satelite 3500 and a Spectrum computer for utility station listening. Unfortunately he has a problem with severe interference on all frequencies above 21MHz. This sort of interference can be quite difficult to cure but there are one or two simple things that can be done. First of all, use an external antenna, a long wire is fine, this should be as long as possible and remember it doesn't have to be in a straight line. Next point to watch is that you have a good single earth for all your radio gear, multiple earths mean trouble! If you want any further reading I suggest you look up the article by Richard Wilmot in the March '88 issue of *SWM*.

Kevin Bates, Derby asks what happened to the promised review of the Microwave Modules MM-2001 RTTY decoder. Well I'm sorry to say that the review model hasn't materialised, hence no review. Incidentally Kevin uses an impressive array of equipment for his monitoring as follows: Sony 2001D receiver with AN1 active antenna, Lowe HF-125 receiver with Mizuho a.t.u. For v.h.f. he has a Tandy PRO-2004 and a Signal R535 air-band receiver.

Dr Peter Grannell is particularly interested in FAX reception and currently uses a Yaesu FT-767 transceiver and a doublet antenna (3.5MHz and 14MHz dipoles in parallel). The decoding is achieved using a PK-232 inteligent terminal unit and the computer is an Atari 1040STFM. The latest development is the construction of the FAX decoder described in *Elektor* magazine, January '89. I shall be very interested to see how he gets on. Also on the construction front is an a.m. to f.m. decoder to enable the PK-232 to resolve NOAA 10 and 11 signals which should also be interesting.

Bill Hetherington, Gateshead has just bought himself the latest Wavecom 4010 decoder complete with version 2 software. His only problem is in recognising the various signals, in fact he has sent me a tape of one particular signal, 15.696MHz, to see if I could identify it. Unfortunately the recording was at a very low level so it was not too easy, but I am pretty sure it is a piccolo signal. The bad news is that as far as I know this type of signal is used primarily by diplomatic services and is difficult to decode. Even if you do manage to decode the basic signal you will probably find that the message is encrypyed, so the whole excersise seems a bit pointless. However, I hope to be featuring piccolo transmissions in a forthcoming column, so watch this space!

If you can't wait for my explanation details can be found in the *Radioteletype Code Manual* by Klingenfuss which is available from the *SWM* book service.

Third Shift What..?

For this months technical feature I though I would take a look at the third shift alphabets and what they mean.

I'm sure you've all seen third shift Cyrillic mentioned in frequecy lists and at that point you probably turned the page quickly! Despite the rather obscure name, the use of third shift is actually quite simple as I will attempt to explain.

Let's start with the normal RTTY alphabet which is known as the International Telegraph Alphabet No2 (ITA2). This alphabet defines all the characters that are available and the 5 unit code assigned to those characters. If you are a mathematician you will soon work out that a 5 unit code has only 32 possible combinations i.e., not enough to cover the alphabet, numbers and punctuation. The solution chosen was to give each of the 32 codes two meanings hence doubling the maximum number of characters to 64. So how do we know what character a code represents if it has two meanings? The solution is quite simple and involves two of the available codes being nominated as shift characters. These are then used to switch between the two possible meanings for the subsequently received characters. Incidentally the two sets of codes are known as letters and figures.

So let's describe how the shift character works in practice. If we imagine a RTTY link with a teleprinter at each end. The normal starting point is for both machines to be set-up to receive letters. Providing the information on the link is letters only, everything flows along with just the relevant characters being sent. If on the other hand the sender wants to send some punctuation or a number, a figure shift character is sent followed by the required number or punctuation. Once the figure shift has been received all subsequent characters are interpreted as figures or punctuation. In order to revert to sending letters, the sender has to send a letter shift character. So from this you can see that you switch between the two character sets by sending a letter or figure shift. This system could actually be called two shift RTTY, as two shifts are required to select the full character set.

From this description I hope you can now guess what third shift means - yes that's right, there are three shift characters. Your next question is why do we need three shifts? Well, for English texts we don't, but some foreign languages have considerably more characters than English and it is these that need the extra shifts.

Examples of Alphabets requiring three shifts are - Cyrillic, Korean, Amharic, Thai and Greek. In addition to these there is a four shift Arabic, third shift Japanese using a six-element code and finally Chinese!

One rather interesting point with some of these transmissions is that the foreign alphabet character and the latin equivalent use the same code so some of the translation process is automatic. Examples of this are third shift Cyrillic and Greek though with Cyrillic you will have to enable the "unshift-on-space" feature to prevent the text being received as figures.

If on the other hand you want to receive standard Cyrillic or some of the other languages you will have to manually decode the messages. A good guide to this process and all the necessary tables can be found in the Klingenfuss publication *Radio Teletype Code Manual* which incidentally is available from the *SWM* book service. The decoding process involves three stages:

1: Obtain a hard copy printout of the signal you want to decode.
2: Perform a code conversion using the appropriate alphabet (again in the Klingenfuss book)
3: Compare the result with the list of common phrases.

Although the process is quite time consuming it can be very rewarding particularly if you enjoy puzzles!

If you would like to try your hand at this, APN Moscow on 10.465MHz sends messages using the Cyrillic alphabet.

Do you have any modes you would like me to try and explain? If so, please drop me a line and I will do my best.

Schedules

This months featured commercial station is weather FAX station Melbourne broadcast which is actually located in Canberra. The station calsign is AXM with a two digit suffix added to identify the actual frequency in use. The full details, which incidentally were taken from a QSL card issued by AXM, are shown here:

Target area for broadcast: Southwards from 010N, between 070E and 150W.
Power: 5kW
Emission class: F3C
Bandwidth: White +400Hz, Black -400Hz
IOC: 576
Drum Speed: 120 r.p.m.
Scanning line density: 3.8 lines/mm
Scanning frequency: 120 lines/minute
Start Signal: Carrier modulated by 300Hz for five seconds.
Phasing: Black signal interrupted by one white pulse per revolution, transmitted for at least 30 seconds prior to start of transmission.
Stop Signal: Carrier modulated by 450Hz for five seconds followed by ten seconds of black signal.

The Melbourne transmissions run to a 24 hour schedule 365 days a year. In order to receive their schedule you will have to either get up early or go to bed late as it is transmitted at 0115 to 0130UTC! There are several interesting images transmitted like the Antartic support charts which are sent at 0645 and 1345UTC. Other interesting ones are the Indian Ocean charts sent at 0715, 1300 and 1915UTC. My thanks to Jan .... for this information.

If you receive any QSL cards or station schedules why not drop me a line with the details and I will pass it on to all via the column.

FAX TIP

Fred Batty, Godalming has sent me a very impressive weather FAX chart received on his Trio R2000 and Spectrum computer running J & P Electronics software. What makes this

chart particularly impressive is that he has taken the time to colour-in the land masses, with the end result being very attractive. So when you're sat in the shack waiting for the next image to materialise, why not colour-in some of your charts you'll be surprised at the difference it makes.

Frequency Lists

Don't forget, if you would like a copy of my frequency list, all you need do is send three first or second stamps to the address at the head of this column (please don't send to the editorial offices). The list has recently been updated and currently lists over 650 stations, all logged during the past 3 months.

Moving on the frequencies for this month, I have used the usual format, i.e., frequency, mode, speed, shift, time, callsign and notes. My thanks to Chris Swann, Robert Hall, for their logs which helped prepare the list this month.

3.0355MHz RTTY 100/425 2110 DHJ51 Grengel Meteo
3.61MHz FAX 60/288 ROO70 Rostov-on-Don Meteo
4.25MHz c.w. PCH20 1619 Scheveningen Radio
4.4424MHz RTTY 50/R RGC72 2220 Kiev Meteo
5.335MHz RTTY 50/N 2142 RDM78 Tbilisi Meteo
5.7557MHz ARQ 100/170 HBD20 0815 MFA Berne
8.7065MHz ARQ 100/170 IAR 1630 Rome Radio
9.255MHz FAX 120/576 NGR 1900 USN Kato Soli
10.465MHz RTTY 100/r RKA74 0830 APN Moscow Cyrillic
11.3217MHz FEC 100/170 ? 1023 Egyptian

That's all for this month, so please keep the letters coming and I'll look forward to a bumper postbag next month.

1: J & P Electronics Ltd., Unit 45, Meadowmill Estate, Kidderminster DY10 1HH. Tel: 0562 753893.
2: Pearsons Computing, 42 Chesterfield Road, Barlborough, Chesterfield, Derbyshire S43 4TT.

The next three deadlines are:
June 19, July 17 & August 21

INFO IN ORBIT

Pat Gowen G3IOR

MIR

As the end of the mission for U3, U4 and U5MIR approached, the orbiting cosmonauts found that they had virtually completed their main scientific, medical, engineering and ecological research programmes. They were heard by **Chris van den Bergh** to ask the TsUP command station over the 143.625MHz v.h.f. communications channel "...what do we do now?..".

After checking the details of the long list of accomplishments to the planned programme requirements, the command suggested that they proceed to maximise their amateur radio activities, the propagation research findings and public relations of which is clearly to be seen as a major objective by the mission organisers. This was readily agreed and a major programme of enhanced activity was due to begin in the second week of April until the crew returned to earth on April 29.

This has since been evidenced by the many reports received of hearings and contacts on 145.550MHz S22 f.m. Simplex. Among them was **Jeff Smith RS92044** of Trevethin, near Pontypool in Gwent. Jeff reports that he had just put up his new GP144W two step collinear antenna and was going up the band listening for activity when on 145.550MHz he heard an S9+ signal calling "CQ CQ CQ, this is U4MIR". "The voice was very clear, with a slight accent but very good English," said Jeff. He continues: "Being a new listener I logged the report and thought no more of it until later talking about it to my father, who informed me who it was. I have since sent out a QSL and signal report to the address you gave".

In early April, Boris Stepanov UW3AX, editor of *Radio* magazine, QSL Manager for MIR and an old personal friend of your columnist, detailed in a 14.280MHz QSO the plans for future amateur radio operations from the Soviet manned space station.

He confirmed that a high level of activity would result from U4MIR and U5MIR as they approached their return to earth on April 29, and that the new crew of U6 and U7MIR were to go to MIR via SOYUZ-TM-8 on April 19. A Soyuz capsule with its transported launcher is shown in Fig. 1, whilst Fig. 2 shows the lift off from Baikonur.

The new crew were planning upon arriving April 21, and were already trained in amateur radio techniques including split frequency operation. Up to that time, no period had been available to train the existing crew in that form of communication, so the operations had mainly taken place on 145.550MHz simplex. Boris quoted U2MIR as saying "..we made many good QSOs all around the world, but had many problems when within range of Western Europe. As soon as we came over the European horizon, our receiver would be blocked by many calls, and it was very hard to make a single contact...".

Boris also said that he had already collected the log books of U1 and U2MIR for QSOs up to December 1 last year, and as soon as he had calculated the number of QSO and s.w.l. QSL cards needed, he would get these printed and sent out via Valery UA6HZ. The logs of Musa U3MIR, were not available, as they were still with him in the space station.

The plan was to put up a very large 20 metric tonne special module by Energia to attach to MIR in April, followed by a further module to re-achieve a central centre of gravity in May or early June. These were to provide additional facilities and power, as they had their own solar cells. The module expert is Alexander Serebrov, who would have had the callsign U6MIR. Because of technical problems delaying the special module completion, the initial launch of the attachment had to be postponed to September, with the second planned for December this year.

This meant that the mission of Alexander Serebrov had to be postponed to September also, so the new plan was to have Alexander Viktorenko fly again accompanied by Alexander Balendkin on his first flight. Even so, last minute training in the specialities of amateur radio communications was provided for the new cosmonaut in time, so continuity of operations could have been established.

Alas, further technical problems came about, as by April 10 the MIR crew were reporting problems in the life support systems of the spacecraft. Both a water leak and an air leak had developed, possibly due to micro-meteorite impact, possibly to UV irradiation of the sealings, but probably due to aging and wear and tear of the two year old system. Whilst Russian space technology is highly advanced, the same cannot be said for their plumbing. The water leak had permeated into the wiring system, and was suspected as being the cause of low voltage supply, this in turn causing erratic and intermittent operation of the on board computers. It also caused a very high humidity, which, coupled with excessively elevated temperatures, was giving discomfort to the crew. Chris van den Bergh overheard them having to get up in the middle of the MIR "night" to check the air pressures, which were found to be rather low in several of the compartments.

The outcome is that new parts have to be produced and ferried to MIR, and that training of a new crew will have to be enacted before the damage can be repaired. Couple this with the current criticism of the high economic cost of the Soviet Space Programme, and the delay of the new modules, and it is not surprising that MIR will have to be abandoned, for some three months at least.

Thus, when the current crew have returned, now to be two days early on April 27, MIR will be automatically boosted to a higher "parking" orbit by use of a Progress ferry rocket, and the station will remain crewless until the problems are overcome. It is thought by expert MIR followers that we may well see new manned activities again this coming winter, as one recent plan was to bring back Salyut-7 by means of the new large BURAN space shuttle before it re-entered due to the escalation in solar flux and the consequent frictional drag brought about by atmospheric expansion. As Nico Janssen PA0DLO reports that Salyut-7 will be at the same Right Ascension (e.g. the same plane) as MIR in early January 1990, a rescue mission, as accomplished earlier for Salyut-7, may well come about. Nico says, "Most certainly MIR cannot be left for too long if it has sprung leaks, otherwise the whole spacecraft will be lost for all time".

The problems have had an effect on Buran, the new Soviet space shuttle. There will be no further flights this year, but it is expected that this vehicle will be employed to bring Salyut-7 back to earth for refurbishing in early January.

Thus, the 143.625MHz and 145.550MHz spots may now well remain devoid of space activity for a little while. MIR can still be tracked by listening for the earth uplink commanded 166.000MHz tracking and telemetry signal (sidebands on 165.875 and 166.125MHz) that comes on when the spacecraft in within range of the USSR. Salyut-7 still has the strong beacon on the attached Cosmos module on 19.955MHz, so there is plenty to listen to.

Shuttle

The next amateur event planned for the STS-35 Columbia shuttle mission is for 31 March 1990, when Ron Parise WA4SIR says he will be using two metre voice f.m., packet radio and an amateur television system that accepts fast scan on the uplink and puts down slow scan on the downlink. The normal voice communications frequencies are 259.7MHz and 296.8MHz, with a C-band transmission uplinked from NASA to the RCA SATCOM-F2R transponder 13 on 3960MHz vertical polarisation. This satellite is a Geosat located at the equator at 72 degrees west longitude. Now that the Shuttle program is "off the ground" again, we shall be able to follow many missions, although some of these will orbit at a low inclination, and be out of range of virtually all of the UK except perhaps the Channel Islands.

Satellites in Education

The role of satellites as an educational tool is quite invaluable. It is an easy and rewarding way into teaching mathematics, physics, chemistry, geography, astronomy, and a whole lot more of scientific and even art related subjects. The UoSATs, both OSCAR-9 and OSCAR-11 have been specially tailored to the educational and teaching aspects, as well as to the research facility that they offer.

Noel Moore GI7CMC, who is an instructor at the Belfast Royal Academy, writes to tell us of his and his pupils interest in satellites and the field of radio in general.

"Although I had taught electronics as a subject in school, I had no particular interest in radio" writes Noel. "That changed when an article by Michael Furminger was brought to my attention by a keen pupil. The article outlined how a BBC computer could be used alongside a receiver and a relatively simple interface to receive weather satellite pictures. The geography department seemed interested and produced the finance to build it. After considerable refinement, we had a reliable NOAA satellite receiving station in operation

SEEN & HEARD

Remember to send your reports to Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB.

The next three deadlines are: **June 19, July 17 & August 21**

by 1985. Although some of the pictures were outstanding, there were problems, the major one being that we often had great trouble in identifying geographical features through dense cloud. Furthermore, NOAA only produced pictures during those particular times of the day that did not suit the geography department, who wanted live pictures during particular classes".

The problem was solved when a down converter and a satellite dish were purchased to allow reception from the geostationary Meteosat. As a result, interest grew, not only in satellites but in all participational forms of radio. Eventually Noel succumbed to sixth form pupil pressure, and commenced a lunch break course in preparation for students wishing to take the Radio Amateurs Examination. The result of the passes, these including Noel himself, was the establishing of a school club station, GI7DAW, which is now borrowing, collecting and building equipment in order to expand their horizons. A p.m.c. and a RTTY unit have been constructed, and already telemetry has been decoded from the UoSATs. They are now working their way to logging some additional extra-terrestrial QSOs!

QRP Experiment

Readers will recall this columns publicity of the QRP experiment run on the RS-10/11 satellite by Ron Mikkenie PE1ISP. The results are now in, and Ron is sending out comprehensive returns on the data to all of those who participated. The QSL is shown on our Fig. 3, the reverse of which is a correlation of the letter combination sent and reported with the power levels and positions throughout the monitored pass. This is accompanied by a computer print out of all the relevant data, from which some interesting deductions can be made. Ron wishes to thank all contributors to the experiment, all of whom will receive similar returns.

Weather Satellites

As promised in last months column, here follows the data on the new Soviet METEOR-2/18 Weather satellite. It was launched on February 28, and thus becomes International Designation 89-081A, with catalogue number 19851. It transmits on 137.300MHz, although this is subject to change. The latest Keplerian element set to hand reads:

Epoch Year: 89
Epoch Day: 61.11001708
Inclination: 82.5176 degrees
Right Ascension of Ascending Node: 244.4995 degrees
Eccentricity: 0.0013414
Argument of Perigee: 247.0277 degrees
Mean Anomaly: 113.0261
Mean Motion: 13.83746684 revs/day
Decay, Acc. or Drag Factor: 1.17E-6 rev/day²
Revolution or Orbit Number: 27

Lawrence Harris of Peverell, near Plymouth is our regular and reliable correspondent on this topic. This month he sends in more of the many weathersat photographs that he has taken from his screens. First, as promised last month, comes Fig. 4, a MET 3/2 shot direct from the monitor. This is an infra-red result of Italy and the Caucuses Mountains, taken at 2303UTC on 23 December 1988. Lawrence apologises for the low contrast, which is entirely due to the photography of the direct off-screen result. Future pictures will be stored on his new tape recorder in stereo so that simultaneous recordings of both the reference clock signal and the METEOR signal may be later played back together into his computer, thus permitting contrast enhancement and clearer definition.

He has also sent Fig. 5, which is a dual picture from the OKEAN-1 multiple format satellite described earlier. The picture was taken in the night of December 5/6, and shows the entrance to the Gulf of Finland. On the left is the microwave sounder imaging result, whilst on the right of the picture is the image produced by the Radar Colours are added by his own processing, which permit the presentation of underwater features.

Lawrence says: "The Radar shows very clear details, and, of course, it is cloud free. It always stops after a few minutes, presumably due to power constraints". The pictures so made are normally limited to one weekly. He, and other enthusiasts, are finding that transmissions are not limited to just the eastern passes, as picked up OKEAN on westerly passes covering the United Kingdom.

The North Pole is shown on Fig.6, which is a Goes picture from NOAA-11 taken on 13 February 1989. The NOAA administration are manoeuvering the Goes satellites although Goes-E is still "seen" from the UK. Thus, the re-transmitted pictures are covering different areas until such time as they are in their final positions. The picture you see is a low resolution composite from NOAA-11 sent down by Goes-E, enhanced by Lawrence by the addition of artificial colour to highlight the sea. It is sad that you will see it in monochrome, as the original in blue and white is very beautiful to behold in full colour, appearing extremely "icy"!

Weathersat frequencies

Lawrence reports that Meteor 2/16 came back onto 137.400MHz on April 11, and should now be active for a continuing period. Meteor 3/2 was still commanded off at the same date.

The Dallas Remote Imaging Group report that Meteor 2/17, which was on 137.400MHz, is now to be found operating on 137.400MHz. It is sending Infra Red APT at night at 20 lines per minute instead of the more usual 100 lines per minute rate.

Finally

This will be the last column in *Short Wave Magazine* by G3IOR, who will still continue with the "Amateur Satellites" column in *Practical Wireless* each month. My many thanks to all who have helped to fill the pages with such interesting news, and to those who have read and enjoyed it. I feel sure both will continue. The bad news is that I shall miss the column, but the good news is that you will have a new columnist who is already well known to you all, and who is a real expert on weather satellites. I shall miss you all, but will continue to send the odd snippet of information to Lawrence Harris, who I know will carry on the tradition of this section of interest in a most excellent way. I know it is in good hands. Please send your future information and pictures to Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB.

