Short Wave Magazine

ISSN 0037-4261

£1.45

JULY 1989

SWM SWM SWM SWM SWM SWM SWM

REVIEWED
The Bearcat BC950XLT

Build an Inexpensive Vertical Antenna

Read about the Eiffel Tower Wireless Station

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 7 JULY 1989

ON SALE JUNE 22nd

AUGUST ISSUE ON SALE JULY 27

|10| **Bearcat BC-950XLT Mobile Scanning Receiver.**

Cover In our reveiw this month John Waite takes a good look at the Bearcat BC-950XLT Mobile Scanning Receiver.

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

Eiffel Tower Wireless Station	7	*Stan Crabtree G3OXC*
SWM Preview Bearcat BC-950XLT Scanner	10	*John Waite*
Antennas Part 7	23	*F. C. Judd G2BCX*
Fun With Antennas	27	*Mikhail Drakov*
Inexpensive Vertical Antenna	28	*James Stirrat*
Introduction to DX-TV Part 19	29	*Keith Hamer & Garry Smith*
Piccadilly Radio	33	*Sharon George*

REGULARS

A Word in Edgeways	2	*Your Letters*
What's New	3	*Latest News & Products*
Listen Out For	2	*Special Event Stations*
Rallies	4	*Where to Go*
Trading Post	5	*Readers' Adverts*
Grassroots	6	*Club News*
Airband	14	*Aeronautical Radio News*
Bandscan	17	*Broadcast Station News*
Scanning	21	*For the Scanning Enthusiast*
Services	34	*Important Information*
Starting Out	35	*For the Beginner*
Further Thoughts	38	*Ommissions ("Scanning" June 89)*
Advertisers' Index	57	*Find that Advert*
Book Service	58	*Order Your Technical Books*

SEEN & HEARD

Amateur Bands Round-Up	39	*Paul Essery GW3KFE*
Decode	40	*Mike Richards G4WNC*
Info in Orbit	41	*Lawrence Harris*
Band II DX	44	*Ron Ham*
Television	44	*Ron Ham*
Long Medium & Short	48	*Brian Oddy G3FEX*

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

In reply to both J. H. Wright and the more recent letter from Harold McIntyre G3FLJ, I have used a Sangean ATS-830A for all of my loggings to SWM *- Seen & Heard for almost a year and I am very pleased with the result. I would recommend this receiver to anyone who wishes to hear stations from all parts of the world.*

The only other point worth mentioning is that the output from the DIN socket is in stereo which can be channelled through an a.f. amp where it could be used to drive speakers. Also, Sangean has left out the 22m band in the main band function so one has to punch in 13600 and work from there remembering that the search facility will not jump in 5kHz steps as it will with all other short wave bands.

Also, you might be interested in the following bit of news. In a Radio Nederland Media Network *programme, an interview was heard from Radio Canada International from which I understand that the possible site for a new Radio Nederland relay will be Thailand in co-operation, if funds permit, with Radio Canada International. Apparently RCI wishes to have a permanent base in Asia.*

RICHARD J. C. RADFORD-REYNOLDS
GUILDFORD
SURREY

Sir

In your April issue, photographs of old radio equipment of the twenties took me back to my schooldays and I was especially interested in "The Radio Set" by Scott Taggart. At that time, my father was a keen "radio man" and I remember him making these sets for our neighbours. The speaker was also supplied and it was my job to cut the fret-work front for the speaker box. We had no electricity in our home, gas was the means of lighting and cooking. So a 120V dry battery was the h.t. supply and a 6V accumulator was also needed, not forgetting the grid bias battery. It was my job to take the spare battery to the charging station to ensure that there was always a full battery on hand. It was my father's pride and joy to show visitors his radio and proudly tell them that they were listening to "radio from America". Now that I have retired and have gone back to my schoolboy hobby I enjoy listening to world short wave radio, both amateur and commercial. I am also a regular reader of SWM *which I enjoy and learn from.*

TOM MARKS
NEWTOWNARDS
CO. DOWN

WHAT'S NEW

Pocket-size DMM

The ultra-compact SOAR model 3060 is a personal digital multimeter that incorporates a 3200 count 3½ digit read out, a 32-segment analogue bar graph and a variety of features that can be operated with one hand.

The unit measures 51 x 106 x 10mm and weighs 100g. It delivers high speed sampling on the 32-segment bar graph and is fully protected on all ranges to 450V. Solex International say it is virtually "drop-proof" and it includes an automatic power-off feature. The 3060 employs the dual slope integration method for measuring a.c. and d.c. voltages up to 450V; resistances from 300Ω to 30MΩ; and is supplied complete with a soft, protective carrying case to guard against accidental drops. It uses standard "button cell" batteries and has both over range and low battery indicators. Accessories include an instruction manual, test leads, protective case and two batteries. **Solex International, 95 Main Street, Broughton Astley, Leicestershire LE9 6RE. Tel: (0455) 283486**

New Marine Channels

The DTI has assigned additional v.h.f. radio frequencies for use by marinas, yacht clubs and pleasure craft to reduce congestion on the existing communications channels in coastal waters.

The boom in yachting has resulted in the current 158.85MHz frequency, called Channel M, becoming over-used. The frequency 161.425MHz, provisionally called Channel M2, has been made available to yacht clubs whose need is mainly for a simplex channel on which to pass messages, for instance to a group of yachts in a race.

Marinas, which often need to be contacted by foreign vessels, may apply for a transmitting frequency of 161.625MHz and a receiving frequency of 157.025MHz which are together known as Channel 80. This is in the international band available to the UK and foreign yachtsmen. The new channels will require a licence or, in the case of current Channel M licences, an ammendment to this licence will be needed.

Communications Museum

The Museum of Communication will be displaying some of the interesting items from the museum's collection in the Upper Library, Bo'ness during the weekend of September 16/18.

Amongst the things on show will be examples of early spark transmission, telegraph and telephone mechanisms, a cylinder recorder and horn gramophone, crystal receivers, horn loudspeakers, early single and multi-valved receivers to name but a few. Bo'ness is also the home of the Kinneil and Bo'ness Steam Railway and the steam trains will be operating on the 11km return journey to the Birkhill Clay Mine which has been opened to the public this year by the Bo'ness Heritage Trust. **Museum of Communication, 22 Kinglass Avenue, Bo'ness, West Lothian.**

DXpedition

Once again the Isle of Man ARS are setting up a station on the Calf of Man. This is a small island 0.5km across and is a nature reserve and bird sanctuary. During the summer months, the population is only five ... until the GDs arrive!

The party of amateurs will be going out to the Calf on Friday July 7 and returning (weather permitting) on Sunday July 9. The callsigns in use will be GD0IOM and GD3FLH on h.f. with GD4IOM on v.h.f. The frequencies to listen on are: 14.250MHz s.s.b., 21.250MHz s.s.b., 28.525± QRM, 144MHz, 430MHz and possibly 50, 70 and 1296MHz.

Contacts made during the Calf DXpedition will count towards the Golf Delta Award.

Catalogues

BDL Electronic Components and Equipment have a catalogue of their components available. It will be sent on request if you send a 19p stamp and your address. It contains details of the components from light-weight stereo headphones to i.c.s, diodes and filters. There is also a page of special offer i.c. packs, all at £1 per pack (you could get as many as 10 i.c.s in a pack depending upon the type). **BDL, 88 Bewick Road, Gateshead, Tyne & Wear NE8 1RS. Tel: 091-490 1975**

The IR Group has published its new rental catalogue *-The Complete Guide to Instrument Rental 1989* - covering a total package of electronic instruments and computer systems available under a variety of rental and leasing schemes. **Instrument Rentals (UK) Ltd, IR Group, Dorcan House, Meadfield Road, Langley, Slough SL3 8AL.**

WHAT'S NEW

CSARS Activity Award

The Civil Service ARS have just launched a new award, open to all radio amateurs and short wave listeners. It is available for working, or hearing, a requisite number of CSARS members on any amateur band(s) using any permitted mode of operation.

All contacts with CSARS members or CSARS callsigns (club or special event) from 1 January 1985 onwards count toward the award and the requirements are as follows:

Standard - 15 points (maximum of 2 CSARS club or special callsigns)
Silver Award - 25 points (maximum of 3 CSARS club or special callsigns)
Gold Award - 45 points (maximum of 4 CSARS club or special callsigns)

Contacts with CSARS members using their own callsigns over a path greater than 80km, count as 2 points. Contacts over a path less than 80km count as 1 point. CSARS callsigns, such as the club stations G1CSR (v.h.f.) and G3CSR (h.f.) together with special event calls GB75CSR, GB0CSR, GB1CSR, etc., count as 5 points. CSARS club stations are usually active from CSARS at Westminster but occasionally operate outside this area on a portable basis.

Each callsign counts once, no matter how many times it is worked or how many modes of operation or bands are used. Callsigns also count only once, either with or without a suffix. No more than two club or special calls may be counted towards the Standard award and no more than 3 to the Silver or 4 to the Gold awards, respectively. For Silver and Gold, any additional special calls to the maximum allowance may count as 1 point. No calls worked or heard through repeaters or satellites are allowed.

For a list of current CSARS members, please send an s.a.e. to the **Awards Manager, Civil Service ARS, Civil Service Recreation Centre, Monck Street, London SW1P 2BL.**

Applications for the award itself should also be sent to the above address. A cheque or postal order for £2 made out to CSARS should be included to cover the administrative cost of the Standard certificate. The Silver and Gold embellishments are issued free of charge.

Skyview

In-flight entertainment is about to be revolutionised with the introduction of the Skyview personal video system from Fieldtech Heathrow. Passengers can now choose their own entertainment from an onboard Video 8 library and enjoy their viewing with full personal control.

The dual player and screen module is designed to fit neatly within the arm rest between seats. Each module has left and right facing Video 8 players and screens. The screens are pulled up from the compact storage in the lower arm rest and the picture viewed on an l.c.d. screen. The

sound is p.c.m. digital stereo via a stereo headset. **Fieldtech Heathrow Ltd, Huntavia House, 420 Bath Road, Longford, Middlesex UB7 0LL. Tel: 01-897 6446.**

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: This station will be on the air on August 19 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 on July 15.

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

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 information from **G4YRH. QTHR.**

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 can be obtained 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

GB2CPC: In conjunction with the National Trust Administrator for Penrhyn Castle, Bangor, North Wales, the Clwb Radio Amatur Y Ddraig (Dragon Amateur Radio Club) will be operating a special event station, GB2CPC for Castell Penrhyn Castle. The station will be active during the periods Friday, July 28 to Sunday, July 30 (Craft Weekend) and Friday, August 25 to Monday, August 28 (Activities Weekend at the Castle). Also from Tuesday August 23 to Monday August 28 visitors to Penrhyn Castle will be able to see an exhibition of amateur radio equipment together with some vintage radios.

RALLIES

***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 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, refreshments 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 ARCs 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.**

*** Short Wave Magazine & Practical Wireless in attendance.**

July 23: The first North Cheshire Radio Club Mini-Rally and Car Boot Sale will be held at the Morley Green Social Club, Mobberley Road, Morley Green, Nr Wilmslow. Car boot pitches are £5 in advance or £6 on the day. There will also be some local trade stands as well as refreshments and a licensed bar. Talk-in on S22 from G1NCR. **Peter G4WCE. Tel: Lymm 5959** or **via packet** at **GB7NWP-2.**

July 22/23: The 934 Club (Essex Group) will be holding their 5th Annual Mobile Rally at Thorndon Park, Brentwood, Essex. The rally site will be open from 2pm on the 22nd for campers/vans, etc. An overnight charge of £2 will be required. Entrance on the Sunday (from 10am) will be free. The Southend & District Radio Society will be attending, working h.f., packet and 144MHz using GB0NTF. There will also be the annual "fun quiz" (on air) for mobile stations with 934MHz equipment on Sunday afternoon. Also a free-of-charge car boot sale. **Tel: (0702) 712595** or **(0702) 420918.**

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 can be obtained 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: **Rob 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. Admission 50p (children free) with free cash draw on the programme. All the usual traders, Bring & Buy, snacks and meals available all day. 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 & 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.**

September 3: The Preston ARS 22nd Annual Mobile Rally will be held at Lancaster University, as in previous years. It will be in the Great Hall, Nuffield Theatre, Minor Hall and A35 (for the Bring & Buy). The licensed bar and snack bar will be located in the Great Hall foyer. A separate restaurant will be available at lunch time too. Contact: **Godfrey Lancefield on (0772) 53810.**

***September 3**: The Telford Amateur Radio Rally will be held in the Telford Exhibition Centre, Telford Centre, Shropshire. Doors open at 11am, 10.30am for the disabled.

September 10: The 6th National Amateur Radio Car Boot Sale will be held at the Shuttleworth Collection, Old Warden Aerodrome, near Biggleswade. Trading starts at 10am. Fly-in is available and permission can be obtained on Northill 288. Further details on the boot sale can be obtained from: **Tony Kelsey-Stead. Tel: (0582) 508259.**

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

TRADING POST

FOR SALE Yaesu FR-101 plus matching speaker 17 bands 50MHz/144MHz. Manual, circuit diagram, s.w., a.t.u. and folded dipole antenna. £200-buyer collects. Tel: Bookham 56741 (Surrey).

FOR SALE Black Jaguar 200MkII scanner. Standard accessories, h.f., v.h.f. (includes air band), u.h.f. frequencies. Five months old. Hardly used, as new. £140. A. Ferry, Salesian School, Blaisdon Hall, Longhope, Glos. Tel: (0452) 830583 Thurs evenings.