Fig. 1

Fig. 2

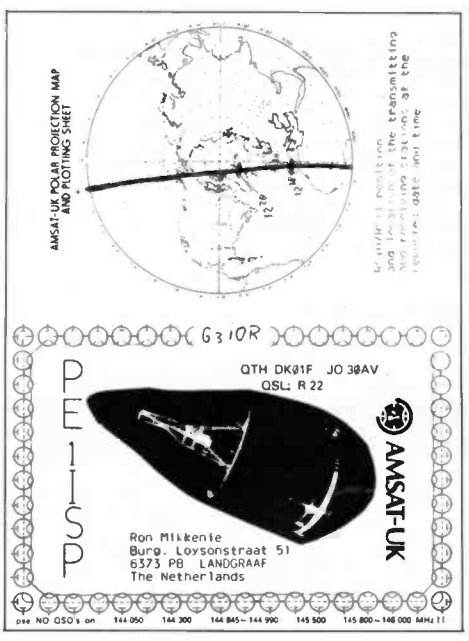


Fig. 3

Fig. 4

Fig. 5

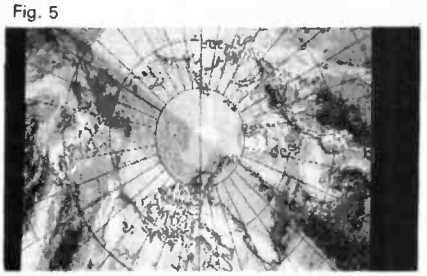


Fig. 6

SEEN & HEARD

BAND II DX

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

Remember the nostalgic days when v.h.f. was the order of the day with the "Home", "Light" and "Third" on the dial with plenty of empty channels for any adventuring DXer to explore. High gain antennas could be successfully employed without overloading," wrote **Simon Hamer** (New Radnor). Referring to 1989, he remarked, "Even on a pocket radio, the f.m. band is crowded in Radnor Valley!"

Many of us do remember those days in the late 1950s and early 60s when Band II extended from 88 to 100MHz and in the UK, the BBC occupied the lower end and public service mobiles used the higher. However, the same can be said about the rest of the radio frequency spectrum, especially the domestic TV bands. There are many contributing factors such as rapidly growing populations plus affluemce which has increased the demand for sets, stations and longer transmission times. All this coincided with the semi-conductor revolution which meant reduced production costs, greater reliability and portability of receivers and a fantastic increase in sensitivity.

Aurora

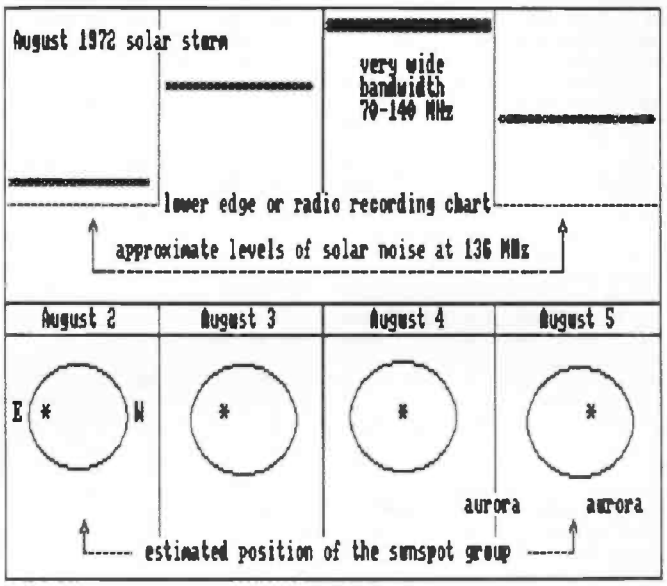
Radio and astronomical enthusiasts are still talking about the massive aurora which manifested during the late evening of March 13 and, despite bright moonlight, much of its colourful glory was visible from southern England. "A fantastic aurora, with beautiful visual effects to the north-east, resembling a hill fire," said Simon Hamer. Like many other DXers, Simon heard distorted programmes from stations in Belgium, Denmark, Germany, Holland, Ireland, Norway, Scotland and Sweden as their signals were scattered by the auroral ionisation caused by radiations from the giant sunspot group which appeared on the 7th. Although aurora is rarely seen from southern parts I had the good fortune to witness a similar event back in August 1972 when a large and very active group appeared on the 1st and as it crossed the sun's central meridian on the 5th, Fig. 1, its complex radiations caused a memorable aurora large enough to be seen from northern France. The daily levels of radio noise which I recorded from this group at 136MHz is indicated in the upper half of Fig. 1.

Reports

Conditions were right for a tropospheric opening at the end of March when I heard at least a dozen French and a few Dutch stations between 87.5 and 102MHz from home, with the R216, at 1100 on the 30th. The weather was warm and sunny and the atmospheric pressure of 30.2in (1022mb) was beginning to fall. At 1335 I was parked on Harting Hill (Sussex) and, although the sun was bright, I could see the moving weather front on the northern and eastern horizons. I quickly tuned the v.h.f. radio dial of the Plustron TVR5D and with its own rod antenna I counted 10 very strong French programmes spread through the band in addition to the usual "warbles" of co-channel interference. I heard such "warbles" and many of those French signals again at 1800 on the 31st.

"The atmospheric pressure was 30.1in (1019mb) around 1100 and when I returned home at Laurencekirk it had fallen slightly," wrote **George Garden** on April 1. He then described the conditions that he encountered at his favourite DX site on the top of Cairn O' Mounth. "A weather front produced thick fog and continuous drizzle, so much so that it soaked the car windscreen with large size raindrops." However, using his v.h.f. car radio George identified programmes being transmitted by BBC Radios Cleveland from Bilsdale in stereo, Cumbria, Newcastle from Chatton and Pontop Pike and York in "very strong stereo." In addition he heard ILRs Hallam from Clifton serving the Doncaster area, Tay from Perth and Tees from Bilsdale which he does not normally hear at this site.

On March 28, **Russ Reed** (Ringmer) was on holiday at Maidencombe, near Torquay and between 1820 and 1900 he checked Band II with his Sangean ATS-803A receiver and telescopic antenna. He logged BBC Radios Bristol, GLR, Solent, 3 Sussex areas and Radio One plus ILRs Capital, LBC, Mercury, 2 Ocean Sound areas, Red Dragon, Southend Sound and Radio 210. Russ also picked up local stations from south Devon and many from France. "The sky was very misty and I'm sure I received them because of freak atmospheric conditions. By the morning most of the stations had gone or were faint and later in the week were untraceable," said Russ.



On the 29th, Simon Hamer identified signals from stations in Belgium, Denmark, Eire, France, East and West Germany including AFN and BFBS, Holland and Luxembourg. Simon also told me that, "Birmingham's BRMB has moved from Lichfield to Sutton Coldfield with a higher radiated power for Birmingham - still on 96.4MHz. Comes in like a powerhouse here. Another one we can hear is Coventry's Mercia Sound with an f.m. extension on 102.9MHz to cover Warwick and Lemington Spa."

While on holiday in Vellore, India, on February 16 **P.R. Guruprasad**, using a Sony ICF-7600DA with its rod antenna was able to listen to the f.m. station at Madras some 112km away on 107.1MHz. After his return to Molepolole, Botswana, he heard Radio RSA on 105.2MHz on March 18 and reports that the 24th, was very good for DX. During that evening his Elweco aneroid barometer was reading 1023mb (30.2in). In addition to hearing very strong signals stemmed from Radio Tswana on 88.8MHz he logged Radio Orion on 101.9MHz and others, which he could not identify, transmitting English drama on 94.6 and 95.1MHz, pop songs on 98.4MHz and an Afrikaans sounding song on 105.2MHz.

The next three deadlines are:
June 19, July 17 & August 21

TELEVISION

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

Tommerup

As I expected, with their wide experience in matters of TV DX, readers of this column provided the answers to the mystery caption TOMMERUP seen by Alan Gibson mentioned in our April issue. "Denmark TV2" came the prompt reply from **Simon Hamer** in New Radnor. From Warley, **Julie Yates** said, "This signal on Ch. 22 (co-channel with Belmont BBC1) would have been from the Danish transmitter at Tommerup located in the north-west part of the island of Fyn. This radiates the Danish second network on Ch. 22, hence the 'TV2' id." Julie also told me that this high power transmitter (500kW) has not been in service very long and she thinks that the horn & crown sign would be the symbol of the Danish PTT (Post og Telegrafvaeseret).

David Glenday (Arbroath) reports that the transmitter is near Odense and on the day in question he also received Danish TV2 test-cards from Aabenraa and Hedensted.

During the opening on January 25, **David Hodges** and **Garry Jackson** (Leighton Buzzard) logged this Danish test-card on Ch. 22, Fig. 1 and another from Hedensted on Ch. 30. These pictures, sometimes in colour, were received with an 18-element antenna, 24m high and a Labgear mast-head amplifier. They also logged a German test-card (WDR1 MU 32), Fig. 2, on Ch. 32 at Garry's QTH, near Leighton Buzzard. Garry uses an Antiference XGS wide-band antenna with a Triax mast-head amplifier in the loft.

Band I Auroral

Dave Coggins (Knutsford) received a picture, via aurora, from Scandinavia on Ch. E2 (48.25MHz) at 2015 on March 13. There was tone-A sound on on Ch. Ia (53.75MHz) at 1400 on the 19th and 2130 and 2300 on the 22nd. While monitoring this channel, with his 2-element quad antenna beaming west, Dave heard solar noise from the setting sun at 1750 on the 17th.

While the great aurora was in progress on the 13th, David Glenday

SEEN & HEARD

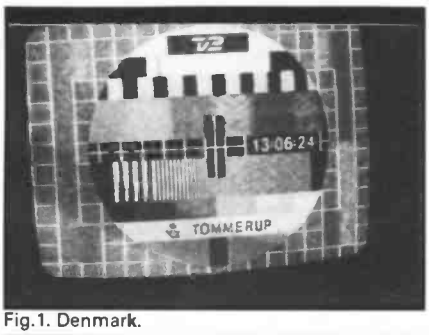


Fig.1. Denmark.


Fig.2. Germaany.


Fig.3.


Fig.4. Malaysia.


Fig.5. India.


Fig.6. Pakistan.


Fig.7.

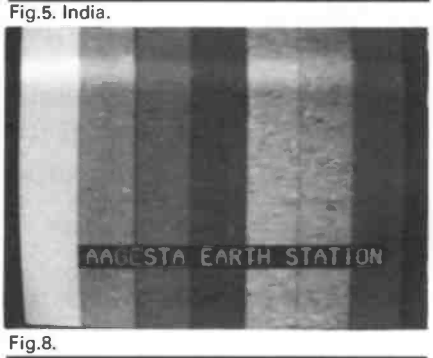


Fig.8.

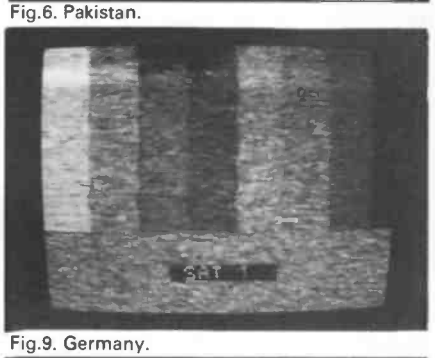


Fig.9. Germany.

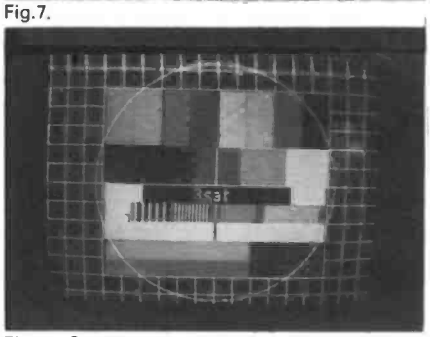


Fig.10. Germany.

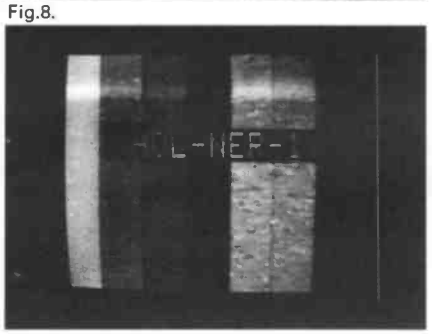


Fig.11. Holland.

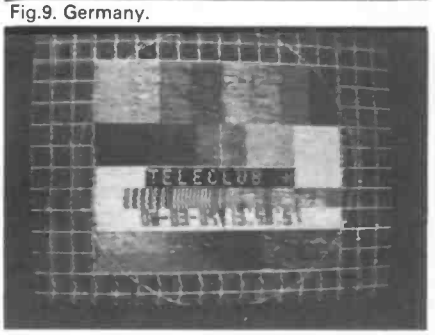


Fig.12.

saw a subtitled film and commercials from Finland on Ch. E3 (55.25MHz). He also saw *Hill Street Blues* with Swedish subtitles, in colour, from Sweden's SVT-1 on Ch. E2.

Although the pictures were distorted, Simon Hamer (New Radnor) identified Iceland's (RUV) logo on Ch. E3, a weather map from Norway on Ch. E4 (62.25MHz) and clock idents from Sweden (SVT-1) on Chs. E2/3/4 and the USSR on Ch. R1. This aurora extended its influence into Band III where Simon found equally deformed signals from Denmark (DR), East and West Germany (ARD and DFF), Ireland (RTE), Norway (NRK), Sweden and the USSR.

Band I F2

At Meerut, **Lt. Col. Rana Roy** received those "multiple smeary and fluttering" pictures and distorted sound, via the F2 region of the ionosphere, during the evenings of February 2-5, 7, 8, 10, 14, 15, 17, March 6 and 8. Although he managed to identify the contents of a few programmes from unidentifiable stations like Fig. 3, seen on Ch. E2, he can confirm that signals from Malaysian TV, Fig. 4, were present on Ch. E2 because, at 2105 on February 4 and during the opening on the 15th, their ident "3" appeared. Rana also found Thailand at 2020 on the 5th.

From a variety of smeary pictures Simon Hamer indentified Arabic Teletext from Dubai and a test-pattern from Iran at 1230 on March 20, test-patterns from Zimbabwe on the 16th and 22nd and possibly Ghana and Kenya on the 21st and 22nd respectively.

Band I Sporadic-E

John Woodcock (Basingstoke) logged very strong pictures from one of the Spanish stations at 0845 on the March 23. "There was a slow fade on the signals but on the peaks the pictures were very good indeed. I am amazed that such pictures are possible on loft antennas," said John. In Great Sutton, **Bob Brooks** logged Spain (TVE) at 1415 on March 20 and Italian (RAI) Breakfast programmes on Chs.Ia and b around 0800 on the 23rd. "There is still some activity around Chs. R1/E2 and E4," wrote **Edwina** and **Tony Mancini** (Belper). They saw test-cards from Czechoslovakia (CST1) and Poland (TVP1) on March 24, Holland (PTT NED1) and Sweden (SVT/K1) on the 26th and Holland and Poland respectively on the 27th and 31st. Their log for April includes various pictures with sound from the USSR on the 8th and test cards from the Norwegian regional Bremanger on the 9th, Holland, Sweden and Italy on the 11th and Finland (YLE/TV1), Holland and Sweden on the 12th.

Around 2055 on March 19, David Glenday logged test-cards scribed "Norge Steigen" and "Norge Hemnes" on Chs. E2 and 3 respectively. Some twenty minutes later a music programme, in colour, and another with Scandinavian subtitles appeared on Ch. E2. Between 2000 and 2135, David watched the news (*Aktuele*) from Sweden, a programme in colour from Finland and an unidentified production on Chs. E2, 3 and 4. respectively. Simon Hamer logged RAI (Italy) on Ch. Ia at 1300 on March 25.

Neil Purling (Hull) has replaced his early DXTV gear with a D100 converter feeding a Pye colour set ready for the 1989 Sporadic-E season. On the subject of photography, Neil says, "be patient" because with rapidly changing signal strengths during a Sporadic-E opening it may take some time to catch the right moment for the best shot.

Tropospheric

Rana Roy observed tropospheric openings, mainly between 0700 and 0830 and some evenings on February 2-5, 15-18, 24-28 and March 2. Most of the signals received by Rana were in Band III and came from Indian and/or Pakistani TV. Among these were pictures from Agra and Jalandhar on Ch. E9, Bhatinda Ch. E12, Fig. 5 (Punjabi News), Kasauli Ch. E6 and Lahore Ch. E5, Fig. 6 (news). The programmes consisted of Breakfast TV in the mornings and in the evenings, news, plays, reviews and songs. "Pictures were fairly clear most of the time and in colour," said Rana.

SEEN & HEARD

The weather was mild and the atmospheric pressure was starting to fall and around 2100 on March 29 co-channel interference was beginning to appear in the u.h.f. band. By 0830 on the 30th, I logged negative pictures, most likely French, on several spots in Band III. These were exceptionally strong when I checked this band again at midday with my Plustron TVR5D and its rod antenna while parked on the South Downs near Harting. At 1800 on the 31st, I received French pictures in Band III and a mild interference could be seen on some u.h.f. stations around 2200.

During the afternoon of April 1 **George Garden** (Edinburgh) drove to a site on the cliffs near Arbroath, placed a log-periodic antenna on top of his car and fed the signals via the appropriate group A, B, C or D amplifier to his set. "This is a promising site when conditions are good," said George, having logged BBC2 from Caldbeck on Ch. 34 coming in waves and mainly black and white, Border CH4 from Selkirk in fair colour on Ch. 65 and a fading erratic signal from Tyne Tees TV on Ch. 61 from Pontop Pike.

Band III and u.h.f. DX poured into Simon Hamer's receiver throughout the evening of March 29 when he logged pictures from AFRTS (Holland), Belgium (BRT1/2, RTBF1 and Tele 21), Czechoslovakia (CST1) on Ch. R10 with flag and national anthem, France (TDF) on most channels in both bands, Denmark (Tommerup, Aabernaa and Hedensted), East and West Germany (DFF1 and ARD/NDR1/3, WDR1 and WEST3), Holland (NED1/2/3), Luxembourg (RTL PLUS French and German), Norway (NRK) and Sweden (SVT1). On April 9, he found Ireland's RTE1 on Chs. E29 and E40 and Network 2 on Chs. E33 and 43.

"I've received a QSL letter from TV2/Denmark and they were surprised that several UK TVDXers were seeing their station....They are based in Odense (birthplace of Hans Christian Anderson) and housed in an old covered cattle market," said Simon.

Les Jenkins (Godalming) spent that weekend in Deal and from his caravan, using a bow-tie-grid wide-band antenna, Fig. 7, received good pictures from Lille (A2, FR3 and TFI) and weak but watchable signals from Holland (NED 2). Bob Brooks received Band III pictures from France (Canal+) and Ireland (RTE) at 2200 on March 28 and again between 1000 and 1050 on the 31st. While a weather system was moving overnight on March 17/18, I noted slight co-channel interference on some u.h.f signals and negative pictures on Ch. F5. Later on the 18th, I checked Band III for DX at several locations but conditions were back to normal. Canal+ was received by Edwina and Tony on April 1, 8, 9 and 12 and they also sent photographs of the coloured test-signals that they have received, via satellite, from Aagesta Earth Station, Fig. 8, Germany (SAT 1 & 3), Figs. 9 and 10, Holland (HOL-NER-1) Fig. 11 and Teleclub+ Fig. 12.

SSTV

During the weekend of April 1 and 2, **Fred Pearce** (Driffield) looked at his first SSTV contest and was delighted with the results. "The quality of the pictures was astounding, they are the best I have ever received," said Fred. In addition to logging a new one for him, YO2IS on 21MHz, he copied pictures from stations in Bulgaria, Czechoslovakia, Denmark, Finland, France, East and West Germany, Holland, Hungary, Italy, Poland, Spain, Sweden and Yugoslavia on 14MHz and Yugoslavia on 21MHz.

The next three deadlines are:
June 19, July 17 & August 21

LONG MEDIUM & SHORT

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

DX Report

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

Long Wave DX

Since Morocco moved their broadcasts in Arabic via Azilal from 209 to 207kHz earlier this year, a new long wave transmitter has been brought into service by R. Jordan in Amman, which radiates their Arabic service on 207kHz. From Macclesfield, **Philip Rambaut** mentioned that he has been hearing a broadcast in Arabic on 209kHz and that a hetrodyne whistle is now evident on that frequency. It is possible that the new transmitter in Jordan resulted in co-channel interference and so one has moved to 209kHz, so far no reports clarify the situation.

Alex Mackow (London) checked the band from Siusi in N. Italy during the evening, he picked up BBC Radio 4 on 198, shared by Burghead (50kW), Droitwich (500kW) and Westerglen (50kW) clearly at 2253. During the early evening he listened to five other countries.

Mark Thompson (Wakefield) picked up the Peace and Progress broadcasts in English from the USSR on 263 at 2030.

MW Transatlantic DX

In Wakefield, Mark Thompson found conditions rather strange during the month, with no sign of any signals from the USA or Canada - not even CJYQ! However, broadcasts from the Atlantic Beacon, Turks and Caicos Islands 1570 and the Caribbean Beacon, Anguilla 1610 were often heard at 333 around 0500. Towards the end of the month transmissions from R. Globo in Rio, Brazil 1220 could be heard between 0210 and 0500. This seems to be a reversal of conditions during the last few months.

Broadcasts from CJYQ in St Johns, NF 930 were heard at 0600 by **Tim Shirley** in Bristol and he managed to log several other Canadian stations during the early hours. A few broadcasts from the USA were noted, mainly from the New York area. Tim uses a loop or choice of outdoor wire antennas plus a.t.u. with either: a Trio R600, a Realistic DX 400, Sony ICF 2001D or ICF 7600DS.

Mark Hattam of Wembley drew my attention to an error in the transatlantic DX charts in the February to April issues. WFAN, NY was logged on their new frequency of 660kHz and not on 1510kHz as shown.

A QSL letter from CJYQ has been received by **Roy Patrick** in Derby, confirming reception of their broadcasts at 2245.

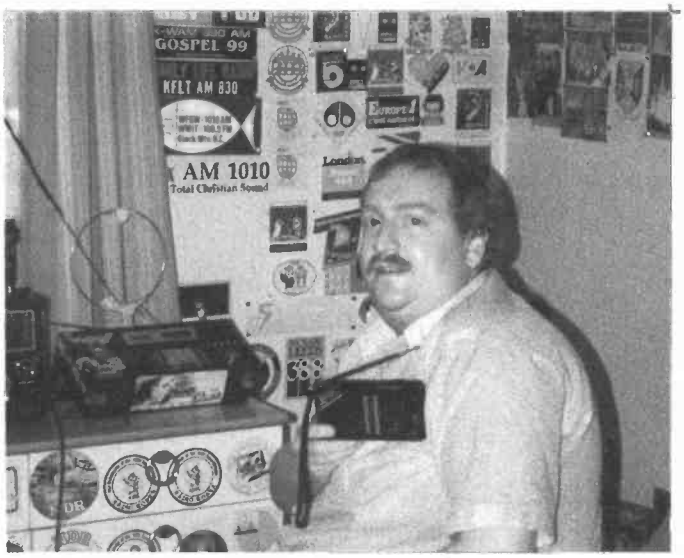
Other MW DX

The broadcasts in Arabic from Al-Hasseeke, Syria on 918kHz were heard for the first time by **Neil Wheatley** in Newcastle-upon-Tyne. After Ljubijana, Yugoslavia on 918 (600kW) had closed down, Neil heard music at 2358, followed by an announcement in Arabic at 0000, which was the same as that used on the s.w. bands by R. Damascus, Syria. This was followed by a reading from the Koran and at 0013 they played the Syrian National Anthem before closing down. This station has not been reported before and is subject to confirmation by QSL.

While in Siusi, Alex Mackow picked up two BBC broadcasts via Orfordness, UK: BBC 648, the multi-lingual service on 648kHz (500kW) at 1811 and their European language service on 1296kHz (500kW) with programmes in Polish at 1828.

MW Local Radio DX

The skywave signals from the high power transmitters used by BBC GLR 1458 (50kW) and ILR Capital Gold 1548 (97.5kW) were received in Siusi, Italy around 2230 by Alex Mackow. Many low power local radio transmitters in the UK were also logged during his visit.



Tim Shirley at his listening post in Bristol.

Broadcasts from BBC Wiltshire Sound via Lacock 1332 have reached listeners well outside their intended service area, but there are problems with co-channel interference on the Swindon transmission 1368. **George Millmore** noted good reception on 1332, but he experienced co-channel interference on 1368 from the BBC R. Sussex transmitter at Duxhurst, near Reigate (500W). Reports indicate that these problems exist in other areas.

No doubt BBC Wiltshire Sound will welcome detailed reception reports on both of their transmissions, but do remember to include an s.a.e. The report from Louis Whitfield in Luton resulted in a QSL letter, engineering info, car stickers and other interesting information.

Having completed a Sooper Loop, Martyn Williams (Sunningdale) says, "It is wonderful - I wish I had built one a long time ago!" Encouraged by these results, Martyn now intends to build the much larger hexagonal spiral loop which John Ratcliffe detailed in the April issue.

Edward Emery (Stoke-on-Trent) built the "Hexagon Loop Antenna". Having connected it to the antenna socket on his receiver he tried it out for the first time and he says, "I could not believe it. It is brilliant!". Edward found that it would also work just as well when placed near to his receiver, but it has proved to be easier to use with a direct connection to the set because only the loop has to be rotated. While checking the m.w. local radio scene with the hexagon loop he logged several stations which were previously inaudible.

During the last few months, some of the ILR broadcasters have adopted new names for their m.w. services. **Francis Hearne** (Ilford) has been trying to keep a check on them: Beacon R. introduced a m.w. service called WABC (Wolverhampton and Black

SEEN & HEARD

Country) in January, which is aimed at the over 55s; Invicta R. launched a new m.w. service called "Coast-AM" on March 27; Saxon R. started broadcasting twenty four hours from April 3; BRMB and Mercia Sound launched a m.w. service called Xtra-AM on April 4. If you know of any ILR m.w. service changes in your area which are not shown in the LM&S chart, please send the details.

Short Wave DX

Nine broadcasters are now taking advantage of the excellent conditions in the **25MHz (11m)** band: RTB, Brussels; R. Norway International (RNI), Oslo; R. Deutsche Welle (DW), Cologne; BBC London; R. RSA, Johannesburg; R. France International (RFI), Paris; R. Denmark, Copenhagen; R. For Peace International, Costa Rica; also BRT External Service, Brussels.

The broadcasts from RTB on 25.645 (Fr, Ger 1000-1250 and 1500-1545) are preceeded by a rhythmic drum beat. They have been heard on three occasions in Quebec, Canada by **Alan Roberts**, who rated them as 35443 at 1530. **Fred Pallant** (Storrington) noticed a pronounced echo effect on their signal at 1000.

RNI use transmitters at Fredrikstad (350kW), Kvitsoy (500kW) and Sveio (500kW) to cover their schedule on 25.730 (Norw to Australia, Middle East 0600-0645; to Africa 1000-1045 Eng Sundays; to W.Africa, S.America 1100-1145; to E.Africa, Middle East 1400-1445; to Africa 1445-1545 and 1800-1845). **Dick Moon** rated them in George, S.Africa as 34433 at 1500. Their broadcasts also reach Quebec, but Alan Roberts rated them as only 15321. In many areas of the UK their signal is poor, but in the north east, Leo Barr rated it as 33433 at 1545.

So far, no reports have arrived here from abroad on the broadcasts from R. DW 25.740, although John Ratcliffe says he picked up a transmission in German while checking the band. Their signals were logged by several UK DXers. Listening in Guildford, **Richard Radford-Reynolds** rated them as 35433 at 1208.

The BBC have extended their broadcasts via Daventry 25.750 (Eng to E.Asia, Africa) from 1100 until 1745. As expected, their signals are potent in Africa and they have also been heard in Australia by John Ratcliffe. They also reach Quebec between 1230 and 1745, Alan Roberts rated them as 25332. Most UK listeners have observed a pronounced echo effect.

The broadcasts from R. RSA 25.790 (Ger 0900-0956 and Eng 1400-1556) to the UK, S.Ireland, W.Africa, W.Europe are being very well received here, the 544 noted at 1400 by Cyril Kellam in Sheffield is typical.

RFI beams its broadcasts to Africa via Issoudun on 25.820 (Fr 0900-1600) and they are reaching their target well. They are also reaching Quebec at 35322 at 1245.

Despite the target areas involved, all of the broadcasts from R. Denmark are in Danish, 25.850 is beamed to Japan 1000-1100; Indonesia and SE Asia 1200-1300; Europe and Africa 1200-1400; Australia 1400-1500; Middle East 1500-1600). Dick Moon logged them at 1200 as 34333 and Alan Roberts as 15221 at 1440.

Mark Hattam has heard their 3kW transmission from R. for Peace Int on 25.945 in Spanish (1400-1700 Mon-

Freq kHz	Station	Country	UTC	DXer
153	Bechar	Algeria	2000	G*
153	DLF Donebach	Germany (W)	500	B,C,D,E,G,J*
153	Brasov	Romania	1200	E
162	Allouis	France	2000	A*,B,C,D,E,F,G,I
171	Medi 1-Nador	Morocco	1200	E*,G*
171	Kaliningrad	USSR	1000	E,I
177	Oranienburg	Germany (E)	750	C,D*,E,J*
183	Saarlouis	Germany (W)	2000	A*,B,C,D,E,I
189	Motala	Sweden	300	C,E
198	BBC Droitwich	UK	400	A*,B*,C,D,E,F,I
207	DLF Munich	Germany (W)	500	C,D*,E
207	Azilal	Morocco	800	A*,E*
216	Roumoules	Monaco	1400	A*,B,C,D,E,I
216	Oslo	Norway	200	E*,J*
225	Konstantinow	Poland	2000	B,C,D,E,I
234	Junglinster	Luxembourg	2000	C,D,E,F,I
245	Kalundborg	Denmark	300	C,D,E,I
254	Tipaza	Algeria	1500	A*,C,D,E
254	Lahti	Finland	200	E
263	Burg	Germany (E)	200	E,I
263	Moscow	USSR	2000	C,D,H
272	Topolna	Czechoslovakia	1500	B,C,D,E,I
281	Minsk	USSR	500	E

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

DXers:
A: Colin Diffell, Corsham.
B: Alex Mackow, Siusi, N.Italy.
C: George Millmore, Wootton, IOW.
D: Fred Pallant, Storrington.
E: Philip Rambaut, Macclesfield.
F: Mark Selby, Aldershot.
G: Tim Shirley, Bristol.
H: Mark Thompson, Wakefield.
I: Neil Wheatley, Newcastle-on-Tyne.
J: Max Wustrau, Bedford.

Freq kHz	Station	ILR BBC	Power (kW)	DXer
567	RTE-1 Tullamore	B	500	G
585	R. Solway	B	2.00	G,P,Q
603	Invicta Sound(Coast)	I	0.10	J,N,D,P,R,S
603	R. Gloucester	B	0.10	C,J,P,S
630	R. Bedfordshire	B	0.20	C,G,H,L,N,O,P,Q,S
630	R. Cornwall	B	2.00	J
657	R. Clwyd	B	2.00	A,C,E,H,L,N,P,Q,S
666	Devonair R	I	0.34	J,N,R,S
666	R. York	B	0.80	E,G,L,N*,P,Q,S
729	BBC Essex	B	0.20	G,H,J,N,O,P,R,S
738	Hereford/Worcester	B	0.037	C,P,R,S
756	R. Cumbria	B	1.00	N,P,S
756	R. Shropshire	B	0.63	C,J,L,N*,P,R,S
765	BBC Essex	B	0.50	C,G,H,J,N,O,P,R,S
774	R. Kent	B	0.70	J,N,O,R,S
774	R. Leeds	B	0.50	E,G,L,P
774	Severn Sound	I	0.14	C,G,P,S
792	Chiltern R	I	0.27	C,G,J,L,N,O,P,S
801	R.Devon	B	2.00	C,G,J,N,P
819	Hereford/Worcester	B	0.037	C,G,P
828	2CR	I	0.27	J
828	R. WM	B	0.20	C,P
828	R. Aire	I	0.12	A,L,P
828	Chiltern R	I	0.20	N,O,P,S
837	R. Cumbria	B	1.50	P
837	R. Furness	B	1.00	L
837	R. Leicester	B	0.45	C,J,N,O,P,S
855	R. Devon	B	1.00	J
855	R. Norfolk	B	1.50	A,H,N,O,P,R,S
855	R. Lancashire	B	1.50	A,G,L,P
873	R. Norfolk	B	0.30	G,H,J,L,P,R,S
936	Brunel R. (GWR)	I	0.18	C,D,G,H,J,P,R,S
945	GEM-AM (R. Trent)	I	0.20	C,J,L,M,P,S
954	Devonair R	I	0.32	C,J,L,M,P,S*
954	R. Wyvern	I	0.16	C,G,P
990	R. Aberdeen	B	1.00	Q
990	WABC (Beacon R.)	I	0.09	C,P,S
990	R. Devon	B	1.00	J
990	Hallam R	I	0.25	L,P
999	Red Rose R	I	0.80	G,L,P,Q*
999	R. Solent	B	1.00	H,J,N,O,R,S
999	GEM-AM (R. Trent)	I	0.25	G,M,P
1026	R. Cambridgeshire	B	0.50	G,H,L,N,O,P,R,S
1026	R. Jersey	B	1.00	J
1035	R. Kent	B	0.50	H,J,N,O,R,S
1035	NorthSound R	I	0.78	E,Q
1035	R. Sheffield	B	1.00	G,L,P
1107	R. Northampton	B	0.50	G,H,J,N,O,P,R,S
1116	R. Derby	B	1.20	C,L,N*,P
1116	R. Guernsey	B	0.50	H,J,N,O,S
1152	BRMB	I	3.00	C
1152	R. Broadland	I	0.83	N*,P,R
1152	LBC	I	23.50	J,N,O,S
1152	Metro R	I	1.80	E*,Q
1152	Piccadilly R	I	1.50	G,L,P
1161	R. Bedfordshire	B	0.10	N,O,P
1161	Brunel R. (GWR)	I	0.16	C,J,S
1161	R. Sussex	B	1.00	J,O,S
1161	R. Tay	I	1.40	P*
1161	Viking Gold	I	0.35	L,N,P
1170	R. Orwell	I	0.28	N
1170	Signal R	I	0.20	C,P
1170	TFM Radio	I	0.32	L,P,Q

Freq kHz	Station	ILR BBC	Power (kW)	DXer
1170	Ocean Sound	I	0.12	H,J,O,S
1242	Invicta Sound(Coast)	I	0.32	G*,J,N*,O,P,S
1251	Saxon R	I	0.76	H,J,M,N,P,R,S
1260	Brunel R. (GWR)	I	1.60	C,H,J,K,S
1260	Marcher Sound	I	0.64	P
1260	GEM-AM Leicester	I	0.29	H,M,P,S
1260	R. York	B	0.50	A,L,P
1278	Pennine R	I	0.43	L,P
1305	R. Hallam	I	0.15	A,G,L,P
1305	Red Dragon R	I	0.20	C,J,N*,S
1323	R. Bristol	B	0.63	C,G,N,P*
1323	Southern Sound	I	0.50	H,J,N,O,S
1332	Hereward R	I	0.60	H,J,N,P,R,S
1332	Wiltshire Sound	B	?	B,C,F,G,J
1359	Essex R	I	0.28	N,R,S
1359	Mercia Sound	I	0.27	C,P,S
1359	R. Solent	B	0.85	J,O
1368	R. Lincolnshire	B	2.00	L,N,P
1368	R. Sussex	B	0.50	J,S
1368	Wiltshire Sound	B	?	C,F,J,R,S
1431	Essex Radio	I	0.35	M,N,P,S
1431	Radio 210	I	0.14	J,O,S
1449	R. Cambridgeshire	B	0.15	G,J,N,P,R
1458	R. Devon	B	2.00	J
1458	GLR	B	50.00	I*,J,L*,O,R,S
1458	R. Newcastle	B	2.00	E,L,P,Q
1458	GMR	B	5.00	P
1458	Radio WM	B	5.00	C
1476	County Sound Gold	I	0.50	H,J,M,N,O,P,S
1485	R. Humberside	B	1.00	G*,L,N,P
1485	R. Merseyside	B	1.20	P
1485	R. Oxford	B	0.50	C,N*,R,S
1485	R. Sussex	B	1.00	H*,J,O,S
1503	R. Stoke-on-Trent	B	1.00	C,L,N*,P
1521	R. Mercury	I	0.64	H*,J,O
1521	R. Nottingham	B	0.50	N,P
1530	R. Essex	B	0.15	N
1530	Pennine R	I	0.74	L,P
1530	R. Wyvern	I	0.52	C,P
1548	R. Bristol	B	5.00	C,G*,R
1548	Capital Gold	I	97.50	H,I*,J,N,O,S
1548	R. Cleveland	B	1.00	L,P,Q
1548	R. Forth	I	2.20	C*,G*
1548	R. Hallam	I	0.74	P
1557	R. Lancashire	B	0.25	P
1557	Chiltern R.N'hants	I	0.76	C,G,L*,N,P,R
1557	Ocean Sound	I	0.50	J,O,P*,S
1584	R. Nottingham	B	1.00	C,L,N,P,S
1584	R. Shropshire	B	0.50	C,P
1602	R. Kent	B	0.25	H,J,N,O,P,S

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

DXers:
A: Leo Barr, Sunderland.
B: Ian Bond, Wirral.
C: Lez Chipperfield, Stourbridge.
D: John Coulter, Winchester.
E: Alan Curry, Stockton-on-Tees.
F: Colin Diffell, Corsham.
G: Edward Emery, Stoke-on-Trent.
H: Sheila Hughes, Morden.
I: Alex Mackow, Siusi, N.Italy.
J: George Millmore, Wootton, IOW.
K: David Minter, Portland.
L: Chris Nykiel, Leeds.
M: Roy Patrick, Derby.
N: Christian Pritchard, Cambridge.
O: Mark Selby, Aldershot.
P: Mark Thompson, Wakefield.
Q: Neil Wheatley, Newcastle-upon-Tyne.
R: Louis Whitfield, Luton.
S: Martyn Williams, Sunningdale.

YOUR ONE STOP LISTENER SERVICE ! Established 1973

HUGE STOCKS — BEST PRICES — GOOD BACKUP — FREE SECURICOR

ALMOST EVERY ITEM IN THIS MAGAZINE FROM STOCK!

SONY AIR-7 HAND-HELD AM/FM 108-176MHz + LW/MW/FM UNBEATABLE VALUE

PRICE DOWN

The best VHF monitor there is. That's a fact! 108-176MHz plus LW/MW/FM broadcast. Covers air, marine, PMR, etc. LCD display, memories, scanning, lockout, priority, etc. Supplies are short but we are the UK's largest stockist, so check with us!

£227 FREE SECURICOR

AM/SSB/CW SONY ICF7600DS PORTABLE COMMUNICATIONS!

PRICE DOWN

Not a toy, but a serious communications receiver. 150kHz-30MHZ AM/SSB plus FM 76-108MHz. Digital readout, memories, clock and provision for external antenna. Listen to the DX at work! Mains or battery.

New SW-1 in stock £249

£159 FREE SECURICOR

VHF/UHF AIRBAND MONITOR SIGNAL R535 £249 Carr. Free

This latest receiver covers both civil and military bands. Coverage is 108-143MHz & 220-380MHz AM. Featuring a 60 channel memory, the receiver will enable you to monitor virtually any air traffic. The 12 volt requirement makes it ideal for base, mobile or portable work.

SONY ICF2001D RECEIVER SUPER PORTABLE AM/SSB/CW + AIR BAND COVERAGE

PRICE DOWN

Described as "the best portable on the market" by a recent reviewer, it covers 150kHz-30MHz AM/SSB/CW plus AM VHF air band and FM broadcast. Memories scanning, etc. are all included. The SSB performance is superb and can match many base station receivers. 230/110v AC power supply included.

£299 FREE SECURICOR

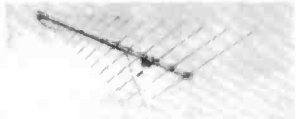
NEW SCANNER PRE-AMP WAZ-1

£69.00

This highly sensitive 3-1500MHz pre-amp will transform the performance of your scanner. Fitted with switched HPF for UHF it requires 12v DC and provides 15dB of gain.

"HEAR THE DIFFERENCE!"

SCANNING AERIALS



CLP 5130 Beam 13dB gain!

Illustrated above, this beam antenna covers 105—1300MHz. A forward gain of up to 13dB and a front to back ratio of 15dB provides the means of dramatically improving reception. With a VSWR better than 2:1 it can also be used for transmission up to 500 watts.

£89.00 plus post £3.00

CLP 5130 50MHz-1300MHz version in stock

£179.00 + £7.50 Securicor

D130N Discone

The D130N antenna is the leader in discones and used by military and research establishments. What better recommendation! Covering 25-1300MHz with low VSWR, it is supplied complete with 50 ft of ultra low loss cable and N plugs,

£82.00 plus post £3.00

OTHER SONY PRODUCTS

IFC7600DA Analogue SW receiver	£129.00
ICF SW1S Micro short wave receiver	£249.00
ICF PRO80 SW/VHF receiver	£299.00
AN1 Active SW antenna	£49.00
AN3 Vertical for Air-7 receiver	£45.00
BP23 Ni-cad battery pack	£16.95
ACD4 Mains PSU/charger	£19.95
DCC 127A 12v car PSU	£24.95

All our Sony stocks carry UK cards and do not have serial numbers etc removed from boxes!

AOR 2002 SCANNER VHF/UHF MONITOR

From AOR the famous VHF/UHF monitor that covers 26-1300MHz AM/FM. Highly compact, 230V or 12V DC with LCD, memories and scanning. Ideal for the serious user. A wide range of facilities and 230V AC or 12V DC.

£475 FREE SECURICOR

AOR 900 SCANNER!

We are approved stockists of this latest model. Look at the range! AM/FM 108-174MHz /220-280 MHz300-380MHz/ 406-470MHz/ 830-950MHz. At last a decent monitor that covers military airband!

£235 + £2 p&p

AT 1000 SWL ATU

This ATU has been designed for the SWL who wants the best out of his aerial system handles all forms of aerials and simple to install.