FOR SALE JRC NRD-515 receiver. 100kHz-30MHz condition as new, still boxed, £625, delivery possible. Tel: Locks Heath (0489) 574574 (Southampton).

FOR SALE AOR AR-2002 scanner 25-550 and 800-1300MHz for mobile or home use, antenna included, excellent condition, little used, £310. Tel: Gillingham (Dorset) 3781.

WANTED for FRG-7: Digital readout, f.m. board, i.f. filter, service manual. For Spectrum 48K: Any accessories, light pen, programs, games, etc., (not RX4, JEP FAX, ZX1....). Please write to Einar Sandoz, Bauganes 1, 101 Reykjavik, Iceland.

FOR SALE Yaesu FRG-8800 receiver complete with v.h.f. converter fitted, also FRA-7700 active antenna. All in superb condition & boxed with manual. £475. Clifford. Tel: (0253) 58305.

FOR SALE ITT Creed Teleprinter 444 + RTTY terminal decoder for ham and press with 19in v.d.u. All in perfect working order. Buyer collects. Tel: Ellesmere, Shropshire (0691) 622368.

FOR SALE Eddystone 680X, classic 15-valve receiver, 480kHz to 30MHz full coverage plus b.f.o./s.s.b. Excellent condition. Includes spares, headphones, speaker, manual/circuit diagram and other literature. £140. Mr J. Hood, 19 Stanhill Road, Radbrook Green, Shrewsbury SY3 6AL. Tel: (0743) 240165.

FOR SALE Yaesu FRG-9600 Mk 5. 100kHz to 950MHz continuous coverage, 11 months old. Mint condition, boxed, complete with mains p.s.u. £580 plus postage. Tel: Swindon (0793) 828456 weekends only.

FOR SALE Pye Fenman II 1955, 11 valves, 4 speakers, l.w., m.w., f.m. service sheets, excellent condition. Reasonable offer. **Wanted** manual/service sheet for 19 set MkIII would swap boxed TV valves, copy/buy. E. J. Allison, 138 George St, Mablethorpe, Lincolnshire LN12 2BT. Tel: (0521) 77805.

FOR SALE Tandy PRO-2004 scanner, as new, only 7 months old with discone antenna £250. Tel: (0325) 718665.

FOR SALE v.h.f. conv, FRV-7700 £35, AR-88D a.v.c. fault offers, *WRTV Handbooks* 1950-1970 offers, DX-160 RX £35. G. Trowler. Tel: (0273) 673556 Brighton. Buyer collects RXs.

FOR SALE AOR AR-2002 scanner receiver, near new, boxed, complete with Diamond discone antenna, £400 o.n.o. G. Milne. Tel: (0252) 547564 evenings.

FOR SALE Icom IC-R71E general coverage receiver, between 100kHz and 30MHz with manual, with f.m. unit installed, also Icom RC-11 W.R. controller with manual. Will sell for £590 o.n.o. L. McCarthy, 17 Rackham Close, Lockleaze, Bristol BS7 9TQ. Tel: 512706 or 515174.

FOR SALE HA-600 receiver 150kHz-30MHz, 5 bands, a.m., s.s.b., with filters, mains transformer and operating manual. Mint condition. £50. P. Perry, 22 Applefield, Northgate, Crawley, Sussex RH10 2BJ. Tel: (0293) 37580.

FOR SALE Realistic PRO-32 hand-held scanner (covers airband), 200 memories, as new, £140 o.n.o. Also mint PRO-2004 scanner, 25-1300MHz, 300 memories, if right price offered. Tel: (0272) 861589.

FOR SALE Black Jaguar BJ-200 Mk2, good condition in makers box, 18 months of use, with leatherette case £100. Included is mobile mount. Mr. C. C. Hibbard, 510 Pentregethin Rd, Caereithin, Swansea SA5 8AG. Tel: (0792) 583322.

FOR SALE Kenwood 1000 + manual. *1989 World Radio Hand Book*. Long length of wire. Reason for sale rapid loss of sight in remaining eye. £240. P. Gerrard, 20 Park Rd, Featherstone, Wolverhampton, West Midlands. Tel: (0902) 735832.

FOR SALE Lowe HF-125 still under guarantee, boxed with active ant and frequency list £300. Also pair of v.h.f. hand-helds £100. Greg. Tel: 01-729 6651 day.

FOR SALE Tatung TMR-7602 plus power supply, 150kHz-29.99MHz, f.m., s.s.b., a.m., nine memory channels. £80. Tel: (0252) 547564, evenings.

WANTED Urgently, manual or circuit for solar scope, CD 513.2, needing repair. Made about 1955, this scope is used with pupils on RTTY work and we can not afford to replace it. G. D. Massey, 57 Silver St, Thorverton, Devon EX5 5LT.

FOR SALE Win-108 airband monitor and holster, v.g.c., £130 ono. J. Lockwood G3XLL, QTHR. Tel: Mellis 596.

FOR SALE Racal RA17 0-30MHz receiver 100Hz to 8kHz bandwidth £155 buyer collects. G3LIV RTTY terminal BBC £45. D. L. Bird FAX interface, new £45. Bill. Tel: 091-482 1344 (Tyneside) after 6pm.

FOR SALE Realistic PRO-32 scanner with NiCads £130. Sony SRS-55 active speakers (pair) £40. Both the above excellent and boxed. Large effective home-brew m.w. loop (similar R. Netherlands design) £20. Roger Provins. Tel: (0242) 518364.

FOR SALE Sony ICF-2001D receiver 150kHz-30MHz, a.m./s.s.b./c.w., v.h.f. airband, f.m. broadcast, universal p.s.u. 110/240a.c., original packing, manuals, wave-guide, unmarked, all as new, under guarantee with purchase receipt. £235. P. Rein, 4 Borough View, Torrington, Devon EX38 7NN. Tel: (0805) 23311 anytime.

FOR SALE Kenwood RZ-1 wide-band scanning receiver. 500kHz-950MHz a.m., f.m. narrow, f.m. wide stereo. 100 memory store plus message store, as new. Boxed with instructions. £325 o.n.o. Mike. Tel: 01-650 7724.

FOR SALE Icom IC-R71E 100kHz-30MHz general coverage receiver, excellent condition with full service info, circuit diag's etc., £695.00, buyer collects. Tel: 061-445 5888 (Manchester).

FOR SALE Antenna tuner, Mizuho KX-2 Sky Coupler', £39. Variable speed cassette recorder Philips D6410, £35. Buyer collects. Tel: 01- 445 5888 (Manchester).

WANTED Grundig Satellit 1400 or Vega 242. Write with price and details to V. R. Davies, 119 Manor Crescent, Newport, IOW PO30 2BH.

FOR SALE WWII military equipment, some items newish condition. BC221, class D wavemeters, BC458A, TU6B, ZC1 MkII, RF26, rotary transformers, etc. Write for details, wants. Bruce Adams, 53 Red Leasowes Rd, Halesowen, West Midlands B63 4SE.

FOR SALE Racal RA17L, 500kHz-30MHz, a.m., c.w., s.s.b., manual, speaker, a.t.u., MkII, etc. K. F Branston. Tel: (0949) 50640.

FOR SALE Kent brass key (assembled) £19.00, Datong Morse tutor £38.00, both virtually unused. Will take £50.00 for the pair. Tel: 01-654 1882 eves (Croydon).

FOR SALE Realistic PRO-2009 base receiver 68-88, 144-174, 410-512MHz f.m. requires external antenna, scan search, delay, lockout, 8 channel memory. Manual not supplied. £23. No callers please. P. Burns, 9 Crummock Avenue, Cockermouth, Cumbria CA13 9BQ.

FOR SALE FRG-7700-M, FRV-7700, FRT-7700, excellent condition, offers. M. Wykes, Newlands, Whites Row, Kenilworth, Warwicks. Tel: (0926) 57261.

FOR SALE AOR AR-2002 scanning receiver as new in box £300 carr paid. Lowe HF-125 receiver as new in box £250 carr paid. Please reply in writing to: Carl Smith, Trealaw, Roadwater, Watchet, Somerset TA23 0RG.

FOR SALE Dressler ARA-900 active antenna, 50MHz-1300MHz, as new, £90. Tel: (0621) 742555 day or (0261) 855285 evening.

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.

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.

SWM JULY 1989 TP

GRASSROOTS

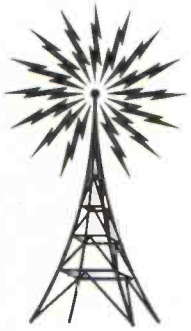
Lorna Mower

S☆T☆A☆R☆S

Verulam ARC meet 2nd & 4th Tuesdays at the RAF Association HQ, New Kent Rd, St. Albans. July 11 is an Informal and the 25th is Hands on EMC G3VTT. George Christofi G0JKZ on 01-427 4800.

Braintree & District ARS meet 1st & 3rd Mondays, 7.30pm at The Braintree Community Association Centre, Victoria St. (next to Bus Park). July 17 is Live Broadcasting by Henry G1GMM. Derek Brades G0IZW on Braintree 44908.

Plessey, Christchurch ARS meet 2nd & 4th Thursdays, 7.30pm at the Clubhouse, rear of Plessey



Sports Social Club, Grange Rd, Somerford, Christchurch. Dennis G3BJR on Highcliffe 72826.

Bolsover ARS, details from S. C. Utridge, c/o Black Bull, 3 Hill Top, Bolsover, Chesterfield, Derbyshire S44 6NG.

Willenhall & District ARS now meet Wednesdays, 8pm in the upstairs function room at Brewers Droop Inn, Wolverhampton St. Dave G0EGG on Wolverhampton 734475.

Wimbledon & District ARS have HF Antennas and Feeder Systems G5RV on June 30 and Camp Planning and General Activity

Evening on July 14. 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd. Nick Lawlor G6AJY on 01-330 2703.

Dragon ARC have a talk/demo of Amateur TV on July 3 and Preparation for Special Events on the 17th. 1st & 3rd Mondays, 7.30pm at Four Crosses, Menai Bridge (St. John's Ambulance HQ). Tony Rees on Bethesda 600963.

Mid-Warwickshire ARS meet 2nd & 4th Tuesdays, 8pm at 61 Emscote Rd, Warwick. June 27 is Youth In Tune - A young hams view of an old hobby G0KAQ and July 11 is Visit to Warwick School Satellite Station G0GLU. Mike Newell G1HGD on Kenilworth 513073.

Trowbridge & District ARC have a Social Evening on July 5 and their Annual Family Picnic and "barbie" on the 19th at White Horse Hill, nr Westbury, from 6pm onwards. Meet in the TA Club, Bythesea Rd. Ian G0GRI on Bratton 830383.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. June 29/July 27 are Natter Nights, July 6 is HF Radio Noise G3MYM, the 13th is Two Element Beams G3MYM and the 20th is Receiver Noise Measurement G8AWB. David Bailey G1MNM at Flat 7, Thatcham Close, Yeovil, Somerset BA21 3BS.

Hastings Electronics & RC have a Packet Radio Talk on July 19. 3rd Wednesdays, 7.45pm at West Hill Community Centre, Croft Rd and Fridays, 7.30pm at Ashdown Farm Community Centre, Downey Close. Reg Kemp G3YYF at 7 Forewood Rise, Crowhurst, Hastings.

Sutton & Cheam RS meet 3rd Fridays, 7.30pm at Downs Lawn Tennis Club, Holland Ave, Cheam and Natter Nights are 1st Mondays in Downs Bar. June 27 is a Committee Meeting at 35 Great Ellshams, Banstead, July 3 a Natter Night and the 21st is Pye Westminsters - Conversion & Trouble-Shooting evening. John Puttock G0BWV on 01-644 9945.

Norfolk ARC meet Wednesdays, 7.30pm in The Norfolk Dumpling, The Livestock Market, Harford, Norwich. June 28 is Practical Antennas G3KBR, July 5 is Sizewell "A" Power Stn Len Green of CEGB, the 9th is Club Visit to Sizewell "A" Power Stn - Weekend event, the 12th/26th are Informals and the 19th an Inter-Club Quiz with Gt. Yarmouth ARC & Lowestoft ARC. Craig Joly G0BGD on Norwich 485784.

Bedford & District ARC have Amusing Anecdotes G3FWA on July 4 and "QRP" Masters the Power and Antennas that did it G4MEW on the 18th. Allen's Club, Hurst Grove, 8pm. Glen Loake G0GBI on Bedford 266443.

Fylde ARS meet 2nd & 4th Thursdays at South Shore Tennis Club in Midgeland Lane. July 13 is a d.f. Foxhunt and the 27th an Informal. F. Whitehead G4CSA on St. Annes 720867.

Lothians RS have a Barbecue on June 28. 2nd & 4th Wednesdays, 7.30pm at the Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. P. J. Dick GM4DTH at 21 West Maitland St., Edinburgh EH12 5EA.

Colchester RA's have a v.h.f. night on July 6. Room 15, Ground floor, "C" Block, Gilberd School, Brinkley Lane, Highwoods. Mike J. Griggs G4YJN on Layer-de-la-Haye 348189.

Thornbury & District ARC have Amateur TV on July 5 and h.f. activity on the 19th. 1st & 3rd Wednesdays, 7.30pm in the United Reform Church, Chapel St. Tom Cromack G0FGI at Rose Cottage, The Naite, Oldbury-on-Severn, Bristol BS12 1RU.