£69 + £2 p&p

LISTENER ANTENNAS

D 130N Discone 25-1300MHz	£82.00 (3.0)
CLP5130 Log-peridic 105-1300MHz	£89.00 (3.00)
Revcone Discone 70-500 MHz	£32.95 (2.50)
Slim Jim 2m vertical	£8.95 (2.00)
G5RV 80-10m dipole 102ft	£16.95 (1.50)
G5RV 40-10m dipole 51ft	£14.95 (1.50)
Royal Blue Monopole 2-30MHz	£29.95 (3.00)
Sony AN-1 150kHz-30MHz	£49.00 (2.00)
Sony AN-3 VHF vertical	£45.00 (2.00)
Datong D370 Active antenna	£69.00 (2.00)
AT1000 ATU. 150kHz-30MHz	£69.00 (2.50)
CX3A 3 way coax switch	£6.95 (1.50)
Airband Groundplane 118-136MHz	£19.95 (2.50)
PVC wire per metre	0.15 (1.00)
Egg insulators	0.75 (0.20)
SO239 dipole centre insulators	£2.95 (0.75)
Self Amalgamating Tape	£4.49 (0.75)
FRA7700 Yaesu active antenna	£49.00 (2.00)
FRT7700 Rx ATU 1500kHz-30MHz	£59.00 (2.00)

RECEIVERS (Free delivery)

R5000 Short Wave 150kHz-30MHz	£875.000
R2000 Short Wave 150kHz-30MHz	£595.00
VC20 VHF conv. for R5000	£167.00
VC10 VHF conv for R2000	£161.95
FRG8800 150kHz-30MHz	£639.00
FRV8800 VHF converter	£100.00
IC—R71 Short wave 150kHz-30MHz	£825.00
Sony 7600DS Short wave	£159.00
Sony ICF2001D band Short wave + air band	£299.00
Lowe HF125 Short wave	£375.00
FRG9600 Scanner 60-950MHz	£509.00
IC-R7000 Scanner 25-2000MHz	£957.00
AOR 2002 Scanner 25-1300MHz	£475.00
Sony Air-7 VHF scanner	£227.00
Sony Pro-80 VHF + SW scanner	£299.00
R537S Air band monitor	£69.50
R535 Air band scanner	£249.00
R528 Air band xtal scanner	£125.00
WIN 108 Air band scanner	£175.00

LISTENER'S FREQUENCY GUIDES

Add £1.00 post each. Maximum £2.00.

COMPLETE VHF/UHF FREQUENCY GUIDE

If you use a scanner receiver then this guide is for you. covering the range 26 to 2250MHz the guide lists all the main user services together with simplex and duplex frequencies. No other publication gives you so much information. Customers should note that many frequencies cannot be legally monitored without a licence. Ref. CGTVHF/UHF £5.95.

VHF/UHF AIRBAND FREQUENCY GUIDE

This guide has been specially written for the airband enthusiast. It covers both military and civil operations and lists are both numerical and alphabetical. There is much editorial as well as general data. Almost 100 pages packed with the information, professionally prepared and bound. Not the nasty photo copies of just a few pages that some dealers sell! Ref. VHF/UHF £5.95.

MARINE FREQUENCY GUIDE

Here is a new guide that has just been published. It is aimed at the marine enthusiast and runs to 60 pages of printed text covering VHF and HF. All the Port and Coastal stations are listed around the UK together with complete traffic schedules, simplex, duplex and channel numbers. Also listed are the world coastal phone stations. Ref MARINE £4.95.

CONFIDENTIAL SHORT WAVE FREQUENCY LIST

This is an old idea under a new title. Previously known as the UK CONFIDENTIAL FREQUENCY LIST, this new publication has had a radical update with much information added and now represents one of the foremost guides on the subject. Covering every kind of service between 1.6 and 30MHz, it includes broadcast, air, military, marine etc. With Callsigns and times. Ref. SWFG. Available April £7.95

POCKET GUIDE TO FAX & RTTY FREQUENCIES

A useful guide to FAX & RTTY frequencies of the short-wave bands. List frequencies, modes and times where known. Includes SITOR etc. Ref. FAX £2.95

HF OCEANIC AIRBAND COMMUNICATIONS

For those who find an interest in tracking the world's airliners around the globe, this is a must! It lists all the short-wave band aircraft frequencies, both civil and military, and also VOLMETS. There is also some interesting editorial on the structure of this service. Ref. OCEANIC £3.50

WRITE FOR A COPY OF OUR LATEST PRICE LIST AND CATALOGUE

We stock a wide range of products for the radio enthusiast by all the major manufacturers and suppliers. Unfortunately, within the space of this advertisement it is only possible to list a fraction of the range that we stock. We have for some while had one of the best mail order price lists available listing over 700 items. This has now been combined with an illustrated catalogue of some of the special items we import, many of which you will not have seen before. And a copy of it is yours for the asking!

WATERS & STANTON

RETAIL & MAIL ORDER:- 18-20, Main Road, Hockley, Essex SS5 4QS.
Tel: (0702) 206835, 204965

RETAIL ONLY - 12, North Street, Hornchurch, Essex RM11 1QX.
Tel: (04024) 44765

Visa and Access by telephone. 24hr. Answerphone. Early Closing Wednesday

STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA

Telephone (0942) 676790

Turn at the Greyhound Motel on the A580 (East Lancs. Road).

SHOP HOURS
Mon-Fri 9.30-5.00pm
Sat 9.30-4.30pm
24 HOUR MAIL ORDER SERVICE

ANTENNA RANGE

Cushcraft

A3 3 Element Tribander Beam	£262.99
A4 4 Element Tribander Beam	£353.35
10-3CD 3 Element 10m Monobander	£115.04
15-3CD 3 Element 15m Monobander	£139.70
20-3CD 3 Element 20m Monobander	£238.21
AP8 8 Band Vertical 25ft High	£184.35
AP5 5 Band Vertical 25ft High	£123.36
18 Element 2m Boomer Antenna	£108.59
15 Element 2m Boomer Antenna	£85.26
Ringo Ranger 2m Vertical	£42.98

Butternut

HF6VX 6 Band vertical Antenna	£159.00
HF2V 80/40 metre Vertical	£142.00
A1824 HF6V 17/12m Add on kit	£30.99
20MRK HF2V 20m Kit	£33.39

Hy-Gain

TH2MK3 2 Element Tribander	£249.00
18AVT 5 Band Vertical	£146.00

Jaybeam

TB3 Mk3 3 Element Tribander	£348.00
TB2 MK3 2 Element Tribander	£234.00
TB1 MK3 Rotary Triband dipole	£117.30
VR3 MK3 Triband Vertical	£81.56
DB4 4 & 6m Element Beam	£129.37
4Y/4m 4m 4 Element Beam	£44.46
4Y/6m 6m 4 Element Beam	£54.05
LW5/2m 5 element 2m	£20.53
LW8/2m 5 element 2m	£26.28
PBM14/2m Parabeam	£77.05
5XY/2m 5 element Crossed	£39.68
8XY/2m 8 element Crossed	£50.60

HAND HELD SCANNING RECEIVERS

WIN108 Airband	£175.00
AR80DE	£199.00
AR90DUK	£235.00
Basestation Receiver AR2002	£487.00
NEW HF 225 general coverage receiver	£395.00

Kenwood Range

TS940s HF Transceiver	£1995.00
AT940 Automatic Antenna tuner	£244.88
SP940 Speaker with filters	£87.55
TS440S HF Transceiver	£1138.81
AT440 Automatic Antenna tuner	£144.82
PS50 20 amp power supply	£222.49
TS140S HF transceiver	£862.00
PS430 power supply	£173.78
SP430 Speaker	£40.81
AT250 Automatic Antenna tuning unit	£366.00
AT230 Antenna tuning Unit	£208.67
SP230 Speaker with filters	£66.49
TL922 HF Linear amplifier	£1495.00
MC50 Base station microphone	£46.00
MC60A De Luxe desk microphone	£88.22
TR751E 2m Multimode Mobile Transceiver	£599.00
TR851E 70cm multimode transceiver	£699.00
TM231E 50watt 2m Transceiver	£289.00
TM431E 35watt 70cms Transceiver	£318.00
TM701E 25watt 2m/70cm Transceiver	£469.00
TS680S HF Transceiver + 6 Metres	£995.00
TH25 2m FM Hand held Transceiver	£258.00
TH205E 2m FM Handheld Transceiver	£215.26
TH215E 2m Handheld FM Transceiver	£252.00
TH405E 70 cm Handheld FM Transceiver	£288.00
R5000 General coverage receiver	£875.00
VC20 VHF Converter 108-174 MHz	£167.21
R2000 General coverage receiver	£595.00
VC10 VHF Converter 118-174 MHz	£161.95
HS5 De Luxe headphones	£37.54
TS790E Dual Bander Transceiver	£1495.00
LF30A Low Pass Filter	£32.26
SP50 Mobile Speaker Unit	£20.40

Full range of accessories stocked microphones. SWR meter, DC Leads, Antennas etc.

Full size G5RV Antenna £16.50. Half size £14.50. High Power 7MHz Traps £19.50. Diople Kits £25.00. 3.7MHz traps £9.50. 200 watt. 8MHz traps £9.50.

TEN-TEC

We are pleased to announce we are now the official North West Stockist for the full range of the TEN-TEC range of HF equipment.

"Paragon" HF transceiver with full general coverage receive facilities. £1839.00

"Corsair" MkII HF Amateur Band Transceiver. £1200.00

"Argosy" MkII HF Amateur Band Transceiver. £689.00

"Century 22" CW only Transceiver. £399.00

FULL RANGE OF ACCESSORIES AVAILABLE
SEND S.A.E. FOR DETAILS

MFJ Accessories Range

MFJ1601 Random Wire Tuner	£42.02
MFJ1701 6 way Antenna switch	£30.72
MFJ 949C Versatuner	£157.75
MFJ 941D Versatuner	£105.13
MFJ 901B Versatuner	£63.00
MFJ 300 watt dummy load	£28.35
MFJ RF Noise Bridge	£63.10

Rotators

G400	£139.00
G600	£169.00
G600C	£219.00
Diawa MR 750E	£254.00
CDE AR40	£168.72
CD4511R	£237.00

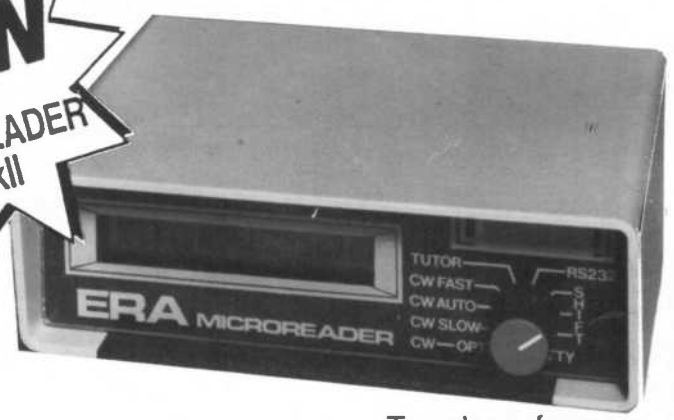
Power Supplies

PS30M Heavy duty 30Amp 22A Cont	£129.50
PS120M 3-15V variable 12Amp max	£79.50

Postage/carriage at cost.
We are also stockist for Global. Cap Co. and have a full range of publications by RSGB-ARRL and others. Our secondhand list is updated daily. Please send SAE for this or any information.

ENTERPRISE RADIO APPLICATIONS LTD.

NEW The MICROREADER MkII



WHAT'S NEW?

Excellent, Amazing, Unbelievable. We don't use such words to describe the Microreader but many of our customers do. What then would they say about the MkII Microreader? With three times more signal processing and computing power packed into this small unit the MkII Microreader will be ahead of anything in it's class well into the nineties. The question most people ask is "Are they as good as people say they are?" to which the answer must be now be "No they're actually better!" But don't just take our word for it, we will be pleased to demonstrate the MkII Microreader together with our amateur products at most rallies this year.

FEATURES

1. **SMALL & COMPACT,** ideal for the small shack. The built in LCD display eliminates the need for TVs or monitors.
2. **LOW COST.** Compare this with any other self-contained reader with these features. Only the highest quality components are used to guarantee performance and reliability.
3. **EASY TO USE.** No computers to set up or tapes to load. No filters, interfaces or special leads. Just connect to headphone socket or speaker and switch on.
4. **MORSE.** Decodes hand or machine sent morse between 5-50 WPM. Auto/man speed tracking. Built in bandpass and notch filters. Noise blanker. LED bargraph tuning and signal strength indicator. Built in text editor.
5. **RTTY.** Decodes and displays both commercial and amateur RTTY. Built in shift indicator. Automatic polarity sense. Unique synchronous sampling system for high noise immunity and wide operating range. Two dedicated control processors to decode, edit and display text (45/50/75 Baud — 170/425/850 Hz shift).
6. **TUTOR.** The built in tutor contains all the features you expect including auto repeat. Plus the ability to see what's being sent or what your sending!
7. **RS232.** For direct connection to compatible terminal units or printers at 1200 to 9600 Baud or to our intelligent buffer/interface at up to 1 Mega Baud.

PRICE £139.95
includes VAT & Postage

Full 12 months guarantee
Also available from:-
R.A.S. (Nottingham)
or CRT Jersey CI

To order or for more information on this other ERA products just ring or drop us a line

ERA Ltd
26 Clarendon Court
Winwick Quay
Warrington WA2 8QP. Telephone (0925) 573118

SEEN & HEARD

Fri) and part of their broadcast in English (2000-2300 Sat). Alan Roberts rates them as 24332.

The report from Dick Moon indicates that the broadcasts to Africa from BRT on 26.050 (Du, Eng, Fr 0900-1130) reach their target as 34343 at 0910. Reception in the UK varies, but Philip Rambaut noted 333 at 0945.

The 21MHz (13m) broadcasts to Europe noted stemmed from UAE R., Dubai 21.605 (Ar, Eng 0615-1645) 33433 at 1030 by **Ken Whayman** in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Leo Barr; Voice of Israel, Jerusalem 21.760 (Russ, Eng, Fr 1000-1200) 44243 at 1128 by Richard Radford-Reynolds; WHRI South Bend, USA 21.840 (Eng 1500-1700) 555 at 1530 by Neil Wheatley; R. RSA, Johannesburg 21.590 (Eng 1400-1556) 434 at 1543 by Ian Bond (Wirral); WYFR, Okeechobee 21.615 (Eng, Ger, It 1600-1845) 343 at 1700 by **Kenneth Buck** in Edinburgh; R. HCJB, Quito 21.470 (Cz, Ger, Eng, Sw, Norw, Dan, Fr, Sp 1800-2230) "very strong" with **John Nash** in Brighton.

There are many broadcasts to areas outside Europe. Logged during the morning were: R. Moscow, USSR 21.790 (Eng to Australia, SE.Asia 2300-0800) 35333 at 0637 by **Kenneth Reece** in Prenton; R. Prague, Czechoslovakia 21.705 (Eng, Cz to SE.Asia 0730-0930) 444 at 0753 by **Mal Tedds** in Nottingham; BBC via Limassol 21.470 (Eng to E.Africa 0500-1615) "a very strong signal at 0800" with **John Parry** in Northwich; BBC via Rampisham 21.710 (Eng to N.Africa 0900-1615) 44444 at 0915 by **Sheila Hughes**; Vatican R., Rome 21.485 (Fr, Eng, Port to Africa 1100-1220) 43444 at 1115 by **Max Wustrau** in Bedford; BRT via Wavre 21.810 (Du to Africa 1100-1200) 34443 at 1200 by **David Edwardson** in Wallsend.

Later, R. Japan via Moyabi, Gabon 21.700 (Eng, Jap to Middle East 1500-1700) was logged at 1520 by **Chris Shorten** in Norwich; SRI via Schwarzenburg 21.630 (Eng, Fr, Ger to Middle East 1515-1700) 35444 at 1533 by David Wratten in Cambridge; R. DW via Julich 21.600 (Eng to S.Africa 1500-1550) 45544 at 1550 by **Christian Pritchard** in Cambridge; RAI Italy 21.560 (It to USA 1830-1905) 211 at 1848 by Philip Rambaut; WCSN, Scotts Corner 21.640 (Eng, Fr, Ger to E.Africa 1800-1955) 534 at 1905 by Alan **Smith** in Northampton; R. Nederlands via Bonaire 21.685 (Eng, Fr, Du to W.Africa 1830-2125) 45544 at 2050 by **Neil Dove** in Lockerbie; R. Nacional de Espana 21.555 (Sp to C.America 2200-0200) also on 21.495 (Sp to S.America 2300-0200) both heard at 0140 by Mark Hattam.

Although the **17MHz (16m)** broadcasts from New Zealand and Australia are intended for other areas, during some mornings they have been reaching the UK. At 0500, Christian Pritchard picked up broadcasts from R. New Zealand, Wellington on 17.705 (Eng to Pacific Areas 2345-0730) at 22222. In Torquay, **George Hewlett** has been monitoring R. Australia via Carnarvon 17.715 (Eng to S.Asia 0100-0915) on a daily basis from 0400. Their signals as very weak or non-existent until 0700, but they usually improve and peak to SIO 433 by 0800.

Broadcasts to other areas have been logged throughout the day. They stem from Vatican R., Rome 17.730 (Am, Fr, Eng to E.Africa 0430-0515) 43333 at 0500 by Sheila Hughes; R. Japan via Yamata 17.810 (Jap, Eng to SE.Asia 0100-1000) 24333 at 0633 by Kenneth Reece; KYOI, Saipan 17.780 (Eng 0200-0800) 333 at 0735 by **John Evans** in Shawforth; R. DW Cologne via Trincomalee 17.875 (Eng to SE.Asia, Australia 0900-0950) 333 by Alan Smith; Africa No.1. Gabon 17.630 (Fr to W.Africa 0800-1600) 35333 at 1110 by Roy Patrick; R. Austria Int. Vienna 17.870 (Ger, Eng to E.USA 1100-1300) 53444 at 1230 by Ken Whayman; Voice of Turkey, Ankara 17.785 (Eng, Ur, Far to S.Asia, Middle East 1330-1500) 35433 at 1340 by John Nash; Voice of the UAE, Abu Dhabi 17.645 (Ar to Middle East 1300-1600) 433 at 1425 by Kenneth Buck; RFI via Issoudun 17.795 (Fr, Eng to E.Africa 1500-1800) 222 at 1622 by Julian Wood in Buckie; R. Oman, Thumrait 17.735 (Ar to Middle East, N.Africa 0800-2130) 433 at 1850 by Philip Rambaut; BBC via Antigua 17.760 (Eng to S.America 2000-2115) 45534 at 2105 by Neil Dove; VOA via Tinang 17.735 (Eng to SE.Asia, Australia 2200-0100) 222 at 2202 by Mal Tedds; KVOH, Van Nuys 17.775 (Sp, Eng to C.America 1400-0100) 33333 at 0000 by Mike Smith in Cambridge; R. Japan via Yamata 17.845 (Jap, Eng to S.Asia 0000-0300) 23332 at 0100 by Max Wustrau.

Some broadcasters beam their programmes, in a variey of languages, towards Europe. They include R. Pakistan, Islamabad 17.660 (Ur, Eng 0715-1120) 34333 at 1105 by David Wratten; R. Bangladesh, Dacca 17.710 (Eng 1230-1300) 43333 at 1230 by Christian Pritchard; R. Nacional de Espana 17.730 (Sp 1030-1900) heard at 1403 by **John Coulter** in Winchester; R. RSA, Johannesburg 17.795 (Eng 1800-1856) 32443 at 1800 by Richard Radford-Reynolds; WYFR via Okeechobee 17.845 (Sp, Ar, Fr, Eng 1600-1945) 34433 at 1900 by Darran **Taplin** in Tunbridge Wells; HCJB, Quito 17.790 (Cz, Ger, Eng, Sw, Norw, Dan, Fr, Sp 1800-2230) 433 at 2130 by **Alf Gray** in Birmingham.

Some of the **15MHz (19m)** broadcasts from R. Australia have been reaching the UK during the early evening. Listening at 2110, Alf Gray noted their transmission to the C.Pacific area via Shepparton 15.160 (Eng 2100-0700) as SIO 444. At 2200,

Freq MHz	Station	Country	UTC	DXer
3.215	R.Orange	S.Africa	0435	N
3.230	ELWA Monrovia	Liberia	2040	M
3.255	BBC via Maseru	Lesotho	1919	B
3.270	SWABC 1, Namibia	S.W.Africa	1905	M,N
3.300	V of Rev. Bujumb	Burundi	1923	B
3.330	R.Kigali	Rwanda	1917	B
3.345	ZBS Lusaka	Zambia	0400	N
3.355	R.Botswana	Gabarone	1912	B,L
3.365	GBC Radio 2	Ghana	2020	N
3.777	VOIRI Tehran	Iran	1926	L
3.909	R.Beijing	China	2350	N
3.910	AFRTS Tokyo	Japan	0400	N
3.915	BBC Kranji	Singapore	2050	D,F,J,M,O,T
3.925	AIR Delhi	India	0037	H
3.955	BBC Daventry	England	1925	D,F,J,N,Q, U,V
3.965	RFI Paris	France	2030	F,J,M,Q,U,V
3.975	BBC Skelton	England	2050	M
3.980	R.Pakistan	Islamabad	2306	V
3.980	VOA Munich	W.Germany	2050	M
3.985	R.Beijing, China	via SRI Berne	2035	J,K,U
3.985	SRI Berne	Switzerland	1915	F,J,N
3.990	RFE Munich	W.Germany	2030	M,N
3.995	DW Cologne (Julich)	W.Germany	2300	D,F,N,Q,V
4.040	Yerevan	USSR	1615	N
4.060	R.Moscow Kharkov	USSR	2035	F,N
4.220	PBS Xinjiang	China	2326	H
4.450	R.Afghanistan	via USSR	0900	N
4.460	R.Beijing	China	2200	N
4.500	Xinjiang	China	2326	H
4.635	R.Dushanbe Tadzhik	USSR	0100	I
4.719	RRI	Indonesia	2055	R
4.735	Xinjiang	China	2326	H,U
4.740	R.Afghanistan	via USSR	1902	M,O,P,T,U
4.750	R.Bertoura	Cameroon	2035	M
4.755	Caracol Neiva	Columbia	0105	H,L,P,R,T,V
4.760	Yunnan Kumming	China	2250	B,T
4.760	ELWA Monrovia	Liberia	2020	J,L,M,N
4.760	R.Afghanistan	via USSR	1910	U
4.765	R.Moscow	via Cuba	0553	P
4.770	FRCN Kaduna	Nigeria	2140	M,N,R,T,U
4.775	RRI Jakarta	Indonesia	2158	R
4.780	RTD	Djibouti	1900	T
4.785	RTM Bamako	Mali	2040	M
4.785	R.Baku	USSR	2030	G
4.789	RRI Fak-Fak	Indonesia	2000	R
4.795	R.Moscow	USSR	2040	A,F,G,J,M, S,T
4.795	R.Moscow, Ulan Ude	USSR	2339	V
4.800	LNBS Lesotho	Maseru	1700	N
4.805	R.Nac.Amazonas	Brazil	2210	B,E,T
4.810	R.Yerevan	USSR	2110	G,M,N
4.815	R.Nac.Tabatinga	Brazil	2215	E
4.815	R.Beijing	China	2230	T
4.815	R.diff TV Burkina	Ouagadougou	2030	M,P,T
4.820	R.Botswana	Botswana	2100	M,N
4.820	La Voz Evangelica	Honduras	0352	B,N
4.820	Khanty-Mansiysk	USSR	0007	T
4.825	R.Ashkhabad	USSR	2235	G,P
4.830	R.Grigota, Santa Cruz	Bolivia	2359	V
4.830	Africa No.1	Gabon	2020	C,F,G,H,I,J, M,N,O, P,T,U
4.830	R.Tachira	Venezuela	0200	G,I,J,N,T,V
4.835	R.Tezulutlan, Coban	Guatemala	0136	R
4.835	RTM Bamako	Mali	2010	A,G,H,I, M,N,P,T

Freq MHz	Station	Country	UTC	DXer
4.845	ORTM Nouakchott	Mauritania	2217	G,H,M,N, P,T,U
4.850	R.Yaounde	Cameroon	2000	B,G,L, M,N,P,U
4.850	R.Capital, Caracus	Venezuela	0145	J,P,T
4.855	R.Mozambique	Mozambique	0400	B
4.860	AIR New Delhi	India	1644	T
4.860	Kalinin	USSR	2047	F
4.865	R.Sociedade,F.Santana	Brazil	0015	V
4.865	PBS Lanzhou	China	2200	B,H
4.865	V of Cinaruco	Colombia	0458	B,H,L,P,T
4.870	R.Cotonou	Benin	2130	B,G,M,R,T
4.875	R.Nac. Boa Vista	Brazil	0047	T
4.875	R.Tbilisi	USSR	1930	L
4.880	SABC Radio 5	S.Africa	1930	L,M,P,T
4.885	R.Clube do Para	Brazil	0103	B,T
4.885	Voice of Kenya	Kenya	1900	B,M
4.890	RFI Paris	via Gabon	1950	I,M
4.890	ORTS Dakar	Senegal	2100	G,M,P
4.895	R.Ashkabad	USSR	2035	F,J
4.895	R.Moscow, Kalinin	USSR	2045	D,I,M,T,V
4.900	V de la Rev.Conakry	Guinea	1910	M
4.905	R.Araguaia	Brazil	2253	B
4.905	R.Relogio, Rio	Brazil	0700	N
4.905	R.Nat.N'djamena	Chad	2100	G,M,P
4.910	R.Zambia, Lusaka	Zambia	2000	M
4.915	PBS Guangxi, Nanning	China	0547	P
4.915	R.Ghana, Accra	Ghana	2000	L,M,N,T
4.920	R.Quito	Ecuador	0608	H
4.920	R.Moscow B, Yakutsk	USSR	1900	M
4.925	R.Nacional, Bata	Eq.Guinea	2040	M
4.925	R.Mozambique, Maputo	Mozambique	1844	P
4.930	R.Moscow, Ashkhabad	USSR	1820	A,G
4.935	Voice of Kenya	Kenya	1950	B,F,J, L,M,P,R,T
4.940	R.Afghanistan	via USSR	1826	A
4.940	R.Kiev	USSR	2105	A,G,M,N,T
4.945	Caracol, Neiva	Colombia	0453	B
4.959	RTV Malagasy	Madagascar	0325	T
4.960	R.Baku	USSR	2017	G,L
4.965	R.Poti	Brazil	0211	B
4.970	R.Rumbos, Caracas	Venezuela	0345	B,J,N
4.975	R.Uganda, Kampala	Uganda	1920	M,N,P,T
4.975	R.Dushanbe	USSR	0015	I
4.980	Ecos del Torbes	Venezuela	0145	G,T
4.985	R.Brazil Central	Brazil	0450	B,P
4.990	FRCN Lagos	Nigeria	0500	H,N,U
5.005	R.Nacional, Bata	Eq.Guinea	2030	F,G,M,N,T
5.010	SBC Singapore	Singapore	0600	N
5.015	R.Moscow Arkhangelsk	USSR	2021	G,L
5.020	ORTN Niamey	Niger	2025	H,M,N,P
5.025	R.Rebelde, Habana	Cuba	0240	G,T
5.025	R.Uganda, Kampala	Uganda	2040	L,M
5.030	R.Impacto	Costa Rica	0110	H,J,P,T
5.035	R.Bangui	C.Africa	2030	M,T
5.040	R.Tbilisi	USSR	1927	F,U
5.045	R.Cultura do Para	Brazil	0647	P,T
5.045	R.Togo, Lome	Togo	2007	L,M,N,P,T
5.050	R.Tanzania	Tanzania	1847	B,L
5.050	R.Mundial, Caracas	Venezuela	0558	R
5.055	Faro del Caribe	Costa Rica	0442	B,P
5.055	RFO Cayenne(Matoury)	French Guiana	0615	P
5.055	TWR Manzizi	Swaziland	0500	N
5.057	R.Tirana Gjirokaster	Albania	1855	J,M,O,P,T,U
5.065	R.Candip, Bunia	Zaire	1940	B,M
5.095	R.Sutatenza, Bogata	Colombia	2300	N
5.260	R.Alma Ata	USSR	2351	P
5.800	PBS Xinjiang	China	2317	A,P

DXers:
A: Leo Barr, Sunderland.
B: Ian Baxter, Blackburn.
C: John Coulter, Winchester.
D: Alan Curry, Stockton-on-Tees.
E: Ferdy De Martin, Cortaillod, Switzerland.
F: Colin Diffell, Corsham.
G: Neil Dove, Lockerbie.
H: David Edwardson, Wallsend.
I: Bill Griffith, London.
J: Sheila Hughes, Morden.
K: Cyril Kellam, Sheffield.
L: John Nash, Brighton.
M: Fred Pallant, Storrington.
N: Christian Pritchard, Cambridge.
O: Richard Radford-Reynolds, Guildford.
P: Kenneth Reece, Prenton.
Q: Mark Selby, Aldershot.
R: Tim Shirley, Bristol.
S: Mal Tedds, Nottingham.
T: Mark Thompson, Wakefield.
V: Neil Wheatley, Newcastle-upon-Tyne.
V: Max Wustrau, Bedford.

SEEN & HEARD

Philip Rambaut logged their broadcast to central Asia via Darwin 15.170 (Chin 2200-0000) as 222.

George Hewlett says their transmission to the central Pacific area via Shepparton 15.240 (Eng 2100-0730) probably provides the best reception during the early morning. Mark Thompson logged it as a remarkable SIO 444 at 0545. George noted that 15.160 may also be heard, but it is weaker than 15.240 and suffers from co-channel interference. Their broadcasts via Carnarvon to E.Asia 15.395 (Eng, Chin 0100-0900) were logged as 22222 at 0802 by Kenneth Reece and to S.Asia 15.415 (Eng 0900-1100) as 24532 at 1036 by David Edwardson. George says "15.415 may be heard opening up at 0900 at SIO 433, but it gets severe interference by 1000 and reception is then unusable".

The broadcasts from R. New Zealand, Wellington to Australia and Papua New Guinea 15.150 (Eng to 2345-0730) have also been reaching the UK during the early morning. In New Radnor, **Simon Hamer** picked up their transmission at 0500.

Broadcasts to outside Europe were logged. During the day: BBC via Limassol 15.420 (Eng to E.Africa 0630-0900) 34233 at 0652 by Kenneth Reece; R. Japan via Yamata 15.270 (Eng, Jap to Australia 0500-1000) 333 at 0740 by **David Middlemiss** in Eyemouth; R. Liberty via Lampertheim 15.445 (Russ to C.Asia, Middle East 0500-1300) 44454 at 0800 by Gary Judd in Hayes; R. Pakistan, Islamabad 15.605 (Ar, Ur to Middle East 1200-1545) 43343 at 1230 by Christian Pritchard; WYFR via Taipei 15.055 (Eng to S.Asia 1302-1502) logged at 1310 by John Coulter; R. Yugoslavia, Belgrade 15.325 (Eng to USA 1300-1330) 55555 at 1310 by John Nash; R. Veritas, Manila 15.220 (Chin, Tel, Si, Ta, Beng, Eng to S.Asia 1230-1530) 343 at 1500 by John Evans; R. DW via Wertachtal 15.595 (Ur, Hi, Eng to S.Asia 1430-1650) 444 at 1602 by Ian Bond; R. Prague, Czechoslovakia 15.155 (Cz, Eng, Ar to W.Africa 1430-1725) 555 at 1605 by Kenneth Buck; R. Portugal, Lisbon 15.220 (Port, Eng to Middle East, S.Asia 1500-1630) 33333 at 1605 by David Wratten.

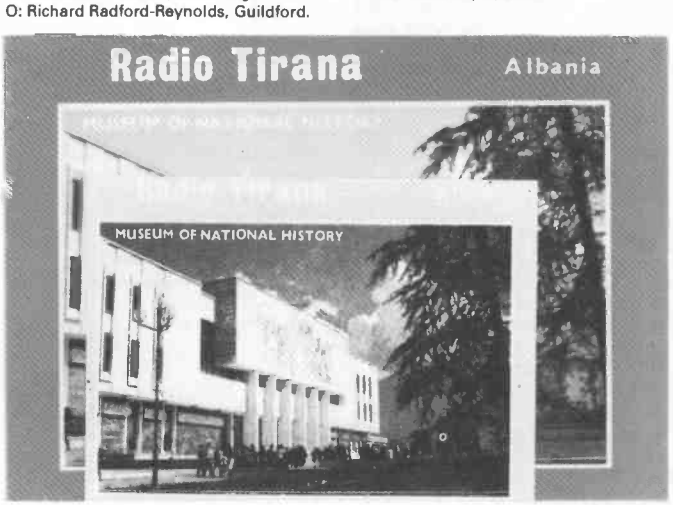
Later, R. Bucharest, Romania 15.365 (Eng, Port to Africa 1730-1826) was logged as 55455 at 1739 by Ian Curry in Stockton-on-Tees; R. Nederlands via Talata Volon 15.175 (Eng to E.Africa 1830-1925) 44444 at 1830 by Richard Radford-Reynolds; BBC via Kranji 15.140 (Eng to SE.Asia, Australia 1900-2300) 433 at 1945 by Alan Smith; R. Nacional de Espana 15.375 (Eng, Fr to Africa 1900-2100) 43444 at 1949 by Leo Barr; KUSW, Salt Lake City 15.650 (Eng to E.USA 1600-2200) 43333 at 2100 by Mike Smith; R. Nac. Chile, Santiago 15.140 (Sp to S.America 1030-0400) 55455 at 2130 by Ferdy de Martin in Cortaillod; VOA via Greenville 15.580 (Eng to W.Africa 1600-2200) 444 at 2159 by Mal Tedds; WCSN, Scotts Corner 15.300 (Eng to W.Africa 2200-0000) 43433 at 2200 by Ken Whayman; R. HCJB, Quito 15.155 (Eng to USA 0000-0300) 43333 at 0300 by Sheila Hughes.

Some broadcasts to Europe were also noted: ISBS Rikisurvarpid, Iceland 15.770 (Ic 1215-1245), heard by Simon Holland in Douglas, IOM.; UAE R. Dubai 15.435 (Ar, Eng 0615-1645) 222 at 1601 by Julian Wood; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Fr, Sp 1600-2130) 433 at 1900 by **Terry Roy** in Gateshead; LJB, Tripoli 15.415 (Ar 1130-0230) 45554 at 1925 by John Parry; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) 32222 at 1930 by David **Minter** in Portland; Voice of Israel, Jerusalem 15.095 (Russ, Eng, Fr, Heb 0530-2030) heard at 2029 by **Ron Pearce** in Bungay; R. Korea, Seoul 15.575 (Ar, It, Port, Eng, Ger, Sp 1645-2300) 44344 at 2108 by **Alan Curry** in Stockton-on-Tees; RCI via Sackville 15.325 (Russ, Uk, Fr, Eng, Pol, Ger, Cz 1430-2200) 333 at 2140 by Alf Gray; R. RSA, Johannesburg 15.365 (Eng 1800-2056) 55434 at 2040 by Neil Dove; R. HCJB, Quito 15.270 (Cz, Ger, Eng, Sw, Norw, Dan, Fr 1800-2200) 55555 at 2145 by Chris Shorten; WINB, Red Lion 15.185 (Eng 2003-2245) 25332 at

Freq MHz	Station	Country	UTC	DXer
3.215	R.Orange	S.Africa	0435	N
3.230	ELWA Monrovia	Liberia	2040	M
3.255	BBC via Maseru	Lesotho	1919	B
3.270	SWABC 1, Namibia	S.W.Africa	1905	M,N
3.300	V of Rev. Bujumb	Burundi	1923	B
3.330	R.Kigali	Rwanda	1917	B
3.345	ZBS Lusaka	Zambia	0400	N
3.355	R.Botswana	Gaborone	1912	B,L
3.365	GBC Radio 2	Ghana	2020	N
3.777	VOIRI Tehran	Iran	1926	L
3.909	R.Beijing	China	2350	N
3.910	AFRTS Tokyo	Japan	0400	N
3.915	BBC Kranji	Singapore	2050	D,F,J,M,Q,T
3.925	AIR Delhi	India	0037	H
3.955	BBC Daventry	England	1925	D,F,J,N,Q, U,V
3.965	RFI Paris	France	2030	F,J,M,Q,U,V
3.975	BBC Skelton	England	2050	M
3.980	R.Pakistan	Islamabad	2306	V
3.980	VOA Munich	W.Germany	2050	M
3.985	R.Beijing, China	via SRI Berne	2035	J,K,U
3.985	SRI Berne	Switzerland	1915	F,J,N
3.990	RFE Munich	W.Germany	2030	M,N
3.995	OW Cologne (Julich)	W.Germany	2300	D,F,N,Q,V
4.040	Yerevan	USSR	1615	N
4.060	R.Moscow Kharkov	USSR	2035	F,N
4.220	PBS Xinjiang	China	2326	H
4.450	R.Afghanistan	via USSR	0900	N
4.460	R.Beijing	China	2200	N
4.500	Xinjiang	China	2326	H
4.635	R.Dushanbe Tadzhik	USSR	0100	I
4.719	RRI	Indonesia	2055	R
4.735	Xinjiang	China	2326	H,U
4.740	R.Afghanistan	via USSR	1902	M,O,P,T,U
4.750	R.Bertoura	Cameroon	2035	M
4.755	Caracol Neiva	Columbia	0105	H,L,P,R,T,V
4.760	Yunnan Kumming	China	2250	B,T
4.760	ELWA Monrovia	Liberia	2020	J,L,M,N
4.760	R.Afghanistan	via USSR	1910	U
4.765	R.Moscow	via Cuba	0553	P
4.770	FRCN Kaduna	Nigeria	2140	M,N,R,T,U
4.775	RRI Jakarta	Indonesia	2158	R
4.780	RTD	Djibouti	1900	T
4.785	RTM Bamako	Mali	2040	M
4.785	R.Baku	USSR	2030	G
4.789	RRI Fak-Fak	Indonesia	2000	R
4.795	R.Moscow	USSR	2040	A,F,G,J,M, S,T
4.795	R.Moscow, Ulan Ude	USSR	2339	V
4.800	LNBS Lesotho	Maseru	1700	N
4.805	R.Nac.Amazonas	Brazil	2210	B,E,T
4.810	R.Yerevan	USSR	2110	G,M,N
4.815	R.Nac.Tabatinga	Brazil	2215	E
4.815	R.Beijing	China	2230	T
4.815	R.diff TV Burkina	Ouagadougou	2030	M,P,T
4.820	R.Botswana	Botswana	2100	M,N
4.820	La Voz Evangelica	Honduras	0352	B,N
4.820	Khanty-Mansiysk	USSR	0007	T
4.825	R.Ashkhabad	USSR	2235	G,P
4.830	R.Grigota, Santa Cruz	Bolivia	2359	V
4.830	Africa No.1	Gabon	2020	C,F,G,H,I,J, M,N,O, P,T,U
4.830	R.Tachira	Venezuela	0200	G,I,J,N,T,V
4.835	R.Tezulutlan, Coban	Guatemala	0136	R
4.835	RTM Bamako	Mali	2010	A,G,H,I, M,N,P,T
4.845	ORTM Nouakchott	Mauritania	2217	G,H,M,N, P,T,U
4.850	R.Yaounde	Cameroon	2000	B,G,L, M,N,P,U
4.850	R.Capital, Caracus	Venezuela	0145	J,P,T
4.855	R.Mozambique	Mozambique	0400	B
4.860	AIR New Delhi	India	1644	T
4.860	Kalinin	USSR	2047	F
4.865	R.Sociedade,F.Santana	Brazil	0015	V
4.865	PBS Lanzhou	China	2200	B,H
4.865	V of Cinaruco	Colombia	0458	B,H,L,P,T
4.870	R.Cotonou	Benin	2130	B,G,M,R,T
4.875	R.Nac. Boa Vista	Brazil	0047	T
4.875	R.Tbilisi	USSR	1930	L
4.880	SABC Radio 5	S.Africa	1930	L,M,P,T
4.885	R.Clube do Para	Brazil	0103	B,T
4.885	Voice of Kenya	Kenya	1900	B,M
4.890	RFI Paris	via Gabon	1950	I,M
4.890	ORTS Dakar	Senegal	2100	G,M,P
4.895	R.Ashkabad	USSR	2035	F,J
4.895	R.Moscow, Kalinin	USSR	2045	D,I,M,T,V
4.900	V de la Rev.Conakry	Guinea	1910	M
4.905	R.Araguaia	Brazil	2253	B
4.905	R.Relogio, Rio	Brazil	0700	N
4.905	R.Nat.N'djamena	Chad	2100	G,M,P
4.910	R.Zambia, Lusaka	Zambia	2000	M
4.915	PBS Guangxi, Nanning	China	0547	P
4.915	R.Ghana, Accra	Ghana	2000	L,M,N,T
4.920	R.Quito	Ecuador	0608	H
4.920	R.Moscow B, Yakutsk	USSR	1900	M
4.925	R.Nacional, Bata	Eq.Guinea	2040	M
4.925	R.Mozambique,Maputo	Mozambique	1844	P
4.930	R.Moscow, Ashkhabad	USSR	1820	A,G
4.935	Voice of Kenya	Kenya	1950	B,F,J, L,M,P,R,T
4.940	R.Afghanistan	via USSR	1826	A
4.940	R.Kiev	USSR	2105	A,G,M,N,T
4.945	Caracol, Neiva	Colombia	0453	B
4.959	RTV Malagasy	Madagascar	0325	T
4.960	R.Baku	USSR	2017	G,L
4.965	R.Poti	Brazil	0211	B
4.970	R.Rumbos, Caracas	Venezuela	0345	B,J,N
4.975	R.Uganda, Kampala	Uganda	1920	M,N,P,T
4.975	R.Dushanbe	USSR	0015	I
4.980	Ecos del Torbes	Venezuela	0145	G,T
4.985	R.Brazil Central	Brazil	0450	B,P
4.990	FRCN Lagos	Nigeria	0500	H,N,U
5.005	R.Nacional, Bata	Eq.Guinea	2030	F,G,M,N,T
5.010	SBC Singapore	Singapore	0600	N
5.015	R.Moscow Arkhangelsk	USSR	2021	G,L
5.020	ORTN Niamey	Niger	2025	H,M,N,P
5.025	R.Rebelde, Habana	Cuba	0240	G,T
5.025	R.Uganda, Kampala	Uganda	2040	L,M
5.030	R.Impacto	Costa Rica	0110	H,J,P,T
5.035	R.Bangui	C.Africa	2030	M,T
5.040	R.Tbilisi	USSR	1927	F,U
5.045	R.Cultura do Para	Brazil	0647	P,T
5.045	R.Togo, Lome	Togo	2007	L,M,N,P,T
5.050	R.Tanzania	Tanzania	1847	B,L
5.050	R.Mundial, Caracas	Venezuela	0558	R
5.055	Faro del Caribe	Costa Rica	0442	B,P
5.055	RFO Cayenne(Matoury)	French Guiana	0615	P
5.055	TWR Manzizi	Swaziland	0500	N
5.057	R.Tirana Gjirokaster	Albania	1855	J,M,O,P,T,U
5.065	R.Candip, Bunia	Zaire	1940	B,M
5.095	R.Sutatenza, Bogata	Colombia	2300	N
5.260	R.Alma Ata	USSR	2351	P
5.800	PBS Xinjiang	China	2317	A,P

DXers:
A: Leo Barr, Sunderland.
B: Ian Baxter, Blackburn.
C: John Coulter, Winchester.
D: Alan Curry, Stockton-on-Tees.
E: Ferdy De Martin, Cortaillod, Switzerland.
F: Colin Diffell, Corsham.
G: Neil Dove, Lockerbie.
H: David Edwardson, Wallsend.
I: Bill Griffith, London.
J: Sheila Hughes, Morden.
K: Cyril Kellam, Sheffield.
L: John Nash, Brighton.
M: Fred Pallant, Storrington.
N: Christian Pritchard, Cambridge.
O: Richard Radford-Reynolds, Guildford.
P: Kenneth Reece, Prenton.
Q: Mark Selby, Aldershot.
R: Tim Shirley, Bristol.
S: Mal Tedds, Nottingham.
T: Mark Thompson, Wakefield.
V: Neil Wheatley, Newcastle-upon-Tyne.
V: Max Wustrau, Bedford.