Stourbridge & District ARS have a Carnival briefing on July 4 and G8JTL/G8MKK Test Equipment Use & Abuse on the 18th. Meetings held twice monthly at the Robin Woods Centre, Beauty Bank. C. Brunn G1WAI on Hagley 885602.

Keighley ARS meet Tuesdays, 8pm in the clubroom, rear of Victoria Hall. June 27 is "Wildlife on the Falklands" Slides G0FRQ, July 4/18 are Natter Nights, the 11th is Night on the Air G0KRS and the 25th is Visit to Leeds Bradford Airport (not air traffic control). Kathy G0IGH on Bradford 496222.

Kirkby ARC meet Wednesdays, 7.30pm at Kirkby Sports Centre, 17 Valley Rd, Westvale, Kirkby L33 4UP (just off M57 motorway). Details from Paul Moran at the above address.

Coventry ARS meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas St., Radford. June 23/ July 14/21 are Nights on the Air & Morse Tuition, June 30 is a 144MHz Contest and July 7 is Visit to Rolls Royce Heritage Trust (provisional). Jonathan Ward G4HHT on Coventry 610408.

Biggin Hill ARC meet 3rd Tuesdays, 7.30pm at the Victory Social Club, Kechill Gdns, Hayes. July 18 is p.c.b.s. Geoff Milne G3UMI on 01-462 2689.

South Dorset RS meet 1st Tuesdays, 7.30pm at the Pensylvania Castle Hotel, Portland. Geoff Gwilliam G4FJO at 13 Overlands Rd, Wyke Regis, Weymouth DT4 9HS or on Weymouth 781164 after 6pm.

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at the Railway Enthusiasts Club Premises, off Hawley Lane (by M3 bridge). July 12 is Quiz night. Tim FitzGerald G4UQE on Camberley 29231.

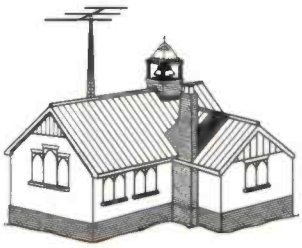
Bath & District ARC have a club night on July 5 and Visit by Regional Liason Officer on the 19th. Meet alternate Wednesdays, 8pm at Englishcombe Inn, Englishcombe Lane. Eric Otten G4GEV on Combe Down 832156.

Wirral ARS have a d.f. contest on July 5 and an Equipment Sale for members' funds on the 19th. 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arrowe Park Rd, Birkenhead. Alec Seed G3FOO on 051-644 6094.

Cheshunt & District ARC meet Wednesdays, 8pm in the Church Room, Church Lane, Wormley. June 28 is Weather Satellites G4OAV (from RIG), July 5/19 are Natter Nights and the 12th is an Open Air Meeting - Baas Hill Common. Roger Frisby G4OAA on Hoddesdon 464795.

Derby & District ARS have a Night on the Air on June 28 and a Junk Sale on July 5. Wednesdays, 7.30pm at 119 Green Lane. Kevin Jones G4FPY on Derby 669157.

Spen Valley ARS meet Thursdays. 8pm at Old Bank Working Mens Club, Old Bank Rd,



Mirfield, W. Yorks. July 6 is Closing Night on the Air. Anthony Galvin G0IKD on Cleckheaton 875038.

South Manchester RC meet Fridays, 8pm at Sale Moor Community Centre, Norris Rd, Sale. June 23 is Midsummer d.f. and Barbecue, 7.45pm at St. Joseph's Scout HQ, Springfield Rd, Sale and the 30th is Discussion Night and Preparations for v.h.f Field Day. David Holland on 061-973 1837.

EIFFEL TOWER WIRELESS STATION

Stan Crabtree G3OXC

There were certain misgivings about the appearance of the Eiffel Tower, erected 100 years ago. Many felt it would be an eyesore. All admitted the genius of the design of Gustave Eiffel but questioned its long term usefulness. Since that time, it has become the symbol of Paris and of all things French.

One of the uses that could not have been foreseen at the time of its construction was that of a radio station. Yet, for the first quarter of the Twentieth Century the Eiffel Tower supported antennas for one of the most famous transmitters in Europe.

The idea was the brainchild of Commandante Ferrie, later to become Director of the French Military Wireless Service. He was one of the most enthusiastic of the early wireless pioneers. He joined the Army Telegraph Service after graduating and rapidly gained recognition in this field.

Ferrie first realised the potential of wireless telegraphy when he was appointed a member of the special committee, representing the French Government to evaluate Marconi's first inter-continental test. He visited the French station at Wimereux and witnessed the first signals to be exchanged between England and France in March 1899.

In 1900 he was credited with the success of design work on the electrolytic detector at the same time as R. A. Fessenden, but both were unaware of the other's experiments. A year later he was responsible for the first wireless communication between the Cote d'Azur and Corsica.

Antenna Design

By this time, Ferrie had become interested in antenna design and his first relationship with the Tower came in 1902 when he installed a receiver at the top, fed by a short antenna; the Tower structure being used as an earth. The French Government encouraged his experiments, and later in the year, he set up a small station in a wooden hut in the Champ de Mars. The antenna was suspended from the top of the Tower.

The tests were successful and after proposals from Ferrie, the Government agreed that plans should be drawn up for the establishment of a permanent station for long distance W/T. The only problem was the location. Parisiennes would not take kindly to a new commercial building in the Champ de Mars. Eventually it was decided to build underground chambers to house the complete station. As the equipment was under the control of the French military this would also serve as a security measure. Ferrie continued with tests throughout the construction stage and by 1908 had achieved a range of 6000km.

Time Signals

The Eiffel Tower station really came into its own in 1910 with the transmission of the first wireless time signals. Broadcasting on 2500 metres (120kHz) with the appropriate callsign "FL" the emissions could be heard all over Europe, the Baltic and even into the eastern Atlantic. The signals were sent out at 1000 and midnight GMT. Although primarily for the growing number of ships fitted with wireless apparatus, the service soon became known to the growing band of experimental wireless listeners. They soon began to assess the sensitivity of their home constructed apparatus by the strength they were able to copy "FL".

This was the first time that accurate time signals were received in the home. Until then the population were dependent on the town hall clock or the clock at the local railway station. Many later wireless listeners cut their teeth on time signals from "FL". After the time transmissions a weather forecast and news items were transmitted in French at 12 w.p.m. By 1912, a receiver was available for purchase, especially made to receive the signals from the Eiffel Tower.

The method used was naive by modern standards, but an accuracy of 1/100 second was attained. The "FL" duty operator called CQ, 20 minutes before the due hour and then switched over the keying line to the Paris Observatory. Here a telegraphist in the clock room keyed a warning signal of a dot each second and with the other hand, adjusted a telescope to focus on the second hand of the standard mean time clock. Just before 15 minutes to the hour he deftly switched the clock into circuit and the clock itself actuated the first time signal - a single long dash. This procedure was repeated at 5 minute intervals until the hour. After this the "FL" operator retrieved control of the link and transmitted the weather report and occasionally some news items.

The actual clock keying mechanism was devised by Commandante Ferrie himself. Briefly, at the instant the clock's second hand closed a circuit, a small pump caused a squirt of mercury to take place against a rotating electrode. This short circuited a resistance in series with the feeder transformer and the spark took place.

Spark Transmitters

There were originally three transmitters serving the Eiffel Tower station, two for low frequency spark and one of high frequency with a "musical" note of some 2kHz. Power for the station was obtained from the Paris lighting circuit; 220 volts a.c. at 42Hz. A bank of transformers increased the working voltage to the operational value. The high frequency system was fed from a 150kW alternator having a frequency of 1kHz and this continued in use after the low frequency spark systems were abandoned.

The spark gap in the early years was made of two fixed metal surfaces onto which a blast of air was continuously directed. Keying was achieved by short circuiting a resistance in the feed transformer. In later years a rotary spark discharger was employed.

Six galvanised steel cables, running fan-shaped from the top of the 300m high tower served as the antenna. The cables were of course insulated from the top of the tower. The earthing system consisted of 600 square metres of zinc plates buried below the station foundations. The r.f. output was fed via an auto-transformer coil in series with the antenna. This consisted of 4 turns of 100mm diameter copper tubing in the antenna circuit with one turn tapped off to the oscillator circuit. To tune to the radiated wavelength of 2500 metres the condenser was made up of 8896 Moscicki tubes, each able to withstand 50kV. It was acknowledged that the tower itself absorbed a certain amount of radiated energy but this was considered acceptable when compared with the advantage of an antenna support of 300m - then the highest man-made structure in the world.

The "FL" transmitter was capable of operating on a wavelength anywhere between 2000 and 2500 metres. During the following year, "KAV", the German station at Norddeich, began transmitting time signals on 1800 metres (166.6kHz). Probably because of this the French station gradually moved further away by using longer wavelengths and ended up on 2600 metres. However, listeners soon learnt to differentiate between the two signals. The "FL" signal was reported to sound like "the crumpling of tissue paper". In contrast the German transmission was "like the squealing of a rabbit". The Tower contributed to many successful tests during its wireless career. The American, Lee de Forest, was given special permission to use the 12☞

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

The R-2000 from Kenwood
150kHz-30MHz. SSB/AM/CW/FM
VC-10 converter 118-174 MHz
R-2000 . . . . £595
VC-10 . . . . £162

The R-5000 from Kenwood
100kHz-30MHz. SSB/AM/CW/FM/FSK
VC-10 converter 118-174 MHz
R-5000 . . . . £875
VC-20 . . . . £167

The NRD-525 from JRC
Simply the best receiver you could buy . . . **£1095**

What do I mean by "When you are ready to graduate"? Well, like all hobbies or pastimes, short wave listening is a progressive hobby, and many people come to it almost by accident when they hear an unusual broadcast station on their ordinary domestic radio, particularly if the radio has a short wave band. Interest is aroused, and before long the listener begins to wonder why there are some signals he cannot resolve. He may well turn to the pages of Short Wave Magazine for advice, and become familiar with terms such as SSB, RTTY, selectivity, propagation, and so on.

It is at this point that our worthy listener takes his first step in upgrading his equipment, and comes out of primary education into more advanced listening. Many people at this same point rush along to their nearest High Street multiple retail store and buy what they are told is a "Short Wave Radio", bristling with push buttons and coloured knobs. Sadly, the so-called "Short Wave Radio" is often no more than a domestic portable with a fancy front panel, and the performance when used for anything other than casual listening is no better than the old radio with which he started — in fact it's often worse.

So — these push button portables are excellent for taking on holiday, or carrying to the river bank during a fishing trip, but for real listening — no, no, no.

Our listener is about to graduate from the University of Short Wave Listening, and armed with the knowledge of what he really needs for his hobby will proceed to find a suitable receiver for his purposes. Now it is true that the cost of a properly designed short wave receiver will be higher than the domestic portables; but not so much higher as to be prohibitive, and by going to a specialist (and I mean a true specialist, not someone who talks about "Tranny Radios"), the listener will get good advice based on years of experience in the field, and access to not only new receivers but usually a range of guaranteed second hand units as well. The specialist will also stock and sell a full range of necessary accessories, ranging from simple aerial insulators to complex morse and RTTY decoders for more advanced enthusiasts.

You may get the impression that I am referring to Lowe Electronics when I talk about a specialist dealer, and of course I am. After 25 years of specialising, it is generally accepted that we are without equal, and this is re-inforced by the fact that we have been appointed by so many leading manufacturers to represent their products. As a final point, how many other companies in the UK have designed, built, and sold a real short wave receiver to 17 countries around the world. WE HAVE.

The receivers shown on this page are representative of the best in the world, and are on show at all our branches and at selected dealers throughout the UK. For full information on how to choose your short wave radio, just send off for our "Listeners Guide" (details below), or call and ask. We are happy to help, and we know what we are talking about.

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**

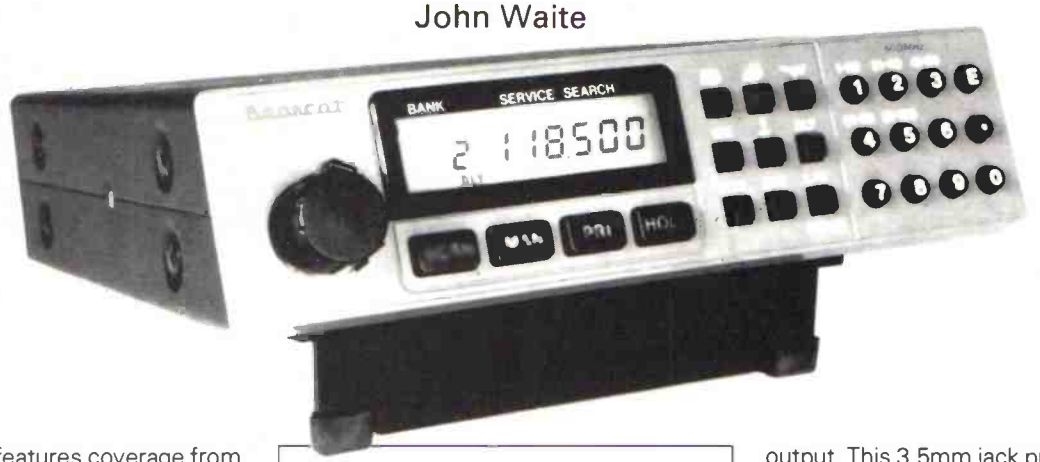
25th Anniversary Prize Draw

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.

BEARCAT BC-950XLT MOBILE SCANNER

John Waite



The BC-950XLT features coverage from 29MHz through to 956MHz in four bands though this is not continuous. The modern styling combined with its very compact size means that it will look good either in the car or shack.

Getting Going

The first task of course is to read the manual, which in this case was a single large sheet 610mm x 420mm printed on both sides. In order to make it easy to handle it was folded into a little booklet measuring approximately 207mm x 141mm. I must admit I would have preferred to see a more conventional format for the manual, as I don't think the one sheet type supplied will last very long. An additional problem was that the registration card had to be cut out of this sheet thus making an even bigger mess of the manual!

Despite the unusual presentation, the necessary information was all there with separate sections for installation, operation, controls and specification. There was also a "Handy Hints" section to help get you out of trouble and perhaps avoid an embarassing trip back to the dealers!

In The Car

Fitting the BC-950XLT in the car proved to be very simple thanks to the supplied mobile mounting bracket and the scanners small size of 160mm x 40mm x 190mm. The mounting comprised a straight forward "U" bracket and the BC-950XLT fitted to it by means of two knurled thumb screws, one each side. The advantage of the thumb screws was twofold - it made adjusting the viewing angle of the scanner easy and also simplified removal from the car. I'm sure most listeners that use one of these mobile scanners, would expect to be able to remove it quickly so it can double as a base station scanner. I would have preferred to see some sort of quick release catch, but I found the screws to be adequate.

The power connection was via the usual 3.5mm coaxial socket on the rear panel. For connecting into my car I used the supplied 1.2m lead which was wire ended. As this lead was fitted with an in-line 1 amp fuse it could be connected to any convenient 12 volt point on the car. For convenience and ease of installation, I used the cigar lighter on my car.

If you are interested in a scanner and would like the capability to operate both from the car and at home the Bearcat BC-950XLT could be just right for you.

The antenna was connected to a "car aerial" type socket on the rear panel. I must admit that I thought this to be a strange choice of socket for a scanner with a frequency coverage to 956MHz, as the inherent losses will be very high. It would be far more appropriate to fit a BNC or similar type socket.

The audio output of the BC-950XLT was a healthy 2.5 watts and should prove adequate for most mobile and base station installations. The only snag was that the internal speaker was mounted on the bottom of the rig facing down. In some installations this may cause most of the sound to be absorbed.

When using the BC-950XLT as a base station the problem of the base mounted speaker was overcome by means of a small retractable flap on the base. When this was extended it angled the receiver nicely for optimum viewing of the display and also allowing the sound to emerge.

If you do have a problem with the internal speaker all is not lost as there is the usual 3.5mm jack on the rear panel for connecting an external speaker. I suspect this will take the normal four or eight ohm types, but there was no guidance in the manual, other than the suggestion that you buy the Bearcat speaker! As is normal practice, the internal speaker was disabled when a plug was inserted in the external speaker jack.

There is one optional connection that can prove to be very useful - the tape output. This 3.5mm jack provides a low-level audio output which is independant of the volume control setting. The obvious use is for connecting a tape recorder, but it could also be used for connecting the BC-950XLT to your in-car audio system for greater output.

The final operation required before I could get on with some serious listening was to fit the memory back-up batteries. These are two AA size cells which fit in a battery compartment on the rear panel. One problem that can occur with back-up batteries is that the memories are lost when you have to change them. Fortunately Uniden have covered this problem and fitted a large capacitor on the memory back-up line which allows you 30 mins to change the batteries before the memory contents are lost. Of course, if you leave the batteries till they are exhausted you will still lose the memories. The trick is to replace them regularly, say every six months.

Tuning Around

The BC-950XLT, like many other scanners on the market, does not have a fully manual tuning system, but relys on two basic tuning functions - scanning and searching. These terms are well known to experienced listeners but are rarely explained, so I will expand here for the benefit of the newcomer. Scanning is the process of automatically selecting pre-programmed memories at high speed. When a signal is received on any memory, the scanning stops. With most scanners the scan will restart either after a pre-determined period or when the signal dissappears.

Searching on the other hand is very similar to scanning but rather than operating on the memories, actually searches between two pre-set frequencies using the minimum frequency steps of the receiver. Searching is used to find new stations which can then be stored in a memory for later recall using the scan facility.

So, with search and scan as the only tuning options, how did the BC-950XLT fare.

BEARCAT BC-950XLT MOBILE SCANNER

Scanning

Starting with the scan facility, the BC-950XLT has 100 memories which can be programmed by the operator. These are divided into five banks of twenty memories which provides a very neat way to separate out different types of station. For example, I put amateur in bank one, airband in bank two, etc.

Storing frequencies into the memories was very easy, requiring selection of the memory number using the numerical keypad on the front panel. Once selected, the required frequency was simply typed in on the keypad. The microprocessor logic was set up to auomatically insert trailing zeros, so if you wanted to enter 145.000MHz you only had to enter 145. and the processor did the rest.

Once I had stored some frequencies in the memories, they could be scanned simply by pressing the SCAN button on the front panel. I thought the scan was particularly effective and remarkably quick at fifteen channels per second. I mentioned earlier that the memories were divided up into banks and the BC-950XLT let you enable or disable these very easily. All that was needed was to enter the appropriate bank number on the keypad while the scan was running and that bank was either selected or deselected, i.e. pressing the bank number had a toggle action.

Once scanning has commenced it continues until it detects a signal strong enough to lift the squelch. The squelch threshold being set by the operator using the rotary control on the front panel. Once stopped on a signal the scan will only automatically continue if the signal disappears. Of course it is possible to manually continue scanning by pressing the SCAN button again.

One problem that can occur when scanning is if you come across a two-way radio contact. In this case the scanner will often continue scanning in between overs. The BC-950XLT overcomes this with a delay facility which can be added to any memory. When enabled this feature causes the scanner to wait a further two seconds after the signal has disappeared before re-starting the scan.

I found the delay very useful when scanning airband frequencies, as these transmissions tend to be rather short and the extra two seconds gave me time to stop the scan if it sounded like an interesting station. By the way, stopping the scan was very easy, just a single press of the MANUAL button.

In addition to the automatic scanning of memories you could also manually select any memory and by pressing the MANUAL button you could manually step through the memories. I found this very useful for monitoring popular local stations, i.e. the local airport approach frequency.

I must admit that I thought that the fast scanning was very effective, making it very quick and easy to monitor a wide range of signals.

Once your favourite stations have been stored in memory the next problem is how to get the scanner to skip over those with a permanent carrier up. This problem is simply overcome using the lock-out feature which has now become standard on most scanners. To operate this you just press the L/O button on the front panel while the appropriate channel is selected. Like the delay function this button has a toggle effect so a second press will reverse the action.

Priority monitoring is another useful scanner facility and the BC-950XLT has this built-in to channel one. To activate it you press the PRI button on the front panel and channel one is automatically sampled every two seconds for activity. The facility is defeated with a second press of this button.

The final facility associated with scanning is the provision of a memory lock switch on the rear panel. This slider switch when operated prevents any of the memory channels from being changed and offers a degree of protection for all those valuable frequencies in the memories!

Searching

As I mentioned earlier the search facility is mainly used for discovering new frequencies for subsequent storage in the memories.

The BC-950XLT is supplied with some very comprehensive search facilities, though several of them were set-up for use in the US which was rather a shame.

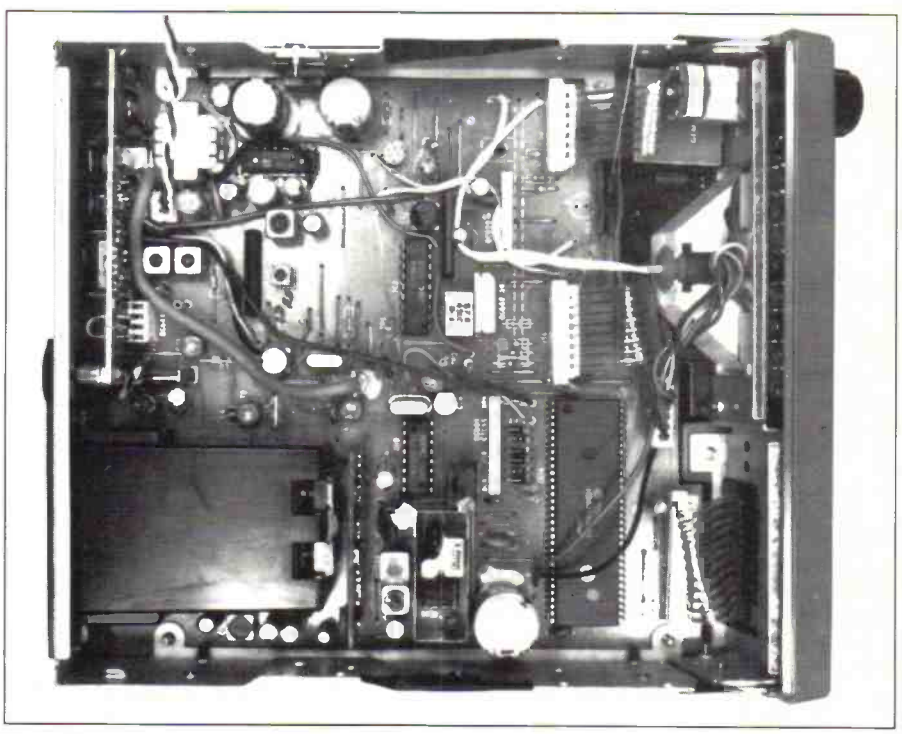
Before you can start the basic search facility you need to enter the upper and lower limits of the search. Fortunately this operation is very easy, you first enter the lower limit using the keypad, then press LIMIT then repeat the process for the higher limit.

Once the limits had been set a press of the SRC button started the automatic search. As with the scan mode the search only stopped when a signal was received which exceeded the squelch threshold, the search starting again as soon as the signal disappeared. The delay button could be used when in search mode, but the operation was slightly different as the two second delay was applied to all frequencies, rather than any single frequency.

There was also the provision to suspend the search if necessary by pressing the HOLD button. This actually enabled a degree of manual tuning as each subsequent press of this button increased the frequency by one step. For manually tuning to a lower frequency the LIMIT button had to be pressed.

There were a useful group of search facilities known as service search and as the name implies, allowed searching of various service bands. For the UK listener by far the most useful are the airband and marine searches.

Starting these searches was very easy - just a single press of the appropriate button. In order to save front panel space the service searches were identified with small diagrams above the buttons, i.e. an



BEARCAT BC-950XLT MOBILE SCANNER

anchor for the marine search.

Other service scans included in the BC-950XLT were as follows:

Police: 37.02MHz - 46.02MHz,
154.65 - 159.21MHz
& 453.05MHz - 465.55MHz
Fire: 33.02 - 47.66MHz,
150.775MHz - 170.15MHz
& 453.05MHz - 468.175MHz
Marine: 156.025MHz - 162.025MHz
Weather: 162.4MHz - 162.55MHz

The police, fire and weather scan searches only cover particular frequencies rather than the whole band segment, so are specific to the US and not really very effective in the UK. Having said that, they can of course still be used and often turn up some interesting stations.

Whilst in service search all the facilities of the normal search were available making it a very useful feature.

Air Test

I spent quite some time monitoring the air and marine bands and I was very pleased with the audio quality. Even with the internal speaker the audio was very crisp and clear without being tinny. There was also plenty of volume from the internal speaker which was fine for mobile use in my car.

The antennas used were a whip for mobile use and my trusty discone when operating from the shack. Fairly obviously the best all round performance was obtained from the discone, but the humble mobile whip can come into its own, especially from hill top sites which naturally favour v.h.f. signals. The sensitivity was good, but the performance naturally tailed off towards the higher frequencies. This was partly due to the poor choice of antenna connector. If you need more gain there is an optional wide band r.f. amplifier available from Bearcat.

The only real problem that I did encounter was a strong image response, which caused a few problems with spurious signals. The most inconvenient manifestation of the problem occurs when listening to the airband when any reasonably strong amateur signals in the 144MHz band will appear as interfering signals between 122.3MHz and 124.3MHz. The effect is also apparent on other parts of the spectrum with false signals appearing 21.7MHz below the true signal.

This problem is not exclusive to the Bearcat and is mainly dependant on the performance of the front end filtering, which is not easy to get right on a wide coverage receiver.

Summary

The BC-950XLT is a very attractive and compact scanner which I'm sure will satisfy a lot of listeners. I was not happy with the image performance but all other aspects of the performance were very good. The scanning facilities were well organised and if the service search was to be adapted for the UK it would be very popular indeed. The BC-950XLT is available from: **Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (0705) 662145.** The cost of the scanner is £229.00, many thanks to Nevada for the loan of the review model. □

EIFFEL TOWER WIRELESS STATION

7☞

structure during radiotelephony tests early in 1908. With an antenna suspended from the top he broadcast a programme of gramophone records which was received 800km away in Marseilles.

Frog's Leg Detectors

In 1913, Dr Lefeuvre received time signals from "FL" at the University of Reims using a frog's leg as a detector. Current from the Reims antenna was passed through the nerve and the resulting contraction of the muscle made marks on a revolving drum covered with blackened paper. The dots were quite clearly defined and resembled a present day oscilloscope waveform.

"FL" was used by Commandante Ferrie to send a congratulatory message to Alan Campbell Swinton, just after his Presidential Address to the Wireless Society of London on 21 January 1914. The transmission, on 2600 metres, was received on a syphon recorder. The movement of the pen, making the Morse characters, was displayed on a large screen for the benefit of the whole assembly.