QSL from Radio Tirana sent in by Niel Wheatley



DEWSBURY ELECTRONICS

G4CLX

IF IT'S KENWOOD IT MUST BE DEWSBURY

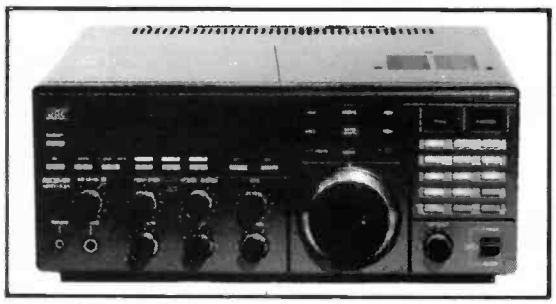
A FULL RANGE ALWAYS IN STOCK

FRG 8800 £639

KENWOOD R5000 £875

APPROVED KENWOOD DEALER

KENWOOD R2000 £595



NRD 525 £1,095

APPROVED KENWOOD DEALER

IC — R 71E £825

DEWSBURY ELECTRONICS ARE ABLE TO OFFER THE SHORT WAVE LISTENER A FULL RANGE OF RECEIVERS, RTTY, TOR, FAX, ASCII, DECODERS, PRINTERS AND MONITORS.

AERIALS ARE AVAILABLE FOR ANY SIZE OF INSTALLATION.

WAVECOM W4010

THE FINEST DECODER IN THE WORLD NOW WITH FAX. FROM **£895** — SAE DETAILS

A STAMPED ADDRESSED ENVELOPE WILL BRING YOU DETAILS OF ANY OF THESE PRODUCTS.

REPAIR FACILITIES AVAILABLE FOR ALL TYPES OF RECEIVER — 7 DAY TURN-AROUND, COLLECTION AND DELIVERY ARRANGED. PHONE FOR DETAILS.

Stockists of DAIWA – KENWOOD – TEN TEC – ICOM – YAESU – WAVECOM
MICROWAVE MODULES – BNOS – STAR MASTER KEY

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228
Telex: 336712 SHELTN G

VISA

Access

Instant finance available subject to status. Written details on request.

SEEN & HEARD

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
710	WOR	New York, NY	0030	A
770	WABC	New York, NY	2300	A
880	WCBS	New York, NY	0100	A
1010	WINS	New York, NY	2330	A
1560	WQXR	New York, NY	0200	A
		Canada		
930	CJYQ	St.John's, NF	0600	A
940	CBM	Montreal, PQ	0400	A
950	CHER	Sydney, NS	0200	A
1150	CKOC	Hamilton, ON	0430	A
		C.America & Caribbean		
1570	Atlantic Beacon	Turks & Caicos Ils	0455	B
1610	Caribbean Beacon	Anguilla	0500	B
		South America		
1220	R.Globo	Rio, Brazil	0210	B

DXers:
A: Tim Shirley, Bristol.
B: Mark Thompson, Wakefield.

2200 by Roy Patrick; ,RAE, Buenos Aires 15.345 (Ar, Eng, Ger, Fr, It, Sp 1700-2300) 333 at 2200 by Cyril Kellam; WINB Red Lion 15.145 (Eng, Fr 2248-2345) 344 at 2314 by Neil Wheatley.

Logged on the 13MHz (22m) were: SRI via Sottens 13.685 (It, Eng, Ger, Fr to Australia, Pacific area 0745-1030) 54544 at 1000 by Ken Whayman and on 13.635 (Eng, Fr, Ger, It to E.Asia 1045-1300) 44444 at 1100 by Sheila Hughes; Peace and Progress via Moscow, USSR 13.700 (Chin, Eng to SE.Asia 1300-1430) 444 at 1410 by Kenneth Buck; R. Prague, Czechoslovakia 13.715 (Cz, Eng, Ar, Fr to S.Asia, Middle East 1400-2125) 434 at 1536 by Ian Bond; AWR Agat, Guam 13.720 (Ta, Mal, Tel, Hi to S.Asia 1500-1700) 22322 at 1559 by Darran Taplin; R. DW via Wertachtal 13.790 (Ha, Eng to Africa 1800-1950) 433 at 1940 by Alan Smith; WYFR via Okeechobee 13.695 (Fr, Eng to E.USA 1200-2245) 34333 at 2211 by Leo Barr; AWR Agat, Guam 13.720 (Chin to C.Asia 2200-0200) 111 at 2228 by Philip Rambaut.

A number of broadcasters are using 13MHz to reach Europe during the day. They include R. Jordan, Amman 13.655 (Eng 0500-1420) 34433 at 0801 by David Edwardson; R. Austria Int., Vienna 13.730 (Ger, Fr, Eng, Sp 0700-1700) 45444 at 1100 by Roy Patrick; WCSN, Scotts Corner 13.760 (Eng, Fr, Ger 1400-1555) 55444 at 1400 by John Nash; I,SBS Rikisutvarpid, Iceland 13.770 (Ic 1855-1930) 45444 at 1929 by Kenneth Reece; also WRNO New Orleans 13.720 (Eng 2100-0000) 23232 at 2130 by Mike Smith.

R. Australia have also been reaching the UK in the 11MHz (25m) band during the early morning. George Hewlett found their transmission to Europe and the south Pacific area via Shepparton 11.910 (Eng 0400-0630) often inaudible until 0530. At 0630, Alan Smith rated it as 433. Their transmission via Shepparton to the central Pacific area 11.720 (Eng 0830-0930) was rated as 34433 at 0849 by David Edwardson.

Other broadcasts mentioned were: VOA via Monrovia 11.915 (Eng to W.Africa 0600-0700) 33333 at 0630 by Kenneth Reece; AWR Agana, Guam 11.805 (Eng to Australia 0930-1100) 232 at 0940 by John Evans; SBC Singapore 11.940 (Eng to SE.Asia 2200-1605) 32322 at 1030 by Christian Pritchard; SRI via Schwarzenburg 11.935 (Eng Fr, Ger, It 1045-1300) 444 at 1112 by Mal Tedds; R. RSA, Johannesburg, 11.925 (Eng to S.Africa 1400-1556) 22222 at 1420 by Chris Shorten; R. Prague, Czechoslovakia 11.685 (Eng, Cz to S.Asia 1430-1625) 54454 at 1455 by Mark Selby in Aldershot; VOA via Tinang 11.965 (Chin to C.Asia 1100-1600) 444 at 1500 by Philip Rambaut.

Later, R. Cairo, Egypt 11.665 (Ar to C.Africa 1900-0030) was heard at 2049 by Ron Pearce; RCI via Sackville 11.880 (Eng, Fr to Africa 2100-2200) 43543 at 2145 by Neil Dove; Voice of the UAE, Abu Dhabi 11.965 (Eng, Ar to USA 2200-0200) 33433 at 2217 by Leo Barr; R. Damascus, Syria 12.085 (Ar, Sp, Port to S.America 2215-0015) 323 at 2230 by David Middlemiss; R. Clarin, Santo Domingo 11.700 (Sp to Dominica 2200-0300) 44444 at 2245 by Bill Griffith in London; BBC via Hong Kong 11.945 (Eng to C.Asia 2245-0045) 222 at 2325 by Alan Smith; RBI via Nauen 11.785 (Port, Sp, Ger to C.America 2315-0200) 54445 at 2345 by Max Wustrau; Voice of Kampuchea, Phnom-Penh 11.940 (Eng, Fr, Th to SE.Asia 0000-0045) 22322 at 0015 by Ferdy De Martin.

Some of the broadcasts to Europe include WYFR via Okeechobee 11.580 (Ger, Eng, It, Fr 0400-0630) 44444 at 0520 by Sheila Hughes; Vatican R., Rome 11.740 (It, Eng, Fr, Sp 0620-0800) 55445 at 0647 by Gary Judd; R. Finland via Pori 11.755 (Fin, Ger, Sw, Eng 0615-2200) 55444 at 0730 by David Wratten; Voice of Greece via Kavala (Gr, Eng 1200-1250) 333 at 1230 by Terry Roy; Voice of Mediterranean, Cyclops 11.925 (Eng, Ar 1400-1600) 54544 at 1401 by John Nash; R. Bangladesh, Dacca 11.510 (Eng, Beng 1815-2000) 44433 at 1822 by Darran Taplin; R. Sophia, Bulgaria 11.720 (Tur, Ger, It, Fr 1600-1900) heard at 1830 by John Coulter; AIR via Aligarh 11.620 (Eng 1845-2230) 43553 at 1923 by John Parry; R. Kuwait, Sulaibiyah 11.665 (Eng 1800-2100) 54434 at 1930 by Ken Whayman; R. Budapest, Hungary 11.910 (Hung, Eng, Ger 1900-2200) 455 at 1935 by Kenneth Buck; R. Nacional de Espana 11.790 (Fr, Eng 1800-2200) 44444 at 2128 by Ian Curry; R. Japan via Moyabi 11.800 (Jap, Eng 2200-0000) 43233 at 2300 by Alan Curry.

Conditions in the 9MHz (31m) band have been generally good. During the evening, the broadcasts from R. Australia to E.Asia and the W. Pacific area via Shepparton 9.620 (Eng 2000-2130) have been reaching the UK. Richard Radford-Reynolds rated them as 54544 at 2102.

Their daily broadcasts to Europe and the S.Pacific area via Shepparton 9.655 (Eng 0700-1030) are usually well received in the UK. George Hewlett says that 9.655 now provides the best reception, holding well until 1000. Mal Tedds rated their signal at 0839 as SIO 433. George has also been monitoring their transmission to SE.Asia via Shepparton 9.770 (Eng 1000-1100) 433 around 1000. During some mornings, sideband splatter from the BBC via Woofferton on 9.760 was evident.

In contrast, the 7.5kW transmissions from R. New Zealand, Wellington 9.850 (Eng to Australia 1000-1205) have been seldom heard here. Kenneth Reece noted them only once as "just audible" at 1004.

Many broadcasters use 9MHz to reach Europe. They include WMLK, Bethal 9.455 (Eng 0400-0630) 32222 at 0610 by Gary Judd; WHRI, South Bend 9.620 (Eng 0600-0800) "Good" at 0700 by Tim Shirley; AWR via Sines 9.670 (Pol, Ger, Eng 0700-0930) 55555 at 0900 by John Nash; R. Nederlands via Flevo 9.715 (Du, Eng 1030-1225) 54444 at 1205 by David Minter; R. Polonia, Warsaw 9.540 (Fr, Ger, Pol, Dan, Eng 1130-1730) heard at 1600 by Simon Holland; Voice of Ethiopia, Addis Ababa 9.660 (Eng 1830-1900) 44344 at 1830 by David Wratten; VOIRI, Tehran, 9.022 (Russ, Far, Tur, Fr, Eng, Sp, Ar 1530-2230) 55555 at 1940 by Chris Shorten; R. Jordan, Amman 9.560 (Eng 1420-2000) 444 at 1730 by Cyril Kellam; R. Pyongyang, N.Korea 9.325 (Eng, Fr, Russ, Kor, Sp, Ger 1300-2150) 333 at 1840 by Alan Smith; R. Tirana, Lushnje 9.480 (Russ, Rom, Ar, Fr, Eng, 1730-2300) 555 at 2000 by Kenneth Buck; R. Damascus, Syria 9.950 (Ger, Fr, Eng 1800-2105) 43222 at 2015 by Ian Curry; R. Beijing, China 9.365 (Alb, Yu, Hung, It 1830-2125) 44433 at 2035 by Neil Dove; AIR via Delhi 9.910 (Eng 2000-2230) 333 at 2210 by Mark Thompson; VOFC, Taipei 9.955 (Eng, Sp 2200-0000) 55344 at 2230 by Mark Selby.

The logs included broadcasts to areas outside Europe: R. HCJB, Quito 9.745 (Eng to Australia, S.Pacific Area 0700-1030) 23322 at 0829 by Leo Barr; KFBS, Saipan 9.495 (Chin to C.Asia 1100-1600) 211 at 1204 by Philip Rambaut; SLBC Colombo, Sri Lanka 9.720 (Eng to S.Asia 1230-1630) 33333 at 1500 by Christian Pritchard; KYOI,Saipan 9.465 (Eng to E.Asia 2000-2200) 444 at 2015 by John Evans; R. Nacional Ext. Asuncion, Paraguay 9.735 (Sp to S.America 2100-0300) 34433 at 2203 by David Edwardson; R. Sophia, Bulgaria 9.700 (Eng, Fr to USA 2230-0125) 43433 at 2250 by Ken Whayman; Voice of Turkey, Ankara 9.445 (Eng, Tur to USA 2300-0450) 444 at 2300 by Terry Roy; RBI via Nauen 9.730 (Eng, Ger, Sp to USA, C.America 2200-0130) 54333 at 2320 by Alan Curry; R. Austria Int., Vienna 9.870 (Ger, Sp to S.America 0000-0200) 44323 at 0000 by Max Wustrau; R. Rumbos, Caracas 9.650 (Sp to Venezuela 0900-0600) 33333 at 0230 by Bill Griffith; TWR, Bonaire 9.535 (Eng to USA 0300-0530) 44444 at 0300 by Sheila Hughes.

Some long distance broadcasts were noted in the 7MHz (41m) band: WCSN, Scotts Corner 7.365 (Eng, Fr, Ger to Europe 0600-0755) 534 at 0700 by Alan Smith; WYFR via Okeechobee 7.355 (Russ, Ger, Eng to Europe 0400-0745) 43433 at 0709 by Gary Judd; WHRI, South Bend 7.355 (Eng to Europe 0800-1100) 54434 at 1000 by Christian Pritchard; R. Para La Paz Int., Costa Rica 7.375 (Sp 1400-1700) 23332 at 1602 by Kenneth Reece; R. Australia via Carnarvon 7.205 (Eng to S.Asia, Europe 1430-2030) 23232 at 1741 by Leo Barr; R. Beijing, China 7.935 (Chin to NW China 2000-0030) 45544 at 2005 by John Nash; R. Korea, Seoul 7.550 (Ger, Eng, Fr, Sp, Port to E.Africa, Middle East 1945-2345) 43343 at 2034 by Richard Radford-Reynolds; WRNO New Orleans 7.355 (Eng to USA 0000-0300) 32222 at 0200 by David Minter.

Many broadcasts to Europe stem from Europe and Scandinavia. They include R. Polonia, Warsaw 7.285 (Pol, Eng, Dan 1300-1455) 44444 at 1425 by Darran Taplin; R. Prague, Czechoslovakia 7.345 (Eng, Ar, Fr, Sp, Port 1500-2125) 55444 at 1530 by David Wratten; R. Sweden via Horby 7.265 (Eng 1800-1830) heard at 1800 by Simon Holland; R. Tirana, Lushnje 7.120 (Fr, Eng 1800-1930) heard at 1830 by Chris Shorten; R. Bucharest, Romania 7.195 (Rom, Fr, Ger, Eng 1730-2126) 444 at 2015 by Kenneth Buck; RBI via Nauen 7.260 (Dan, It, Eng, Sw, Fr, Sp 1645-2245) heard at 2031 by Colin Diffel in Corsham; IBRA R. via Cyclops 7.110 (Pol, Ger, Eng 2000-2115) 44444 at 2045 by Sheila Hughes; R. Polonia, Warsaw 7.270 (Ger, Fr, Eng 1900-2355) 333 at 2250 by David Middlemiss.

High noise levels have been evident in the 6MHz (49m) band from time to time, but generally good reception from stations in Europe has been noted. They include RBI Berlin, GDR 6.115 (Ger, Eng, Fr, It, Sw, Dan 0530-2000) 32222 at 1100 by David Minter; RFI via Allouis 6.175 (Fr 0500-2200) 222 at 1622 by Julian Wood; RCI via Daventry 5.995 (Fr, Eng, Ger, Hung, Cz, Uk, Pol 1700-2300) 55444 at 1720 by David Wratten; SRI via Sarnen 6.165 (Fr, Ger, It, Eng, Sp, Port, Ar 0600-2045) 333 at 1840 by Alf Gray; R. Nederlands via Flevo 6.020 (Eng 1830-1925) 555 at 1852 by Mal Tedds; VOA via Woofferton 6.040 (Eng 1700-2200) 54555 at 1930 by Ian Curry; R. Prague, Czechoslovakia 5.930 (Fr, Eng, Sp, Port 1730-2125) 33333 at 1948 by Leo Barr; Vatican R., Rome 6.248 (Rom, Bul, Alb, Yu, Hung, Cz, Pol, Ger, It, Eng, Fr, Sp 1700-2030) 444 at 2030 by Kenneth Buck; R. Sophia, Bulgaria 6.070 (Eng, Ger, It, Fr, Yu 1930-2155) 54444 at 2031 by Richard Radford-Reynolds; BRT via Wavre, Belgium 5.910 (Du, Eng, Sp 1800-2225) 42222 at 2100 by Alan Curry; R. Polonia, Warsaw 6.135 (Eng, Ger, Fr 1830-2355) 44444 at 2230 by Sheila Hughes; R. Yugoslavia, Belgrade 5.980 (Fr, Eng 0030-0145) SIO 434 at 0100 by Terry Roy; also R. Luxembourg via Junglinster 6.090 (Eng, Ger 0600-0300) heard at 2300 by Roy Patrick.

During good conditions, broadcasts from more distant stations have also been heard: R. HCJB, Quito 6.230 (Eng to USA 0500-0700) 333 at 0550 by Alan Smith; WYFR via Okeechobee 5.950 (Eng to E.USA 2300-0700) 34344 at 0621 by Mark Selby; BBC via Antigua 5.975 (Eng to C.America 0430-0730) 44433 at 0702 by Kenneth Reece; WYFR via Okeechobee 6.065 (Eng to W.USA 0600-0800) 35443 at 0800 by John Nash; R. Australia via Carnarvon 6.035 (Eng to S.Asia, Europe 1530-2030) 34443 at 1635 by David Edwardson; R. Pyongyang, N.Korea 6.576 (Russ, Fr, Kor, Sp, Ger, Eng to Europe 1500-2150) heard at 2005 by Chris Shorten; R. Korea, Seoul 5.975 (Eng, Kor, Russ, Fr, Jap to E.Asia 1600-0400) heard at 2019 by Colin Diffell; King of Hope, Lebanon 6.280 (Fr, Eng to Middle East, Europe 1945-2300) 35443 at 2150 by Neil Dove; Voice of the UAE, Abu Dhabi 6.170 (Ar to USA 2200-0200) 54434 at 2300 by Christian Pritchard.