In 1915 all operations were suspended for the period of the Great War. One of the last services performed was an experiment on behalf of the American Telephone and Telegraph Company who were using a transmitter in Arlington, Virginia with 300 Audion valves in parallel. For the first time, a man speaking in the USA was heard by wireless in Europe.

The message of goodwill to London amateurs was repeated in 1920. But such was the advancement in technology that Campbell Swinton - still in the chair of the Wireless Society of London - received a spoken message from "FL" on a receiver using valves via a frame antenna standing on the table used by the committee.

The Eiffel Tower station continued its experiments with a valved transmitter and in late 1921 commenced a music and entertainment service for domestic listeners. This fact helped in putting pressure on the British Government which eventually sanctioned the start of broadcasting in Britain.

Ferrie was promoted to General in 1925 and died in 1932. His achievements in the early years of wireless are commemorated by a small plaque at the base of the tower which contributed so much to his success.

Abbreviations

a.c.	alternating current
GMT	Greenwich Mean Time
Hz	hertz
kHz	kilohertz
km	kilometre
kV	kilovolt
kW	kilowatt
m	metre
mm	millimetre
r.f.	radio frequency
w.p.m.	words per minute
W/T	wireless telegraphy

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 Mk. 2 mod extends this to 950MHz and changes the SO239 for an 'N' type. Our Mk. 5 mod has an active front end converter, coverage from 100 KHz to 950 MHz and 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
Challenger BJ200	£199.00
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
ROYAL 1300 discone (AH7000)	£59.50

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

COBRA SR-925

SCANNER SPECIAL! EXCLUSIVE TO RAYCOM THE COBRA SR-925

16 channel programmable search, the COBRA scanner covers 29-54MHz for 10m & 6m Amateur bands, 118-136MHz Airband, 136-148MHz for 2m Amateur band, 162-174MHz for Land Mobile Radio and 406-512MHz for 70cm Amateur band and UHF 'T' band. With 16 memory channels, 2-speed search, high sensitivity (0.3 µV) and 1 watt of audio this scanner is ideal for beginner and enthusiast alike! ***RAYCOM SPECIAL PACKAGE*** includes the following: COBRA SR925 including mains adapter plus ***FREE*** - RAYCOM scanner antenna worth £14.95 covering 60-90MHz, 108-136MHz, 138-174MHz and 380-525MHz plus ***FREE*** - antenna adapter, 10 metres of coax and PL259 plugs worth £15 - a ready-to-go special at only

£179.99

(plus £10.00 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 £59.50!

~~£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 - £10 off spare nicads!*

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	✔

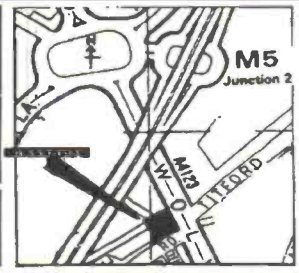
~~£259.99~~ **£229.99** (save £30)

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 BY COURIER (£15.00) - OR 2PM FOR DELIVERY BY POST (£10.00 P&P). PLEASE ALLOW TIME FOR 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 JULIAN.

AIRBAND

Godfrey Manning G4GLM

Judging by the few readers' letters this month you're all out at air displays or flying! So, how about some reports of what you've been up to? If you've got an interesting observation, a technical/operational question, or an amusing anecdote, please send it in for all to share.

This month, Godfrey explains how certain aircraft instruments can give you useful information inside the passenger cabin of an airliner.

You Write

"I have just had the privilege of a visit to the RAF Air Traffic Control (a.t.c.) Training Centre at Shawbury," writes **W. Bell** (Durham) whose son has just qualified there. He saw the a.t.c. simulator used during the training. The radar that gives both a plan view of the approach and a vertical section (showing the glidepath) is not a standard airfield or *en route* surveillance device. In fact, it's a specialised precision approach radar (p.a.r.) used to talk pilots down where an instrument landing system (i.l.s.) would be unsuitable (such as at Northolt). It appears that the Tornado flies a 2.5 degrees glide slope instead of the more usual 3 degrees. I echo the admiration shown at the professional dedication of the controllers.

Location Indicators

J. F. Coulter (Winchester, Hampshire) is "still reading the column with interest." Thanks - letters like that always make it more worthwhile! The question raised concerns the International Civil Aviation Organisation (ICAO) location indicators, those groups of four letters that uniquely specify each airport. Although not used during ordinary voice transmissions they do appear in information sent on the aeronautical fixed Telex network (a.f.t.n.). One type of this information is the terminal area forecast (t.a.f.). You can easily get to see these; for example at many fly-ins the National Air Traffic Services (NATS) provides a caravan for pilot briefings. This often includes a teleprinter giving the latest t.a.f.s; it's also a good source of those free CAA publications that describe certain aspects of air traffic control. But do ask the duty officer before taking anything, and if you're not flying yourself, allow pilots priority access to the facilities if there's a big crowd. Well worth looking into if you see this mobile unit at your local fly-in.

Back to the location indicators. They are also used on flight plans, and hence appear on air traffic controllers' flight progress strips and sometimes the last two letters of the code are shown as part of the secondary radar information; airport charts also refer to them. The list is far too long to print here, but all the usual reference books contain them. For example, the appropriate Aerad *Supplement* is a useful source, obtainable by post from Aerad Customer Services, Building 254, PO Box 10, London (Heathrow) Airport, Hounslow, Middlesex TW6 2JA, Tel: 01-562 0795. A short list appears in the Royal Air Force (RAF) *Flight Information Handbook*, by post from 1 AIDU, RAF Northolt, West End Road, Ruislip, Middlesex HA4 6NG, Tel: 01-845 2300 X209. The UK is covered by *Pooley's Flight Guide*, from the Air Tour Shop, Elstree Aerodrome, Elstree, Hertfordshire, Tel: 01-953 4870. I'm not sure what Jeppesen have to offer but try the Oxford Airport Shop, Oxford Airport, Kidlington OX5 7RA, Tel: 08675 4321.

The first two of the indicator's four letters shows the country, EG being the United Kingdom, EI Ireland, LF France, and so on. The remaining two letters are specific to one aerodrome or, occasionally, an important operational facility such as an air traffic control centre. Hence the specific example of EGQK is Kinloss. Here are some of the major UK indicators:

EGAA Belfast (Aldergrove)
EGBB Birmingham
EGFF Cardiff
EGGA CAA London Headquarters
EGGW Luton
EGKK London (Gatwick)
EGLC London (City)
EGLL London (Heathrow)
EGMC Southend
EGNM Leeds and Bradford
EGPF Glasgow
EGPH Edinburgh
EGPK Prestwick
EGPQ CAA Scottish Division Office
EGSS London (Stansted)
EGTT London Air Traffic Control Centre
EGWU Northolt

Follow-Ups

Liberty is a reporting point on the approach to Lakenheath (see April and June "Airband"). **Stephen Pattrick** (Wisbech, Cambridgeshire) has written in with more information - but because of the production schedule it means that I'm reading his letter after having written the June issue - and before Stephen receives that issue! Stephen also mentions the POKER holding point for Mildenhall; this is just off the coast immediately south of Great Yarmouth, 48nm from the Mildenhall TACAN on the 078 degrees radial. From here, aircraft track 239 degrees until intercepting the runway 29 i.l.s., 21nm out from the TACAN (at a point just north of Stowmarket) at which time a right turn is made to establish the localiser.

In the May "Airband" **James Dennis** (Whitwick) reported problems with his Signal R-535. W. Bell reminds us that nickel cadmium batteries develop a "memory" and should be allowed to discharge before being recharged again - to which I would add that "discharged" is taken to be when the terminal potential difference has dropped to 1.0V per cell. More information comes from John Lockwood (Eye, Suffolk). The batteries are 500mAh and with an average current drain of 80mA by the radio it would seem that in excess of 5 hours use can be expected per charge (James was experiencing only 2 hours). John recommends a charger supplying 55mA at 12V for 14 hours, and that a check be made for a dead or reverse polarised cell. If all seems in order, I suggest that James could attempt to discharge the battery, recharge fully, and repeat once or twice more to see if charge capacity can be increased. Finally, Ni-Cd batteries self-discharge slowly anyway, so if left unused for a time they will lose their charge even if the radio is switched off.

Still on the subject of the R-535, John says that the display backlight can not be turned off as it is in series with other circuitry; the dim/bright switch merely inserts a shunt resistor. Compared to the microprocessor chip that controls the set, the lamp uses only little power anyway. The delay can only be altered with consequences for other circuit functions such as scan rate. However, John suggests a modification that he will send to any reader who supplies a stamped addressed envelope to him at 1 Broadfields Road, Gislingham, Eye, Suffolk IP23 8HX.

Frequency News

John has sent a list of frequencies pertaining to "H.M. Air Force Vessels:" 2.591, 4.540, 6.738, 8.190MHz.

Again I'm grateful to the CAA's *General Aviation Safety Information Leaflet* 4/89 where I read that at Peterborough (Conington) the old air/ground frequency of 123.00MHz has been replaced by 129.725MHz; also that the Gatwick Radar frequency of 119.60MHz no longer operates a lower airspace radar service but that the approach frequency of 125.875MHz may provide this instead. Also mentioned is that London VOLMET (South) is now hard to receive particularly in the extreme south-east of England. The Warlingham

(Croydon) relay has been withdrawn, leaving Ventnor, Daventry and Davidstowe Moor to provide the service.

Another CAA publication, *Aeronautical Information Circular* 49/1989, gives the UNICOMM frequency as 130.425MHz. It is used within a radius of 10nm and up to FL30 at the scene of major emergency incidents occurring on land clear of existing regulated airspace. Emergency service pilots use the frequency to broadcast their intentions on nearing the incident area, so as to achieve some degree of coordination with and separation from other participating aircraft.

Instruments in the Passenger Cabin

When flying as an airline passenger it's all too easy to lose track of where you are. Fortunately the aircrew don't have this problem - but you too can obtain useful information by various means. Simplest is to work out your rough route and estimate the time over obvious landmarks such as coastlines and (always easy to spot from above) airfields. Make a reasonable guess as to true airspeed, say one mile per seven seconds in the cruise for a large jet. Of course, predetermined calculations assume still air; so if there's a headwind it will take longer to reach each point and vice versa in the case of a tailwind. An aeronautical topographical chart gives a suitable level of detail. So the simplest equipment to take on your next flight includes eyeballs (two if possible), a watch and a chart.

How about direction? A small compass won't do any harm and will give surprisingly faithful readings. The airframe is aluminium (Dural to be precise) and there are few components to affect a compass badly but do watch out for steel seat frames. Readings of about 5 degrees accuracy are quite possible. It is particularly interesting to follow a standard instrument departure (s.i.d.) comparing compass with published chart headings.

An altimeter will give good results in an unpressurised aircraft such as the DC-3, Shorts SD-3, light aircraft and helicopters. In a pressurised machine the altimeter now indicates cabin pressure; it is interesting to plot this as the flight progresses (set it to zero before the doors are closed). A working altimeter can be fairly expensive so hunt around at aerojumbles and rallies etc. The ideal cabin pressure indicator is a small self-contained device without a barometric adjustment and easily readable to the nearest 500ft. The dial often has a red background beyond 10000ft - if the needle gets up this far, the flight crew should be on oxygen! And from 14000ft upwards the passenger oxygen masks should also become available. A standard altimeter will do nicely, of course, as the compact cabin pressure type is hard to come by. One regular vendor of altimeters is Parkhouse Aviation, Tel: (0276) 33067 to discuss price and condition of instrument.

The other aneroid instrument that can be used in the cabin is the vertical speed indicator (v.s.i.), sometimes inaccurately described as a rate of climb indicator. In an unpressurised aircraft the reading will give a good idea of the true vertical speed (which is measured in this case by sensing the accompanying change in air pressure). If you have an inertial lead or instantaneous v.s.i. then this will work under the same circumstances; the instrument's pointer is given a "kick-start" by the built-in weights as the aircraft changes from level flight to a climb or descent. In pressurised cabins the v.s.i. will in fact show the rate of change of cabin pressure and is not directly influenced by climbs and descents. An inertial lead v.s.i. could give conflicting readings in this case as the weights still respond to changes in level whilst the pressure sensing mechanism is instead trying to follow the cabin pressure.

Of the gyro instruments the only one that you're likely to come across that can be run off a portable battery is the turn indicator (sometimes presented as a turn co-ordinator in light aircraft but it's really the same thing). I don't recommend this though - the d.c. motor can cause interference to the aircraft systems (see later) should the inbuilt suppression be anything less than perfect. However, the side-slip indicator can be used as it is just a ball sliding around in a tube (or it may take the older form of a pendulum attached to a pointer). However it is hard to find a stable surface to fix it to in the cabin. I've mounted my side-slip ball indicator on an aluminium backing with a transparent acrylic front; the bare U-tube would be too fragile and could be broken if not thus protected. A filing clip (available from stationers) enables the whole to be attached to the stowed airliner meal table. However I found that the ball responded sensitively to every wriggle of the occupant of the seat in front of me! By and large, airline pilots avoid unbalanced turns and the ball should remain central in the tube throughout the flight (apart from taxying). Remember the rule: "step on the ball" - to balance a turn, apply a little rudder on the side to which the ball deflects.

If this awakens your interest in putting aircraft instruments to work then you may start wondering where to obtain them from in the first place. Many air shows attract traders dealing in old equipment; I noticed this at the North Weald Fighter Meet last year. Specialist events are an even better bet: the Yeovilton (Fleet Air Arm Museum) Aerojumble has plenty for the enthusiast whilst the Popular Flying Association Rally at Cranfield is also worth a visit although aimed more at amateur aircraft constructors. I'm aware that all of these places are down in the populous south of England so I hope that anyone with local knowledge of likely sources in other areas or countries will write in. Many old instruments will still work reasonably enough for you to experiment with.

As a general point, though, if you do take an aircraft instrument with you as a passenger, it should have a yellow stripe painted or taped around it. This indicates that the instrument is unserviceable, i.e. is not accurate enough or suitable for actually navigating the aircraft. Please also don't try to use any electronic equipment on board (that includes any sort of radio receiver) because certain aircraft systems might become disturbed. Most vulnerable tends to be the a.d.f. because there is no positive indication that the equipment is following the correct n.d.b. signal as distinct from mistakenly responding to noise (unless the pilot spends the whole time listening on the a.d.f. receiver - in which case he would miss what the air traffic controller is telling him).

Have a try with some simple attempts at following the navigation on your next flight. To see examples of typical instruments visitors are welcome at my museum, Tel: 01-958 5113 for an appointment. Whatever you do, whether it works or not, why not write in so that I can print it here? Looking forward to presenting your letters next month. □

Abbreviations

a.d.f.	automatic direction finder
a.f.t.n.	aeronautical fixed telex network
APHAZ	aircraft proximity hazard
a.t.c.	air traffic control
CAA	Civil Aviation Authority
d.c.	direct current
ICAO	International Civil Aviation Organisation
i.l.s.	instument landing system
mAh	milliampere hour
MHz	megahertz
NATS	National Air Traffic Service
n.a.b.	non-directional beacon
nm	nautical mile
p.a.r.	precision approach radar
RAF	Royal Air Force
s.i.d.	standard instrument departure
TACAN	Tactical Air Navigation
t.a.f.	terminal area forecast
V	volt
VOLMET	VOlume METeorological reports
v.s.i.	vertical speed indicator

BANDSCAN

Peter Laughton

More and more relays are being commissioned by the shortwave broadcasters and Peter Laughton looks at this aspect of the broadcasting scene. Silent radio may be an old joke but it really did happen, intentionally, in the USA recently as is explained in this month's column.

Canada Expands

The first few bars of *O Canada* are used by Radio Canada International as a s.w. tuning signal. RCI has been improving its worldwide coverage over the last two years by doing more and more programme exchanges with foreign broadcasters. In return, Radio Canada International's transmitter site in New Brunswick puts out programmes from five foreign broadcasters, as well as its own. But what of the future? The new director of RCI, Andrew Simon, says he wants his producers to make shorter, snappier items no longer than three and a half minutes. Presenters must sound more friendlier on the air. RCI is also looking for its own relay station in Asia, and if it can find CAN$18 million, may go for a joint project with Radio Netherlands. Thailand, Philippines and Brunei are possible sites. RCI is happy with its current exchange agreements, but still concerned that the contracts include a six month cancellation notice. If it costs £0.6 million to set up a language service, it is risky if the transmission facilities are suddenly taken away because of a political dispute. RCI is also looking at ways to improve its current audio problems with the Radio Beijing transmitters.

It's Money That Matters

To commercial and private s.w. broadcasting stations, money certainly does matter, but so do good frequencies. If you have a relatively low power transmitter you cannot compete with half a megawatt transmitters even if they are on the other side of the world. I called the religious station KJES in El Paso, Texas. You may remember they appeared out of the blue back in March with a few test transmissions. It seems they're currently off the air, but have just received a new set of frequency authorisations from the Federal Communications Commission. The chief engineer returns from holiday shortly, and they'll decide a new plan of test transmissions at that point.

I also called religious station WWCR, Worldwide Christian Radio. They've been quietly constructing a 100kW transmitter with the idea of putting out their own programmes and relay other people who want airtime too. Their office in Nashville Tenessee said that the response to their intital broadcasts on 15.690MHz, (an out-of-band channel), between 1700 and 0200UTC has been good. It has cost WWCR around US$1 million to construct their s.w. station on the outskirts of Nashville. The antenna is a rhombic type, aimed at Europe. WWCR is a religious based radio organisation, but as well as making its own programmes, it plans to sell airtime to other gospel groups. So far, the order books show programmes in a total of six languages. One of the problems in getting the idea going has been to explain the concept of international broadcasting to others.

IRRS

Down in Italy I rang the Italian Radio Relay Service in Milan. They have a 10kW s.w. transmitter and since November 1988 they've been trying to establish a commercial relay station on s.w. It seems that both UN Radio in New York and UNESCO Radio in Paris have now agreed to buy airtime on Sundays. IRRS start transmitting at 0730UTC on 9.860MHz Sundays, signing off around 1130UTC. Station manager, Alfred Controneo, says they've had a healthy response from listeners to the test transmissions. They have QSL'd 400 of the 800 responses from listeners, and they can now think of phase two of the project. That will be to remote control the transmitter site and feed programmes from a studio in downtown Milan.

Voice Of Namibia

As you may know, UN forces are currently in the north of the country 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 attacking the South African military bases in the country.

So, when the multi-national United Nations force came in they used airtime on the SWABC in Windhoek to appeal to SWAPO to lay down their arms. But SWAPO responded that this UN radio was pointless because their forces had not got any radios! The UN may also set up an f.m. station in Windhoek.

Relay Ramblings

Gone are the days when one transmitter could provide a strong reliable signal right around the globe. Even 500kW doesn't ensure that you won't be drowned out by interference. The solution is to put a transmitter nearer the target audiences. For countries with sufficient finances, it often means building a transmitter station in a foreign country, and finding a way of feeding a studio signal to it. In the last few years there's been a continuous stream of new stations. At the same time, others have been discontinued. The Voice of America has just announced that at the end of June it stops using its m.w. relay via Radio Costa Rica's transmitter at Ciudad Quesada. The transmitter goes off the air, although Radio Costa Rica continues to be heard on 930kHz from its sender in San Jose. At the same time the Bethany transmitter site for the Voice of America, that's located in the state of Ohio, has been nominated VOA relay station of the year. They'll be getting three new 250kW s.w. transmitters to replace some ancient ones dating back to the forties.

West Germany's external service has quite an extensive network of relay stations abroad. The oldest is at Kigali, in the African country of Rwanda, mainly intended for Eastern and Southern Africa. There's a relay station in Malta, Sines in Portugal, Trincomallee Sri Lanka, not to mention Antigua and Monserrat in the Caribbean. Added to that, Deutsche Welle hires air-time from Radio Bras in Brazil, and exchanges air-time with Radio Canada International. Peter Senger is the head of the radio frequency department at Deutsche Welle. He says the aim is to have four transmitters at each relay base within two years. Currently there are just two 250kW transmitters in Rwanda, so they're effectively doubling the size of that station. The station in Portugal will get a fourth s.w. transmitter. The station at Malta is the only transmitter site which is already complete, having four transmitters and a satellite dish to receive programmes. Trincomalee in Sri Lanka was constructed back in 1985, but because of political turmoil in the country, it is only just starting to operate at full capacity this month.

African FM

Africa Number One, the Panafrican s.w. radio station based in Libreville Gabon, broadcast on f.m. in Senegal from May 15-30. The stereo broadcasts coincided with the Francophone summit which was held in the Senegalese capital of Dakar from May 20-27. Africa Number One and the Senegalese Broadcasting

Organisation, the ORTS, signed an agreement to this effect last weekend. Africa Number One used two 5kW f.m. transmitters belonging to the ORTS. A top Africa Number One official, Louis Mapangou, announced that the station used 94.8 and 96.9MHz enabling it to cover most of Senegal.

For several months now, they have been trying to establish permanent relays in all the capitals of French-speaking Africa. According to Mr Mapangou, the agreement with the ORTS is a "major step" in this direction. They are also looking for other commercial partners to set up radio stations in other African countries. Africa Number One currently broadcasts 18 hours a day, mostly in French, and claims to have 15 million listeners. It is clearly successful, being second on the list of French language broadcasters beaming to Francophone Africa. Forty per cent of their stock is owned by French private and government interests, 35 per cent by the Gabonese government and 25 per cent by private interests.

At the same conference in Dakar, Radio France International ran an f.m. transmitter too. Whether that has remained on the air was not clear at the time of going to press. Like Africa Number One, Radio France International would like to get onto the f.m. band in major population areas of French-speaking Africa.

Funny Feeds

If you tune just outside the major broadcast bands (e.g. 19m) you may hear news feeds going into Africa and Latin America. Many stations in the region still get some of their radio news reports off s.w. Because it is a point to multi-point service rather than broadcasting, they use frequencies outside the broadcast bands. Voice of America has news fed to stations in Latin America, although some stations have run into trouble for using its material. Two stations in Panama were recently closed down for rebroadcasting US reports they got off the air.

Radio Vilnius

The Saturday night media segment on Radio Vilnius from the Soviet Republic of Lithuania is turning into a fascinating source of information about broadcasting in that part of the world. The transmission at 2130UTC to Europe is difficult to hear due to co-channel interference, but at 2200 the transmission on 7.4MHz comes in well. Radio Vilnius points out that in addition to one medium and one s.w. transmitter in Lithunaia, it rents airtime on Radio Moscow transmitters in the Ukraine, the Soviet Far East and even Bulgaria. Last Saturday, Radio Vilnius reported that because many of the young adults in the Republic are dissatisfied with the present programme line-upon Lithuanian domestic radio, a private f.m. station catering for the youth market is being planned. It will have a staff of eleven, though at the moment that station hasn't found a site for its studios. It's expected that because f.m. is still not widely listened to in the Soviet Union that a m.w. transmitter may also carry the new station during the start up phase. The station is to be financed by commercials and by charging listeners for music requests played on the air.

Radio Vilnius has also reported that many of the 50kW jamming transmitters in the Soviet Union that were used to block western broadcasters have now been converted into broadcast transmitters. They're used to distribute Soviet regional programmes to other parts of the Soviet Union. So, the cessation of jamming at the end of last year has not meant that there are suddenly giant gaps in the broadcasting parts of the s.w. spectrum.

Sound Of Silence

Back on the morning of Friday May 26 many US commercial radio stations went silent for 30 seconds. "The day the radio stopped" marked the beginning of a $100 million campaign with the theme: *Radio, What Would Life Be Without It.* The president of the US National Association of Broadcasters, Edward Fritts, claims this unprecedented collective action by commercial radio stations marked a new marketing era based on psychological research that shows radio is a vital daily part of 228 million people in the US. It appears Americans listen to radio on average of three hours and seven minutes a day. Some 10000 stations played a radio promotional tape that included 30 seconds of "dead air". Although billed as happening simultaneously across the country, there were four silent periods, corresponding to the four time zones across the American continent. Stations on the East Coast went silent at exactly 1142UTC, corresponding to 7.42am local time. An hour later those on the same time zone as Chicago went silent, and so on.

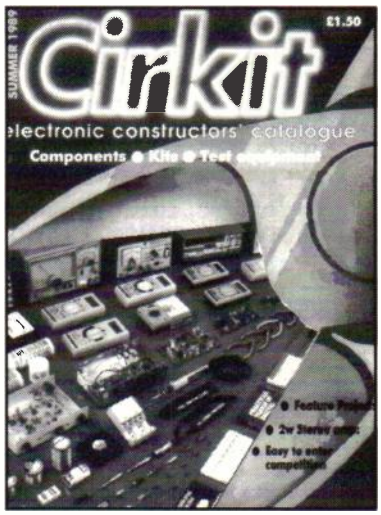
AFRTS On SW?

Several s.w. listeners in Northern Europe report hearing a relay of the US Armed Forces Radio and TV Service on 15.644MHz l.s.b. The announcemets make references to local f.m. frequencies of 102.5MHz and Moron Airbase on 95.1MHz, and summer temperatures around 91 degrees Faranheit. The relay would appear to be coming from Spain. The US Navy base at Rota has long been using that 19m band frequency for point-to-point communications. Somebody must have decided to plug-in a feed for American Forces Radio. If you're interested in Forces Radio, then you might like to check *Media Network* on Radio Netherlands during the latter part of August when they're planning a feature on American Forces in Europe. □

Abbreviations	
f.m.	frequency modulation
kH	kilohertz
kW	kilowatt
l.s.b.	lower sideband
m	metre
MHz	megahertz
m.w.	medium wave
s.w.	short wave
UTC	co-ordinated universal time (=GMT)

Cirkit NEWS JUNE 1989

NEW CAT OUT NOW!



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!**

Cirkit

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

SCANNING

Alan Gardener

Active Antenna Problems

From comments I have heard, it would seem that some listeners are experiencing problems with active antenna systems. This tends to be due to the way in which the d.c. supply is fed to the antenna from the power unit - along the same coaxial cable as the received signals. The way this works is by feeding the amplifier output and receiver input via d.c. blocking capacitors and feeding the power through r.f. isolating chokes (see Fig. 1) This is a very common means of providing a supply to a remotely sited amplifier without having to run in separate cable just for the power.

The problems arise when the antenna or power supply is connected or disconnected with the power supply still switched on. This seems to create some form of current or voltage pulse as a result of the coupling capacitors charging/discharging, which in turn damages the amplifier assembly. This tends to be an expensive integrated circuit rather than a few low cost components so repairs can be expensive, even if you do it yourself. The moral of the story is simple - if you have an active antenna or pre-amplifier which is powered in this way don't connect or disconnect the power supply unit without first switching it off.