SEEN & HEARD

Freq kHz	Station	Country	Power (kW)	DXer
520	Hof-Saale	W.Germany	0.2	K
531	Ain Beida	Algeria	600	M*
531	Leipzig	E.Germany	100	J*,K,Q*
540	BRT-2 Wavre	Belgium	150/50	B*,I,J
540	Sidi Bennour	Morocco	600	M*
549	DLF Beyreuth	W.Germany	200	E*,J*
558	Denizli	Turkey	?	E*
567	RTE-1 Tullamore	S.Ireland	500	B*,C,E*,I,J
567	West Berlin	W.Germany	100	Q*
576	Stuttgart	W.Germany	300	H,J*,Q*
585	FIP Paris	France	8	I
585	RNE-1 Madrid	Spain	200	A*,B*,E*,J*
594	Dubai	Saudi Arabia	2000	M*
594	HRF Frankfurt	W.Germany	400	J,Q*
603	Koenigswusterhausen	E.Germany	20	Q*
603	Ariciro	Madeira Islands	10	E*
603	Oradea	Roumania	50	H*,
612	RTE-2 Athlone	S.Ireland	100	B*,E*
612	Sarajevo	Yugoslavia	600	H
621	RTBF-1 Wavre	Belgium	300	B*,I,J
630	Vigra	Norway	100	B*,Q*
630	Tunis-Ojedeida	Tunisia	600	H*
639	Liblice	Czechoslovakia	1500	B*,I
648	BBC Orfordness	UK	500	C,E*,H,I,J
657	Napoli	Italy	120	H
657	BBC Wales	UK	2	B*
666	Bodenseesender	W.Germany	300/180	E*
675	Marseille	France	600	B*,E*,H,Q*
675	Hilversum-3 Lopic	Holland	120	I,J
684	RNE-1 Sevilla	Spain	250	B*,E*,Q*
684	Beograd	Yugoslavia	2000	H*
702	Banska	Czechoslovakia	400	H*
711	Rennes 1	France	300	B*,I
720	BBC Lisnagarvey	N.Ireland	10	C
720	Sfax	Tunisia	200	E*,K*
720	BBC Lots Road London	UK	0.5	B*,I,J
729	Oviedo	Spain	50	E*
738	Paris	France	4	I
747	Hilversum-2 Flevo	Holland	400	B*,E*,I,J,P*
756	Brunswick	W.Germany	800/200	B*,E*,H,P*
765	Sottens	Switzerland	500	E*,H,P*
774	RNE-1 San Sebastian	Spain	60	P*
783	Burg	E.Germany	1000	B*,E*,H*,I,P*
792	Sevilla	Spain	20	B*,E*,P*
801	BRF via Munich	W.Germany	420	H*,P*
810	SER Madrid	Spain	20	P*
810	BBC Westerglen	UK	100	B*,C*,P*
819	Warsaw	Poland	300	I
837	Nancy	France	200	I
846	Rome	Italy	540	B*,H*,I
855	Murcia	Spain	125	E*,H*
873	AFN Frankfurt	W.Germany	150	B*,D,G*,H,I
882	BBC Washford	UK	70	C,J
891	Algiers	Algeria	600/300	E*,M*
900	Milan	Italy	600	B*,H
909	BBC-R2 Clevedon	UK	50	C
909	BBC-R2 Moorside Edge	UK	200	E*
918	Al-Hasseke	Syria	?	Q*
918	R.Ljubljana	Yugoslavia	600/100	H*
927	BRT-1 Wolvertem	Belgium	300	B*,H,I,J
936	Radio Bremen	W.Germany	100	B*
945	Toulouse	France	300	H*
963	Pori	Finland	600	B*
972	NDR/WDR Hamburg	W.Germany	300	B*,E*
981	Algiers	Algeria	600/300	E*
1008	Hilversum-5 Flevo	Holland	400	A*,I,J
1008	Malaga	Spain	?	E*
1017	Wolfsheim	W.Germany	600	B*,E*,N*
1026	Graz-Dobl	Austria	100	H*
1035	Milan	Italy	50	H*
1044	DDR-1 Burg	E.Germany	250	B*,N*,Q*
1044	Sebaa Aioun	Morocco	300	M*
1062	Kalundborg	Denmark	250	B*,E*,N*
1071	Brest	France	20	E*,I,J
1080	Katowice	Poland	1500	H*
1089	BBC-R1 Washford	UK	50	C
1098	Velke Kostolany	Czechoslovakia	100	H*
1107	Batra	Egypt	600	M*
1107	AFN via Munich	W.Germany	40	B*,D*,E*,H*
1125	La Louviere	Belgium	20	B*,I
1125	BBC Llandrindod Wells	UK	1	D,Q*
1125	Zagreb	Yugoslavia	200	B*,H*,Q*
1134	Valencia	Spain	10	I
1134	Zagreb	Yugoslavia	300	H*,N*,Q*
1143	AFN via Stuttgart	W.Germany	10	B*
1143	Kaliningrad	USSR	150	B*,D*,E*,G*,N*
1152	Cluj	Roumania	950	H*
1179	Solvesborg	Sweden	600	A*,B*,E*,N*
1188	Kuurne	Belgium	5	I
1206	Bordeaux	France	100	H
1206	Wroclaw	Poland	200	B*
1215	Lushnje	Albania	500	Q*
1215	BBC Moorside Edge	UK	100	E*,J
1215	Tartu	USSR	50	H
1233	Liege	Belgium	5	B*
1233	Prague	Czechoslovakia	400	E*,H*,Q*
1251	Siofok	Hungary	135	I
1251	Tripoli	Libya	500	M*
1269	Neuminster	W.Germany	600	B*,E*,I,N*,Q*
1278	RTE-2 Dublin/Cork	S.Ireland	10	E*,Q*
1287	Litomysl/Liblice	Czechoslovakia	300/200	E*,H*,N*,Q*
1296	BBC Orfordness	UK	500	B*,H,I
1314	Kvitsoy	Norway	1200	A,B*,E*,I,N*
1323	R.Moscow via Leipzig	E.Germany	150	B*,E*,H*,N*
1332	Rome	Italy	300	H*,I,N*
1341	BBC Lisnagarvey	N.Ireland	100	B*,C,D*,E*,I,Q*
1350	Nancy/Nice	France	100	E*,H*,I
1359	RBI Berlin	E.Germany	250/100	B*,D,G*,H*
1368	Manx Radio, Foxdale	IOM	20	A*,B*,C*,E*,F,Q*
1386	Kaunas	USSR	1000	B*,D*,E*,H*,N*,Q*
1395	R.Tirana via Lushnje	Albania	1000	B*,E*,G*,I,N*
1404	Brest	France	20	I
1413	RCE Zaragoza	Spain	20	I,P*
1422	Heusweiler	W.Germany	600	N*
1422	Saarbrucken	W.Germany	1200/600	B*,E*,P*
1431	Dresden	E.Germany	250	A*,Q*
1440	Marnach	Luxembourg	1200	B*,E*,H*,I,N*,P*,Q*
1449	BBC-R4 Redmoss	UK	2	P*
1458	R.Tirana	Albania	500	H*
1467	TWR Monte Carlo	Monaco	1000/400	E*,G*,P*
1476	Wien-Bisamberg	Austria	600	H,N*,Q*
1481	Dubai	UAE	?	E*
1476	Wien-Bisamberg	Austria	600	K
1503	Stargard	Poland	300	B*,D*,E*,N*
1512	BRT Wolvertem	Belgium	600	B*,D*,E*,H*,I,L*,N*,P*,Q
1521	Kosice	Czechoslovakia	600	B*,H
1530	Vatican Radio, Rome	Italy	150/450	E*,H*,I,P*
1539	DLF Mainflingen	W.Germany	700	B*,E*,N*,P*
1557	Nice	France	300	H
1566	Sarnen	Switzerland	300	P*
1566	Sfax	Tunisia	1200	M*
1575	RBI via Burg	E.Germany	250	B*,I,N*
1575	Genoa	Italy	50	E*,P*
1593	Langenberg	W.Germany	400/800	A*,B*,E*,N*,P*
1602	Bologna	Italy	1	H

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

DXers:

A: Leo Barr, Sunderland.
B: Ian Bond, Wirral.
C: Lez Chipperfield, Stourbridge.
D: Alan Curry, Stockton-on-Tees.
E: Colin Diffell, Corsham.
F: Edward Emery, Stoke-on-Trent.
G: Sheila Hughes, Morden.
H: Alex Mackow, while in Siusi, N.Italy.
I: George Millmore, Wootton I.O.W.
J: Mark Selby, Aldershot.
K: Tim Shirley, Bristol.
L: Mal Tedds, Nottingham.
M: Mark Thompson, Wakefield.
N: Phil Townsend, London.
O: Martyn Williams, Sunningdale.
P: Max Wustrau, Bedford.

The next three deadlines are:
June 19, July 17 & August 21

INDEX TO ADVERTISERS

VISA 0202 678558 0202 678558

SWM BOOK SERVICE

The books listed have been selected as being of special interest to our readers. They are supplied from our editorial address direct to your door. Some titles are overseas in origin.

HOW TO ORDER

Add 75p per order postage (overseas readers add £1.50 for surface mail postage) and send a postal order, cheque or international money with your order (quoting book titles and quantities) to **PW Publishing Limited, FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP.** Payment by Access, Mastercard, Eurocard or Visa also accepted on telephone orders to Poole (0202) 678558. Books are normally despatched by return of post but please allow 28 days for delivery.

* A recent addition to our Book Service. O/P = Out of print, O/S = Out of stock.

RADIO

AIR & METEO CODE MANUAL
10th Edition
Joerg Klingenfuss
Detailed descriptions of the World Meteorological Organisation Global Telecommunication System operating FAX and RTTY meteo stations, and its message format with decoding examples. Also detailed description of the Aeronautical Fixed Telecommunication Network amongst others. *289 pages* **£14.00**

BETTER RADIO/TV RECEPTION
A. Nallawalla, A. T. Cushen and B. D. Clark
An Australian book giving guidance and advice to listeners seeking reliable reception of distant radio stations, and to DX listening hobbyists. *134 pages.* **£9.95**

BETTER SHORTWAVE RECEPTION (USA)
W. S. Orr W6SAI and S. D. Cowan W2LX
Receivers, antennas, propagation, DX listening techniques for the short waves and v.h.f. *158 pages.* **£5.50**

PASSPORT TO WORLD BAND RADIO 1989
This book gives you the information to explore and enjoy the world of broadcast band listening. It includes features on different international radio stations, receiver reviews and advice as well as the hours and languages of broadcast stations by frequency. *398 pages.* **£12.95**

SCANNERS (updated)
Peter Rouse GU1DKD
A guide for users of scanning receivers, covering hardware, antennas, accessories, frequency allocations and operating prodedures. *177 pages.* **£7.95**

SCANNERS 2
Peter Rouse GU1DKD
The companion to Scanners, this provides even more information on the use of the v.h.f. and u.h.f. communications band and gives constructional details for accessories to improve the performance of scanning equipment. *216 pages.* **£9.95**

SHORT WAVE RADIO LISTENERS' HANDBOOK
Arthur Miller
In easy-to-read and non-technical language, the author guides the reader through the mysteries of amateur, broadcast and CB transmissions. *207 pages.* **£6.99**

RADIOTELETYPE CODE MANUAL
10th Edition
Joerg Klingenfuss
This book gives detailed descriptions of the characteristics of telegraph transmission on short waves, with all commercial modulation types including voice frequency telegraphy and comphrehensive information on all RTTY systems and c.w. alphabets. *96 pages.* **£8.00**

THE SATELLITE EXPERIMENTER'S HANDBOOK (USA)
A guide to understanding and using amateur radio, weather and TV broadcast satellites. *207 pages.* **£9.25**

1934 OFFICIAL SHORT WAVE RADIO MANUAL
Edited by Hugo Gernsback
A fascinating reprint from a bygone age with a directory of all 1934 s.w. receivers, servicing information, constructional projects, circuits and ideas on building vintage sets with modern parts. *260 pages.* **£9.00**

BEGINNERS

AN INTRODUCTION TO RADIO DXING (BP91)
R. A. Penfold
How to find a particular station, country or type of broadcast and to receive it as clearly as possible.
112 pages. **£1.95**

BEGINNER'S GUIDE TO RADIO
9th Edition
Gordon J. King
Radio signals, transmitters, receivers, antennas, components, valves and semiconductors, CB and amateur radio are all dealt with here. *266 pages.* **£6.95**

ELECTRONICS SIMPLIFIED - CRYSTAL SET CONSTRUCTION (BP92)
F. A. Wilson
Especially written for those who wish to take part in basic radio building. All the sets in the book are old designs updated with modern components. *72 pages.* **£1.75**

QUESTIONS & ANSWERS RADIO
Eugene Trundle
Basics of electrical theory, radio and semiconductors, receivers, amateur and CB radio, and test equipment.
110 pages. **£3.95**

THE SIMPLE ELECTRONICS CIRCUIT AND COMPONENTS Book One (BP62)
The aim of this book is to provide an in-expensive but comprehensive introduction to modern electronics.
209 pages. **£3.50**

TELEVISION

AN INTRODUCTION TO SATELLITE TELEVISION (BP195)
F. A. Wilson
Answers all kinds of questions about satellite television. For the beginner thinking about hiring or purchasing a satellite TV system there are details to help you along. For the engineer there are technical details including calculations, formulae and tables. *104 pages.* **£5.95**

A TV-DXERS HANDBOOK (BP176)
R. Bunney
Information on transmission standards, propagation, receivers including multi-standard, colour, satellites, antennas, photography, station identification, interference etc. Revised and updated 1986. *87 pages.* **£5.95**

THEORY

COMMUNICATION (BP89)
Elements of Electronics Book 5
F. A. Wilson
Fundamentals of line, microwave, submarine, satellite, digital multiplex, radio and telegraphy systems are covered, without the more complicated theory or mathematics. *256 pages.* **£2.95**

LEVEL II RADIO & ELECTRONICS THEORY
Ian Ridpath ZL1BCG
A sequel to Amateur Radio & Electronics Study Course, covers advanced theory to a level for most technician courses. The handwritten format aims to make the student feel these are his own notes. *169 pages.* **£6.70**

PRACTICAL ELECTRONICS CALCULATIONS AND FORMULAE (BP53)
F. A. Wilson
This has been written as a workshop manual for the electronics enthusiast. There is a strong practical bias and higher mathematics have been avoided where possible. *249 pages.* **£3.95**

SOLID STATE DESIGN FOR THE RADIO AMATEUR
Wes Hayward W7ZOI and Doug DeMaw W1FB
Back in print by popular demand! A revised and corrected edition of this useful reference book covering all aspects of solid-state design. *256 pages* **£10.95**

LISTENING GUIDES

AIR BAND RADIO HANDBOOK
David J. Smith
Listen to conversations between aircraft and ground control. The author, an air traffic controller, explains more about this listening hobby. *174 pages.* **£5.99**

AIR TRAFFIC CONTROL
David Adair
A guide to air traffic control with maps, drawings and photographs explaining how aircraft are guided through crowded airspace. *176 pages.* **£6.99**

DIAL SEARCH
5th Edition 1988/89
George Wilcox
The listener's check list and guide to European broadcasting. Covers m.w., l.w., v.h.f. and s.w., including two special maps. *46 pages.* **£3.25**

GUIDE TO BROADCASTING STATIONS
20th Edition 1989/90
Philip Darrington
Frequency and station data, receivers, antennas, Latin American DXing, reporting, computers in radio, etc.
240 pages. **£9.95**

GUIDE TO FORMER UTILITY TRANSMISSIONS
3rd Edition
Joerg Klingenfuss
Built on continuous monitoring of the radio spectrum from the sixties until the recent past. A useful summary of former activities of utility stations providing information in the classification and identification of radio signals.
126 pages. **£8.00**

GUIDE TO UTILITY STATIONS
7th Edition
Joerg Klingenfuss
This book covers the complete short wave range from 3 to 30MHz plus the adjacent frequency bands from 0 to 150kHz and from 1.6 to 3MHz. It includes details on all types of utility stations including FAX and RTTY. There are 15802 entries in the frequency list and 3123 in the alphabetical callsign list plus press services and meteorological stations. *494 pages.* **£19.00**

HF OCEANIC AIRBAND COMMUNICATIONS
3rd Edition
Bill Laver
Aircraft channels by frequency and band, main ground radio stations, European R/T networks, North Atlantic control frequencies. *29 pages.* **£3.50**

INTERNATIONAL RADIO STATIONS GUIDE (BP255)
Revised and updated in 1988, this book shows the site, country, frequency/wavelength and power of stations in Europe, the Near East and N. Africa, North and Latin America and the Caribbean, plus short wave stations worldwide. *128 pages.* **£4.95**

THE COMPLETE VHF/UHF FREQUENCY GUIDE
Updated 1988
This book gives details of frequencies from 26-2250MHz with no gaps and who uses what. Recently updated, there are chapters on equipment requirements as well as antennas, etc. *88 pages.* **£5.95**

THE INTERNATIONAL VHF FM GUIDE
7th Edition
Julian Baldwin G3UHK and Kris Partridge G8AUU
The latest edition of this useful book gives concise details of repeaters and beacons worldwide plus coverage maps and further information on UK repeaters. *70 pages.* **£2.85**

THE POCKET GUIDE TO RTTY AND FAX STATIONS
Bill Laver
A handy reference book listing RTTY and FAX stations, together with modes and other essential information. The listing is in ascending frequency order, from 1.6 to 27,1MHz. *46 pages* **£2.95**

WORLD SHORT WAVE FREQUENCY GUIDE
(previously known as UK Listeners Confidential Frequency List))
Bill Laver
Covering the services and transmission modes that can be heard on the bands between 1.635 and 29.7MHz.
£7.95

VHF/UHF AIRBAND FREQUENCY GUIDE (Updated)
A complete guide to the airband frequencies including how to receive the signals, the frequencies and services, VOLMET and much more about the interesting subject of airband radio. *74 pages.* **£5.95**

INTERFERENCE

INTERFERENCE HANDBOOK (USA)
William R. Nelson WA6FQG
How to locate and cure r.f.i. for radio amateurs, CBers and TV and stereo owners. *253 pages.* **£6.75**

RADIO FREQUENCY INTERFERENCE (USA)
What causes r.f.i? Are all r.f.i. problems difficult, expensive and time-consuming to cure? These questions and many more are answered in this book. *84 pages.* **£4.30**

TELEVISION INTERFERENCE MANUAL (RSGB)
B. Priestly
TV channels and systems, spurious-radiation TVI, strong-signal TVI, audio breakthrough, transmitter design.
78 pages. **£2.94**

AMATEUR RADIO

AMATEUR RADIO CALL BOOK (RSGB)
Winter 88/89 Edition
Now incorporates a 48-page section of useful information for amateur radio enthusiasts. *310 pages.* **£7.00**

AMATEUR RADIO LOGBOOK
Standard logbook for the transmitting amateur in horizontal A4 format. 25 lines per page. *96 pages.* **£2.30**

AMATEUR RADIO OPERATING MANUAL (RSGB)
A mine of information on just about every aspect of amateur operating. International callsign series holders, prefix lists, DXCC countries list, etc.
204 pages. **£6.16**

AMATEUR RADIO SATELLITES the first 25 years
Arthur C. Gee G2UK
This souvenir publication mainly a pictorial account of the pattern of developments which have occurred over the last 25 years. *34 pages.* **£2.25**

CARE AND FEEDING OF POWER GRID TUBES (USA)
This handbook analyses the operation of EIMAC power grid valves and provides design and application information to assist the user of these valves.
156 pages. **£6.75**

PASSPORT TO AMATEUR RADIO
Peprinted from *PW* 1981-1982
The famous series by GW3JGA, used by thousands of successful RAE candidates in their studies. Plus other useful articles for RAE students.
96 pages. **£1.50**

PRACTICAL IDEAS FOR RADIO AMATEURS
Ian Poole G3YWX
Offers a wealth of hints, tips and general practical advice for all transmitting amateurs and short wave listeners. *128 pages* **£5.95**

QUESTIONS & ANSWERS AMATEUR RADIO
F. C. Judd G2BCX
What is amateur radio? The Radio Amateurs' Exam and Licence. Technology, equipment, antennas, operating procedures and codes. *122 pages.* **£3.95**

RADIO AMATEUR'S GUIDE TO RADIO WAVE PROPAGATION
(HF Bands)
F. C. Judd G2BCX
The how and why of the mechanism and variations of propagation in the h.f. bands. *144 pages.* **£8.95**

RADIO AMATEUR'S MAP OF NORTH AMERICA (USA)
Shows radio amateur prefix boundaries, continental boundaries and zone boundaries. *760 x 636mm.* **£2.50**

RADIO AMATEUR'S PREFIX MAP OF THE WORLD (USA)
Showing prefixes and countries, plus listings by order of country and of prefix. *1014 x 711mm.* **£2.95**

RADIO AMATEUR'S WORLD ATLAS (USA)
Seventeen pages of maps, including the world-polar projection. Also includes the table of allocation of international callsign series. **£3.50**

THE 1989 ARRL HANDBOOK FOR THE RADIO AMATEUR
This is the 66th edition of this very useful hardback reference book. Updated throughout it has several new sections covering oscilloscopes, spectrum analysers, digital frequency synthesis, phase-noise measurement and new constructional projects.
1200 pages **£15.95**

***THE ARRL OPERATING MANUAL**
Another very useful book from the ARRL. Although writen for the American radio amateur, this book will also be of use and interest to the UK amateur.
684 pages **£12.95**

THE COMPLETE DX'ER
BobLocher W9KNI
Now back in print, this book covers equipment and operating techniques for the DX chaser, from beginner to advanced. *187 pages* **£7.95**

THE RAE MANUAL (RSGB)
G.L.Benbow G3HB
The latest edition of the standard aid to studying for the Radio Amateurs' Examination. Updated to cover the latest revisions to the syllabus.
132 pages **£5.00**