I must admit that I came across another problem with this method of powering an amplifier with a home-built circuit. I had fitted a coaxial relay to switch between two antennas, one of which had a pre-amplifier fitted. When I first operated the relay I very quickly found myself in a smoke filled room. This was because the second antenna was a professional type with a d.c. short across the connector - a quite common arrangement designed to reduce any static build up on the antenna.

I had not built any current limiting into the power supply unit and so the choke feeding the d.c. to the coaxial cable was effectively connected across the supply, fortunately the visual indication produced by the smoke warned me that there was a problem before any major damage was done! However, it does serve as a warning not to use interchangeable connectors if you are feeding power in this way.

Allocation Of Frequencies

C. Hibbard of Swansea has been reading the column with interest and wonders who is responsible for the allocation of radio frequencies in Britain. In particular he wondered how it is possible to have different groups of people using the same frequencies in different geographical areas.

This month Alan considers some of the topics raised in readers' letters and continues to examine portions of the radio spectrum.

The allocation and co-ordination of radio frequencies in the UK is the responsibility of the Government in the shape of the Department of Trade and Industry. This department has its own specialised Radiocommunications Division with its headquarters based at Waterloo Bridge House in London. The range of activities undertaken by this division is vast, from international negotiations and advanced research and development projects down to tracing radio and television interference at a more domestic level.

Before a frequency can be allocated to a user, the DTI has to obtain international agreement in order to limit interference to other users who may be in located in many different countries - radio waves do not stop at national boundaries! This process is co-ordinated by the International Telecommunications Union in Geneva who maintain an international frequency register, in effect a huge database of who uses what, and where. This is an important stage in the licencing process for stations operating below 30MHz or for high power TV and Radio broadcast stations where the problems of interference to and from other services are potentially much greater. In the case of relatively low power transmissions such as those used by private mobile operators, the UK generally has a block allocation which can be used anywhere within a defined geographical boundary. In this case the DTI can allocate frequencies without reference to the ITU.

The problem that the DTI has to cope with is the limited number of radio frequencies available to it for particular purposes. The radio spectrum is a limited resource and so needs careful planning in order to accommodate the vast number of different users each jostling for a larger slice. The DTI maintains its own computerised database of users and has a very sophisticated system enabling it to predict the interference problems resulting from transmitters in different areas operating on the same frequency. This is a particular problem in large cities where many users may have to share. The DTI try and minimise this by regularly monitoring users and analysing the type of communications occurring, the average duration of each call and the peak periods of activity. By mixing the type of user it may prove possible to even out the number of transmissions during the day rather than have peaks of activity - for example during the morning and evening rush hours.

The policing of the radio spectrum is carried out at a more local level by the DTI Radiocommunication Division's Radio Investigation Service. This has several regionally based offices throughout the UK and is responsible for ensuring that equipment is operated within the parameters specified in the licence document. This usually involves visits to radio sites in order to ensure that the transmitter power has not been increased or the antenna system changed. Another aspect of their work involves tracing interference sources ranging from illegal radio transmitters, such as pirate radio stations, long-range cordless telephones and non-approved CB tranceivers, to noise produced by industrial equipment or central heating thermostats. Over the past few years the RIS has been undergoing many changes and now has a large array of equipment to enable offenders to be traced more easily, including receivers and direction finding equipment that most readers of this column would like to have in their own listening post.

If you would like to read more about the DTI Radiocommunictions Division send for a free copy of their colourful annual report which is available from the Information and Library Service, Radiocommunications Division, Room 605, Waterloo Bridge House, Waterloo Road, London SE1 8UA.

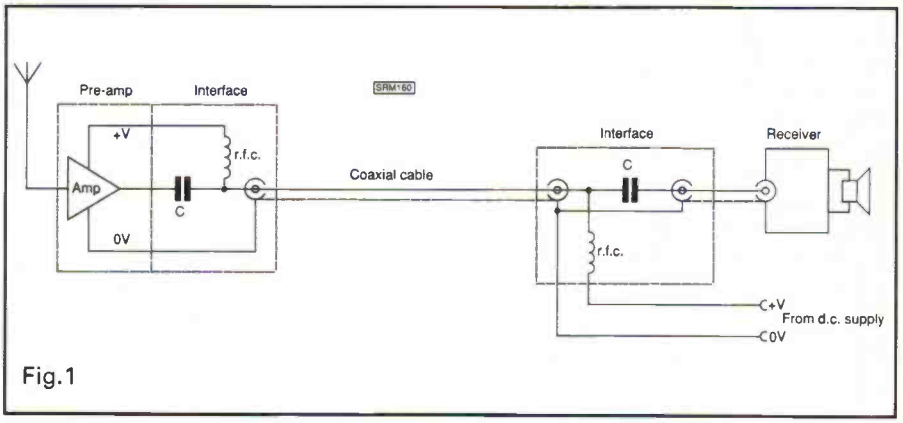


Fig.1

Computer Control

The subject of computer controlled scanning receivers seems to be becoming increasingly popular with readers. Several listeners are operating AOR receivers with either RC packs or Aircastle computers and one or two brave souls are actually experimenting with writing their own software. The problem with many scanners capable of remote control is that either a special interface unit is required or the control commands are very complex in structure or limited in effect. Another problem is that in some cases full two-way data communication with the receiver is not possible; so for example you cannot tell when the squelch is open, which immediately limits applications of the receiver/computer combination.

One or two software packages for the control of some of the more up market scanners have been available in the US for some time now but so far have not made it across to this side of the Atlantic. One bright ray of hope on the horizon is the New AOR-3000 which I have had a chance to use for a short period. This has an RS232 interface socket on the rear panel which can be connected directly into a computer fitted with an RS232 communication port. The commands are all very simple, for example, if I want to tune the receiver to 145.6MHz n.b.f.m., I just type "145.6 N" into the computer keyboard - press "Enter" and the receiver is tuned. Now for the clever part - if no signal is received the scanner sends back an almost continuous stream of % symbols. However, if a signal is present this is replaced by a letter ranging from A to P depending on the signal strength. Other commands allow you to load or read memory banks, switch in the attenuator or change modes/memory banks. The ease with which it is possible to write a simple program to scan a certain frequency band and dump active frequencies into the memories is amazing, especially when you consider that no additional interface is required. Another idea I have seen is a spectrum analyser type of display plotted out on the computer screen. This indicated frequencies in use and received strength in a bar graph type format, the information being stored for replay later thereby compressing several days activity into just one display.

One of the remaining problems with computer control is the level of hash generated by the computer itself. This can be reduced by careful filtering and screening but it is very difficult to eliminate completely. However, with the very simple command structure used by the AOR-3000 it should prove possible to use one of the cheap laptop computers now becoming available or perhaps even something like the Psion organiser which has an add-on RS232 communications port - both of which radiate much lower levels of interference than computers employing conventional c.r.t. displays.

I would be pleased to hear from anyone who has used a computer to control a scanner particularly if they have written their own software for the purpose. Perhaps they may be able to pass on a few tips or ideas of use to other readers.

What Can I Hear? Part 5

In the last instalment we reached 146MHz and the top end of the 144MHz amateur band. The next portion of the spectrum stretching up to 148MHz is used by the emergency services for a variety of purposes ranging from base station transmit and receive channels, control centre to hilltop links, paging systems and data channels - all slotted in between each other and using different modes of transmission.

The band 148-149MHz is a relatively new allocation which has been introduced for use by the Fuel and Power industries who are being gradually displaced from their old allocation in the p.m.r. "Mid Band". The base transmit frequencies at 148MHz are paired with receive frequencies in the range 139.5-140.5MHz. It is also likely that more spectrum efficient use is made of these new channels with techniques such as trunking and dynamic channel allocation being introduced with the new generation of equipment.

The frequency 149-149.9MHz is allocated for use by Government services such as the military with many airbases having spot frequencies in this band.

An interesting part of the spectrum is 149.9-150.050MHz with downlinks from many navigation satellites being audible at various times of the day. These usually transmit time information in the form of an f.s.k. modulated transmission. In addition each satellite transmits on another channel at around 400MHz in order to give an improved degree of accuracy in the presence of various forms of ionospheric disturbance.

Continuing on the space theme, 150.05-152MHz is allocated internationally for the purpose of radio astronomy. Most of the UK radio telescopes use this frequency band extensively, listening to faint radio sources and galactic noise emanating from the very edges of the universe, some of which started to be radiated well before our planet even existed.

Back on earth, and in particular the UK, the final band in this month's look at the spectrum is 152-156MHz, again allocated to the emergency services. With small blocks at 153-153.5MHz for radiopaging systems and 153.5-154MHz for government services, this band has a similar mixture of transmissions as the 146-148MHz portion of the spectrum, with many links mixed in amongst the base station transmit frequencies.

If you have any views, comments or suggestions relating to the column please send them to; PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - good listening. □

Frequency Allocations 146-156MHz

Frequency MHz	Service	
146.000		
	Emergency Services	
148.000		139.500
	New j.r.c. band base transmit paired with	
149.000		140.500
	Government Services	
149.900		
	Navigation Satellites (Space to Earth)	
150.050		
	Radio Astronomy	
152.000		
	Emergency Services	
153.000		
	Radiopaging Systems	
153.500		
	Government Services	
154.000		
	Emergency Services	
156.000		

Abbreviations

CB	Citizens Band
d.c.	direct current
DTI	Department of Trade & Industry
ITU	International Telecommunications Union
MHz	megahertz
n.b.f.m.	narrow band frequency modulation
RC	remote control
r.f.	radio frequency

ANTENNAS

F. C. Judd G2BCX

Part 7

We continue by considering two configurations, known as "broadside" and "endfire", the basis of many different types of h.f., v.h.f. and u.h.f. antennas.

Broadside and endfire systems employ two or more **driven elements**; so they are sometimes called **active** arrays (as are multi-element collinear antennas). This distinguishes them from **parasitic** arrays which usually employ one, or perhaps two, driven elements, the rest being excited by mutual coupling, for example Yagi type beam antennas.

First, the most basic arrangement of all. This consists of two vertical radiators with the spacing between each of λ/8 to λ, or more. The **phase angle** of the current in one of the radiators with respect to the other may be zero (in phase), 45, 90, 135, or 180 degrees (phase opposition). The computer print-out, Fig. 7.1, shows two examples: pattern A is that obtained with two radiators spaced λ/2 apart, and pattern B with the radiators spaced λ apart. The currents in the elements in each case are in phase. For this example the elements are a quarter-wavelength long and operated against ground. Pattern C, which is circular, would be the otherwise omni-directional radiation from a single element[12].

More than 40 different horizontal radiation patterns (known as "G.H. Brown" patterns) are possible with broadside and/or endfire arrays using only two quarter-wavelength vertical elements, with different current phasing and spacing as described.

Broadside/endfire arrays also employ half-wave elements, particularly when they are above ground (h.f.), or in near free-space conditions (v.h.f./u.h.f.). For example, the cardioid (heart-shaped) radiation pattern, shown in Fig. 7.2., is for an endfire array consisting of two vertical half-wave elements spaced λ/8 and with 135° degrees phase difference between the current flowing in each element. If the array is operated horizontally the radiation pattern has the more usual oval shape with a small rear lobe. Used vertically or horizontally, this array is uni-directional and has a directivity gain of about 3dBd. However, note that the 2-element "ZL Special", although based on this configuration, uses folded half-wave elements, one slightly longer than the other; this provides a reflector/director action, resulting in a directivity gain of about 6dBd.

Two horizontal half-wave elements spaced λ/4 apart with a phase difference between the currents in each element of 90 degrees will also produce a cardioid radiation pattern, see Fig. 7.5. Classified as an endfire array this arrangement has a forward directivity gain of 3dBd.

By comparison, Fig. 7.4 shows the radiation pattern obtained with two horizontal half-wave elements spaced λ/8 apart and with 180 degrees phase difference between the currents in each element, i.e. in phase opposition: the array is bi-directional with a directivity gain of about 3dBd from each lobe. This arrangement is the basis of the single "W8JK" antenna used on h.f. bands 14, 21 and 28MHz and designed, along with other endfire/broadside arrays, by Professor John D. Kraus W8JK - author of the book *Antennas*. Constructional details and dimensions for various W8JK antennas will be found in the *ARRL Antenna Book*.