THE RADIO AMATEUR'S DX GUIDE (USA)
15th Edition
The guide contains information not easily obtained elsewhere and is intended as an aid and quick reference for all radio amateurs interested in DX.
38 pages. **£2.95**

THE RADIO AMATEUR'S QUESTIONS & ANSWER REFERENCE MANUAL
3rd Edition
R. E. G. Petri G8CCJ
This book has been compiled especially for students of the City and Guilds of London Institute RAE. It is structured with carefully selected multiple choice questions, to progress with any recognised course of instruction, although is is not intended as a text book.
258 pages. **£6.95**

VHF HANDBOOK FOR RADIO AMATEURS (USA)
H. S. Brier W9EGQ & W. I. Orr W6SAI
VHF/UHF propagation, including moonbounce and satellites, equipment and antennas.
335 pages. **£7.95.**

VHF/UHF MANUAL (RSGB)
G. R. Jessop G6JP
Theory and practice of amateur radio reception and transmission, between 30MHz and 24GHz.
520 pages. **£8.94**

DATA AND REFERENCE

DIGITAL IC EQUIVALENTS AND PIN CONNECTIONS (BP140)
A. Michaels
Equivalents and pin connections of a popular selection of European, American and Japanese digital i.c.s.
256 pages. **£5.95.**

INTERNATIONAL DIODE EQUIVALENTS GUIDE (BP108)
A. Michaels
Possible substitutes for a large selection of many different types of semiconductor diodes. *144 pages.* **£2.25.**

INTERNATIONAL TRANSISTOR EQUIVALENTS GUIDE (BP85)
A. Michaels
Possible substitutes for a popular selection of European, American and Japanese transistors. *320 pages.* **£3.50**

LINEAR IC EQUIVALENTS AND PIN CONNECTIONS (BP141)
A. Michaels
Equivalents and pin connections of a popular selection of European, American and Japenese linear i.c.s.
320 pages. **O/P**

NEWNES AUDIO & HI-FI ENGINEER'S POCKET BOOK
Vivian Capel
This is a concise collection of practical and relevant data for anyone working on sound systems. The topics covered include microphones, gramaphones, CDs to name a few.
190 pages. Hardback **£9.95**

NEWNES COMPUTER ENGINEER'S POCKET BOOK
This is an invaluable compendium of facts, figures, circuits and data and is indispensable to the designer, student, service engineer and all those interested in computer and microprocessor systems.
203 pages. Hardback **£8.95**

NEWNES ELECTRONICS POCKET BOOK
5th Edition
Presenting all aspects of electronics in a readable and largely non-mathematical form for both the enthusiast and the professional engineer.
315 pages. Hardback **£8.95**

NEWNES RADIO AMATEUR AND LISTENER'S POCKET BOOK
Steve Money G3FZX
This book is a collection of useful and intriguing data for the traditional and modern radio amateur as well as the short wave listener. Topics such as AMTOR, packet radio, SSTV, computer communications, airband and maritime communications are all covered.
160 pages. Hardback **£8.95**

NEWNES RADIO AND ELECTRONICS ENGINEER'S POCKET BOOK
17th Edition
Keith Brindley
Useful data covering math, abbreviations, codes, symbols, frequency bands/allocations, UK broadcasting stations, semi-conductors, components, etc.
201 pages. Hardback **£6.95**

NEWNES TELEVISION AND VIDEO ENGINEER'S POCKET BOOK
Eugene Trundle
This is a valuable reference source for practitioners in "entertainment" electronic equipment. It covers TV reception from v.h.f. to s.h.f. display tubes, colour camera technology, video recorder and video disc equipment, video text and hi-fi sound. *323 pages. Hardback* **£9.95**

POWER SELECTOR GUIDE (BP235)
J. C. J. Van de Ven
This guide has the information on all kinds of power devices in useful categories (other than the usual alpha numeric sort) such as voltage and power properties making selection of replacements easier.
160 pages. **£4.95**

RSGB RADIO DATA REFERENCE BOOK
G. R. Jessop G6JP
The 5th Edition of an essential book for the radio amateur's or experimenter's workbench.
244 pages. Hardback **£8.56**

TRANSISTOR SELECTOR GUIDE (BP234)
J. C. J. Van de Ven
This guide has the information on all kinds of transistors in useful categories (other than the usual alpha numeric sort) such as voltage and power properties making seletion of replacements easier. *192 pages.* **£4.95**

FAULT FINDING

ARE THE VOLTAGES CORRECT?
Reprinted from PW 1982-1983
How to use a multimeter to fault-find on electronic and radio equipment, from simple resistive dividers through circuits using diodes, transistors, i.c.s and valves.
44 pages. **£1.50**

GETTING THE MOST FROM YOUR MULTIMETER (BP239)
R. A. Penfold
This book is primarily aimed at beginners. It covers both analogue and digital multimeters and their respective limitations. All kinds of testing is explained too. No previous knowledge is required or assumed.
102 pages. **£2.95**

OSCILLOSCOPES, HOW TO USE THEM, HOW THEY WORK
Revised 2nd Edition
Ian Hickman
This book describes oscilloscopes ranging from basic to advanced models and the accessories to go with them.
133 pages. **£6.95**

PRACTICAL HANDBOOK OF VALVE RADIO REPAIR
Chas E. Miller
The definite work on repairing and restoring valved broadcast receivers dating from the 1930s to the 60s. Appendices giving intermediate frequencies, valve characteristic data and base connections.
230 pages. Hardback **£17.50**

SERVICING RADIO, HI-FI AND TV EQUIPMENT
Gordon J. King
A very practical book looking at semiconductor characteristics, d.c. and signal tests, fault-finding techniques for audio, video, r.f. and oscillator stages and their application to transistor radios and hi-fi.
205 pages. **£10.95**

TRANSISTOR RADIO FAULT FINDING CHART (BP70)
C. E. Miller
Used properly, should enable most common faults to be traced reasonably quickly. Selecting the appropriate fault description at the head of the chart, the reader is led through a sequence of suggested checks until the fault is cleared. *635 x 455mm (approx)* **£0.95**

PROJECT CONSTRUCTION

HOW TO DESIGN AND MAKE YOUR OWN P.C.B.s (BP121)
R. A. Penfold
Designing or copying printed circuit board designs from magazines, including photographic methods.
80 pages. **£2.50**

INTRODUCING QRP
Collected articles from PW 1983-1985
An introduction to low-power transmission, including constructional details of designs by Rev. George Dobbs G3RJV for transmitters and transceivers from Top Band to 14MHz, and test equipment by Tony Smith G4FAI.
64 pages. **£1.50**

MORE ADVANCED POWER SUPPLY PROJECTS (BP192)
R. A. Penfold
The practical and theoretical aspects of the circuits are covered in some detail. Topics include switched mode power supplies, precision regulators, dual tracking regulators and computer controlled power supplies, etc.
92 pages. **£2.95**

POWER SUPPLY PROJECTS (BP76)
R. A. Penfold
This book gives a number of power supply designs including simple unstabilised types, fixed voltage regulated types and variable voltage stabilised designs.
91 pages. **£2.50**

PRACTICAL POWER SUPPLIES
Collected articles from PW 1978-1985
Characteristics of batteries, transformers, rectifiers, fuses and heatsinks, plus designs for a variety of mainsdriven power supplies, including the PW "Marchwood" giving a fully stabilised and protected 12V 30A d.c.
48 pages. **£1.25**

PROJECTS IN AMATEUR RADIO AND SHORT WAVE LISTENING
F. G. Rayer G3OGR
Full constructional details are given for all projects including housing the units in a suitable case. All the projects are either on p.c.b. or matrix board.
90 pages. **£4.95**

QRP NOTEBOOK
Doug DeMaw W1FB
This book deals with the building and operating of a successful QRP station. Lots of advice is given by the author who has spent years as an ardent QRPer. All the text is easy-to-read and the drawings large and clear.
77 pages. **£4.95**

AUDIO FREQUENCIES

AUDIO (BP111)
Elements of Electronics Book 6
F. A. Wilson
This book studies sound and hearing, and the operation of microphones, loudspeakers, amplifiers, oscillators and both disc and magnetic recording.
320 pages. **£3.50**

ANTENNAS (AERIALS)

AERIAL PROJECTS (BP105)
Practical designs including active, loop and ferrite aerials plus accessory units. *96 pages.* **£2.50**

ALL ABOUT CUBICAL QUAD ANTENNAS (USA)
W. I. Orr W6SAI & S. D. Cowan W2LX
Theory, design, construction, adjustment and operation of quads. Quads vs. Yagis. Gain figures.
109 pages. **£5.50**

ALL ABOUT VERTICAL ANTENNAS (USA)
W. I. Orr W6SAI & S. D. Cowan W2LX
Theory, design, construction, operation, the secrets of making vertical work.
191 pages. **£7.50**

AN INTRODUCTION TO ANTENNA THEORY (BP198)
H. C. Wright
This book deals with the basic concepts relevant to receiving and transmitting antennas. Lots of diagrams reduce the amount of mathematics involved.
86 pages. **£2.95**

BEAM ANTENNA HANDBOOK (USA)
W. I . Orr W6SAI & S. D. Cowan W2LX
Design, construction, adjustment and installation of h.f. beam antennas. *198 pages.* **£6.75**

HF ANTENNAS FOR ALL LOCATIONS (RSGB)
L. A. Moxon G6XN
Taking a new look at how h.f. antennas work, and putting theory into practice. *260 pages.* **£5.19**

***NOVICE ANTENNA NOTEBOOK**
Doug DeMaw W1FB
Another book from the pen of W1FB, this time offering "new ideas for beginning hams". All the drawings are large and clear and each chapter ends with a glossary of terms. *130 pages* **£5.95**

OUT OF THIN AIR
Collected Antenna Articles from PW 1977-1980
Including such favourites as the ZL Special and '2BCX 16-element beams for 2m, and the famous "Slim Jim", designed by Fred Judd G2BCX. Also features systems for Top Band, medium wave/long wave loop designs and a v.h.f. direction finding loop. Plus items on propagation, accessories and antenna design. *80 pages.* **£1.80**

SIMPLE, LOW-COST WIRE ANTENNAS FOR RADIO AMATEURS (USA)
W. I. Orr W6SAI & S. D. Cowan W2LX
Efficient antennas for Top Band to 2m, including "invisible" antennas for difficult station locations.
191 pages. **£6.75**

THE ARRL ANTENNA BOOK (USA)
15th Edition
A station is only as effective as its antenna system. This book covers propagation, practical constructional details of almost every type of antenna, test equipment and formulas and programs for beam heading.calculations. **£14.95**

THE ARRL ANTENNA COMPENDIUM (USA)
Volume One
Fascinating and hitherto unpublished material. Among the topics discussed are quads and loops, log periodic arrays, beam and multi-band antennas, verticals and reduced size antennas. *175 pages.* **£9.25**

WIRES & WAVES
Collected Antenna Articles from PW 1980-1984
Antenna and propagation theory, including NBS Yagi design data. Practical designs for antennas from medium waves to microwaves, plus accessories such as a.t.u.s, s.w.r. and power meters and a noise bridge. Dealing with TVI. *160 pages.* **£3.00**

W1FB'S ANTENNA NOTEBOOK
Doug DeMaw W1FB
This book provides lots of designs, in simple and easy to read terms, for simple wire and tubing antennas. All drawings are large and clear making construction much easier. *124 pages.* **£5.95**

25 SIMPLE AMATEUR BAND AERIALS (BP125)
E. M. Noll
How to build 25 simple and inexpensive aerials, from a simple dipole through beam and triangle designs to a mini-rhombic. Dimensions for specific spot frequencies including the WARC bands. *80 pages.* **£1.95**

25 SIMPLE INDOOR AND WINDOW AERIALS (BP136)
E. M. Noll
Designs for people who live in flats or have no gardens, etc., giving surprisingly good results considering their limited dimensions.
64 pages. **£1.75**

25 SIMPLE SHORT WAVE BROADCAST BAND AERIALS (BP132)
E. M. Noll
Designs for 25 different aerials, from a simple dipole through helical designs to a multi-band umbrella.
80 pages. **£1.95**

25 SIMPLE TROPICAL AND MW BAND AERIALS (BP145)
E. M. Noll
Simple and inexpensive aerials for the broadcast bands from medium wave to 49m. *64 pages.* **£1.75**

THE RADIO AMATEUR ANTENNA HANDBOOK
William I. Orr W6SAI & Stuart. D. Cowan W2LX
Yagi, quad, quagi, l-p, vertical, horizontal and "sloper" antennas are all covered. Also towers, grounds and rotators. *190 pages.* **£6.75**

COMPUTING

AN INTRODUCTION TO COMPUTER COMMUNICATIONS (BP177)
R. A. Penfold
Details of various types of modem and their applications, plus how to interconnect computers, modems and the telephone system. Also networking systems and RTTY.
96 pages. **£2.95**

AN INTRODUCTION TO COMPUTER PERIPHERALS (BP170)
J. W. Penfold
Covers a wide range of computer peripherals such as monitors, printers, disk drives, cassette recorders, modems, etc., explaining what they are, how to use them and the various types of standards.
80 pages. **£2.50**

MICROPROCESSING SYSTEMS AND CIRCUITS (BP77)
Elements of Electronics Book 4
F. A. Wilson
A comprehensive guide to the elements of microprocessing systems, which are becoming ever more involved in radio systems and equipment.
256 pages. **£2.95**

MORSE

INTRODUCING MORSE
Collected Articles from PW 1982-1985
Ways of learning the Morse Code, followed by constructional details of a variety of keys including lambic, Triambic, and an Electronic Bug with a 528-bit memory.
48 pages. **£1.25**

THE MORSE CODE FOR RADIO AMATEURS (RSGB)
Margaret Mills G3ACC
A guide to learning to send and receive Morse code signals up to the 12 w.p.m. required for the radio mateur aspiring to a Class A licence having passed the RAE.
19 pages. **£2.88**

THE SECRET OF LEARNING MORSE CODE
Mark Francis
Designed to make you proficient in Morse code in the shortest possible time, this book points out many of the pitfalls that beset the student. *87 pages.* **£4.95**

STOP PRESS

NEWNES SHORT WAVE LISTENING HAND BOOK
Joe Pritchard G1UQW
A technical guide for all short wave listeners. Covers construction and use of sets for the s.w.l. who wants to explore the bands up to 30MHz. *288pages.* **£12.95**

FLIGHT ROUTINGS 1989
T.T.Williams
Identifies the flights of airlines, schedule, charter, cargo and mail, to and from the UK and Eire and overflights between Europe and America. *104pages.* **£4.00**

50 (FET) FIELD EFFECT TRANSISTOR PROJECTS
F.G.Rayer
50 circuits for the s.w.l., radio amateur, experimenter or audio enthusiast using f.e.t.s. *104pages.* **£2.95**

FROM ATOMS TO AMPERES
F.A.Wilson
Explains in simple terms the absolute fundamentals behind electricity and electronics. *244pages.* **£3.50**

TEST EQUIPMENT CONSTRUCTION
R.A.Penfold
Describes, in detail, how to construct some simple and inexpensive, but extremely useful, pieces of test equipment. *104pages.* **£2.95**

HINTS AND KINKS FOR TRHE RADIO AMATEUR
Edited by Charles L. Hutchinson and David Newkirk
A collection of practical ideas gleaned from the pages of *QST* magazine. *152pages.* **£4.95**

The ARRL ELECTRONICS DATA BOOK
Doug DeMaw W1FB
Back by popular demand, completely revised and expanded, this is a handy reference book for the r.f. designer, technician, amateur and experimenter.
260pages. **£8.95**

GUIDE TO WORLD-WIDE TELEVISION TEST CARDS
Edition 3
Keith Hamer & Garry Smith
Completely revised and expanded, this is a handy reference book for the DXTV enthusiast. Over 200 photographs of Test Cards, logos, etc., world wide.
60pages. **£4.95**

26☞

PHILIPS D-2999 WORLD RECEIVER

were three rates automatically set by the microprocessor according to how fast you turn the tuning knob. To give you an idea how well set this was, I didn't realise it was doing it until I read the manual!

The three stages were 1, 2 and 10kHz per step on short wave and 10, 20 and 100kHz on v.h.f. I think the secret to success in this case is the use of the 2/20kHz intermediate step. My only criticism of this aspect of the performance was a short beep which occured when tuning quickly or switching between presets. It sounded as though the synthesiser was momentarily losing lock, but was not a serious problem.

Moving on to some more serious short wave listening I connected up my wide-band nest of dipoles, which proved easy thanks to the solderless connectors supplied.

Starting with the short wave broadcast bands, I logged plenty of stations including the usual Radio Moscow and Voice of America. I was impressed with the versatility of the audio controls and I found, with a little bit of attention, I could obtain the best of any broadcast.

Another feature not yet mentioned was the ability to automatically scan a broadcast band. This is started quite easily by selecting the required band and then pressing the SCAN button. I found this quite valuable for checking the state of the band as you could adjust the signal level required to stop the scan by use of the LOC/DIST button or the manual r.f. gain control.

Now it was time to look at the performance with amateur signals. I started with the 3.5MHz band where there are always some local calls to catch. Resolution of amateur s.s.b. signals with the b.f.o. proved to very easy and I copied several Americans on 14MHz along with an assortment of European and Middle East stations. I did discover that the audio performance could be improved by using the old technique of setting the volume control to maximum and controlling the output with the manual r.f. gain control.

The next mode to try was RTTY which involved connecting the LINE OUT to the audio input of my RTTY terminal unit and firing-up my BBC B computer. I started with a few amateur transmissions on 14MHz and 21MHz and found that the fine control offered by the b.f.o. was just right for decoding these narrow band transmissions. I then explored the world of commercial RTTY and was able to resolve a wide variety, including TASS news broadcasts with no problems.

The final utility station test was to connect-up my ICS FAX-1 and try a few weather FAX charts. My first station was Rome Meteo on 13.6MHz and I received some very good charts. FAX is quite testing for this type of receiver as you need excellent stability to produce good results without constant re-tuning. I'm pleased to say that the D-2999 passed with flying colours.

All these tests with the utility modes meant that the D-2999 was operating very close to my computer and printer and I'm glad to say I suffered no interference problems.

Summary

I must admit I enjoyed using the D-2999, the microprocessor logic was very well set-up and the physical size was just right, I think Philips must have put a lot of thought into the ergonomics. The performance on all modes was very good with the sensitivity being exceptional for a receiver of this type. In view of its good all round performance on all modes I would recommend the D-2999 to anyone in this market.

The Philips D-2999 is available from any Philips stockist priced around £299.99. Thanks are due to **Philips UK** for the loan of the review model. □

ICOM

Count on us!

IC-R7000, 25-2000 MHz

Commercial quality scanning receiver

With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz.

The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisiticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall frequencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected frequency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attentuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.

Icom (UK) Ltd.

Dept SW, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Helpline: Telephone us free-of-charge on 0800 521145. Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.
Datapost: Despatch on same day whenever possible.
Access & Barclaycard: Telephone orders taken by our mail order dept., instant credit & interest-free H.P.

Yaesu has serious listeners for the serious listener.

Yaesu's serious about giving you better ways to tune in the world around you.

And whether it's for local action or worldwide DX, you'll find our VHF/UHF receivers are the superior match for all your listening needs.

The FRG-9600. A premium VHF/UHF scanning communications receiver. The 9600 is no typical scanner. And it's easy to see why.

You won't miss any local action with continuous coverage from 60 to 905MHz.

You have more operating modes to listen in on: upper or lower sideband, CW, AM wide or narrow, and FM wide or narrow.

You can even watch television programmes by plugging in a video monitor into the optional video output. (NTSC System).

Scan in steps of 5, 10, 12½, 25 and 100kHz. Store any frequency and related operating mode into any of the 99 memories. Scan the memories. Or in between them. Or simply "dial up" any frequency with the frequency entry pad.

Plus there's more, including a 24-hour clock, multiplexed output, fluorescent readout, signal strength graph, and an optional PA4C, AC power adaptor.

Extend the coverage further with the optional FC965DX 0.15-30MHz and FC1300 800-1300MHz external convertors.

The FRG-8800 HF communications receiver. A better way to listen to the world. If you want a complete communications package, the FRG-8800 is just right for you.

You get continuous worldwide coverage from 150kHz to 30MHz. And local coverage from 118 to 174MHz with an optional VHF convertor.

Listen in on any mode: upper and lower sideband, CW, AM wide or narrow, and FM.

Store frequencies and operating modes into any of the twelve channels for instant recall.

Scan the airwaves with a number of programmable scanning functions.

Plus you get keyboard frequency entry. An LCD display for easy readout. A SINPO signal graph. Computer interface capability for advanced listening functions. Two 24-hour clocks. Recording functions. And much more to make your listening station complete.

Listen in. When you want more from your VHF/UHF or HF receivers, just look to Yaesu. We take your listening seriously.

YAESU

South Midlands Communications Ltd
S.M. House, School Close,
Chandlers Ford Industrial Estate,
Eastleigh, Hants SO5 3BY
Tel: (0703) 255111

UK Sole Distributor

Dealer inquiries invited.

Prices and specifications subject to change without notice.
FRG-9600 SSB coverage: 60 to 460 MHz.