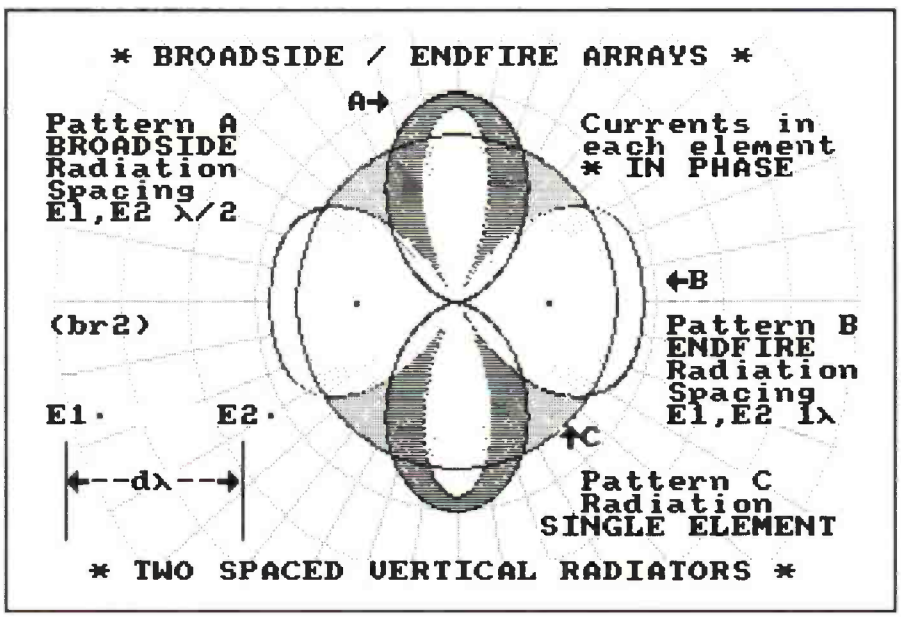


Fig.7.1. Radiation patterns from basic broadside and endfire arrays; element spacing and current phasing as in illustration.

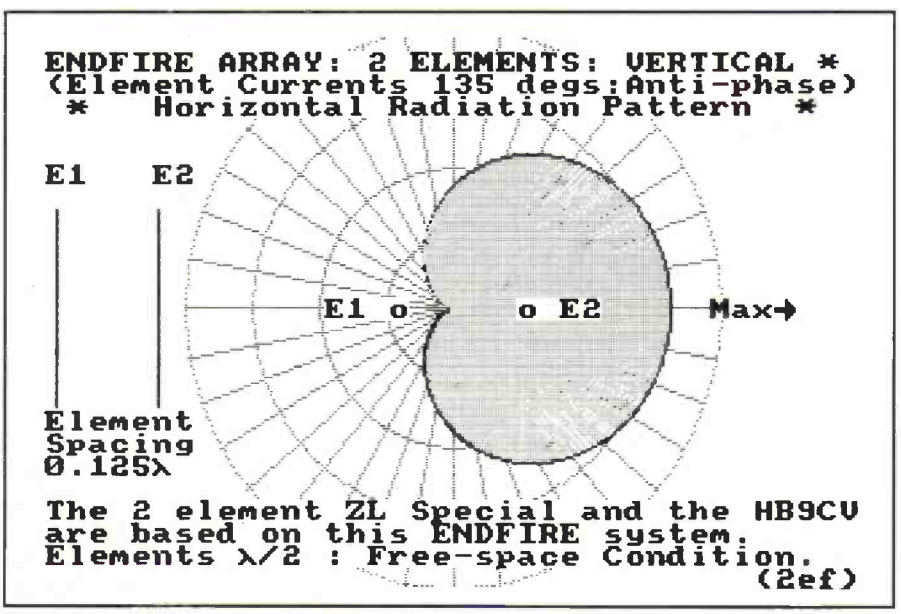


Fig.7.2. Cardioid radiation pattern from a vertical endfire array with close-spaced elements.

Multi-Element Broadside/ Endfire Arrays

Broadside or endfire arrays may contain up to eight or ten half-wave elements with different spacing and current phasing. With a reflector system and a large number of driven elements, uni-directional arrays with very high forward gain are possible, but even for v.h.f. applications they can be physically very large. Such arrays are little used by radio amateurs.

A more practical proposition is a bi-directional array consisting of three or four half-wave elements, the radiation

pattern and directivity gain being dependent on the element spacing and the phase relationship of the currents flowing in each. Whilst such arrays have two symmetrical main lobes, the number of minor (side) lobes increases with the number of elements as well as the spacing between them. A typical example is illustrated by the computer-produced Cartesian plot, Fig. 7.3. This shows the two main lobes at 90 and 270 degrees and the large number of side lobes due to the wide spacing (0.8λ) between each element. Note that the narrow main lobes each provide a forward directivity gain in the region of 12dBd.

A popular 3-element broadside bi-directional array, and one easy to construct, is known as the "Bobtail". It is used mainly for either 14, 21 or 28MHz and has a directivity gain from each main lobe of 8 to 9dBd[12]. This antenna can also be constructed for 144MHz operation[12].

Uni-directional antennas combining a 2-element (endfire) array plus a number of parasitic directors are possible: for example the 5-element ZL Special for 28MHz, which has a directivity gain of about 9dBd[13].

Next month we will look at cubical quads and Yagis. □

References

[12] "Broadside and Endfire Antenna Systems", F.C. Judd G2BCX, *Practical Wireless*, Nov 85 and Jan to Mar 86.

[13] "The Bobtail Antenna", *Practical Wireless*, Mar 86. Constructional details, etc. of 5-element ZL Special for 28MHz (from series as in [12]).

Abbreviations	
ARRL	American Radio Relay League
dBd	gain relative to a half-wave dipole
h.f.	high frequency
MHz	megahertz
u.h.f.	ultra-high frequency
v.h.f.	very high frequency
λ	wavelength

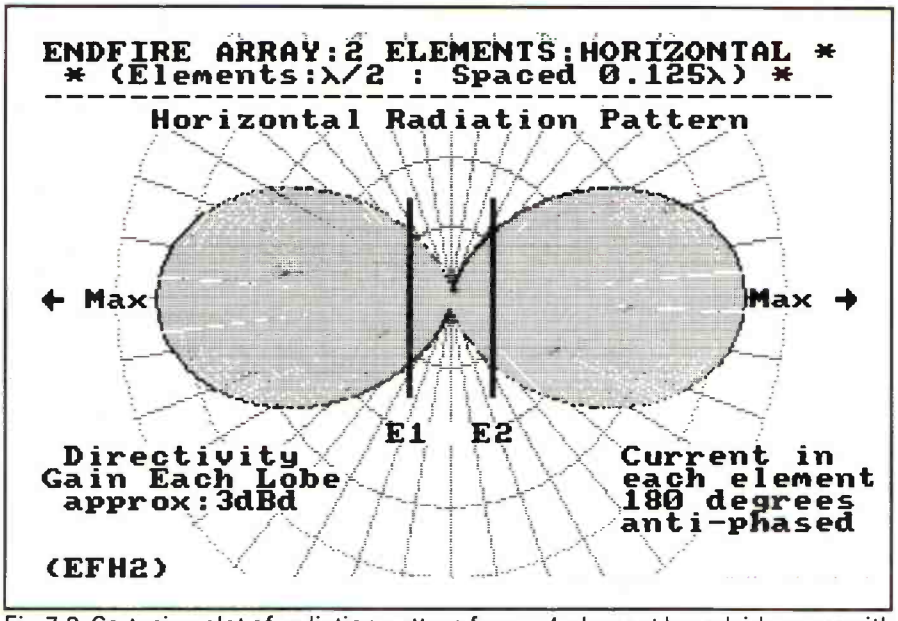


Fig.7.3. Cartesian plot of radiation pattern from a 4-element broadside array with elements spaced at 0.8λ

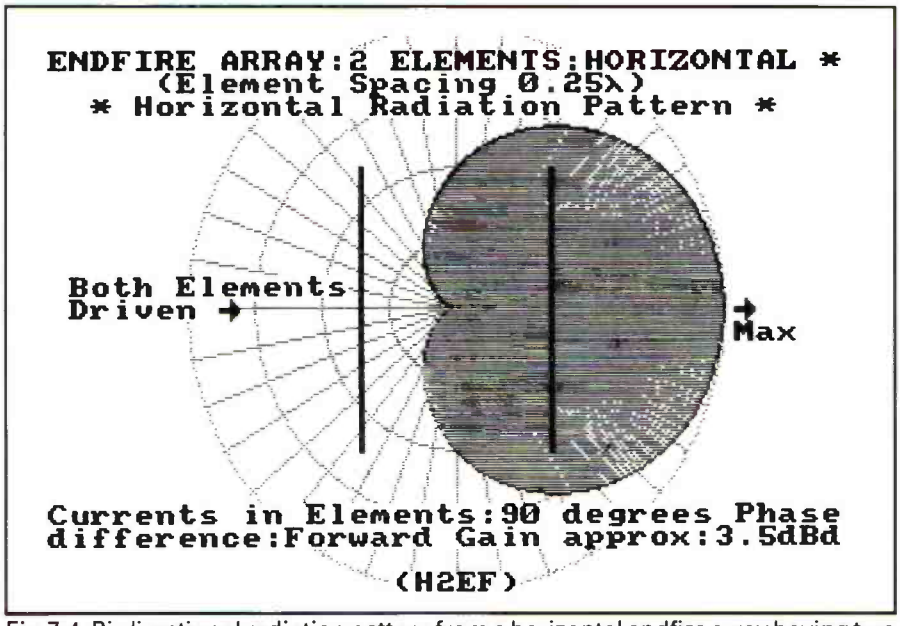


Fig.7.4. Bi-directional radiation pattern from a horizontal endfire array having two elements with anti-phased currents.

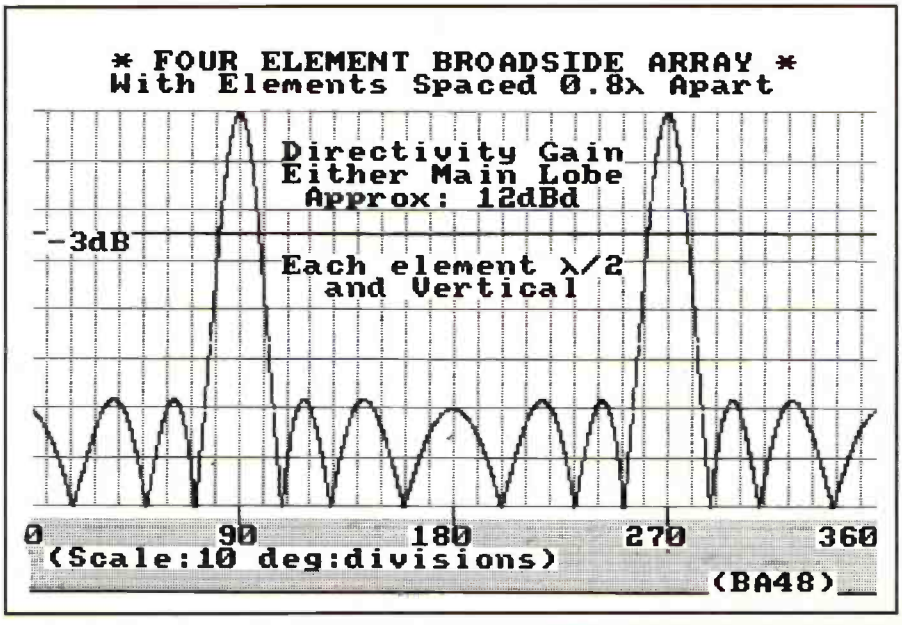


Fig.7.5. Cardioid radiation pattern from a horizontal endfire array; elements spaced at 0.25λ

FUN WITH ANTENNAS

Mikhail Drakov

For the short wave or broadcast listener, antennas are much less fussy since they're not being loaded with any transmitted power. This allows wonderful experiments to be made with household scrap materials or a little shopping at a d.i.y. or electrical shop. Other than this, your only requirements are patience, a sense of humour, a sense of adventure and a little imagination.

It is also a good idea to build from a set of plans thus saving a lot of trial and error and so getting immediate results. Such plans are found in *Short Wave Magazine*, various books and in advertisements carried in these pages.

For those of us of moth-eaten pocket, we can begin by making "bean can" antennas for television reception. The clean and empty cans are equivalent to a broadband quarter-wave, so two cans (one either side of a feeder) will make a reasonable half-wave dipole. To this, we can add a reflector made from wire mesh or even kitchen foil on a cardboard or hardboard square. Other possibilities include large metal cans cut in half to form effective curved reflectors.

I used similar antennas to pick up signals from a distant transmitter in order to receive a picture on CH 4 when it was not locally available. Radio antennas are very simple and good to look at. Indoor antennas can be fine if interference is not a problem and outdoor antennas are not permitted or possible. Such an antenna can be formed from wire pinned to opposite walls near the ceiling or even run around the perimeter of the room or the loft.

Remember that dipoles are always more effective on just one band, so a length of wire fed against earth may give you better results. Unless you prefer to receive from one direction (and its opposite) it is helpful to have the antenna run vertically as well as horizontally and as high as possible.

All this applies equally to the antenna outdoors where it is, of course, far superior. Rather than tie a wire to a tree or metal post, use nylon rope or string and an insulator which could be the polythene reel from a spent roll of insulation tape. Avoid, at all costs, running wire anywhere near overhead lines! Even if they are only telephone lines, there is a risk of shock by the voltage present on the line or e.m.f. (electromotive force) it picks up. You also risk ruining your radio and at least suffering much interference. Never use a mains earth or a gas pipe for a radio earth as this can cause a severe shock or an explosion! Don't run an antenna across a road as, if it falls, it will endanger road users. As long as these basic safety measures are observed and common sense is used, antennas are great fun.

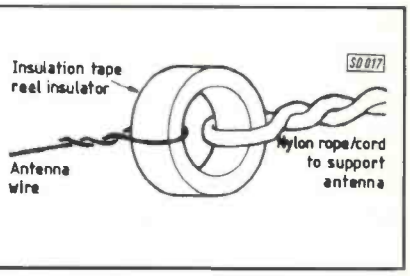
Another kind of antenna not often mentioned is one which gives outdoor results but does not clutter a room and is free from the intervention of bad tempered neighbours by assuming camouflage. This will suit those who do not wish to advertise either their hobby or their equipment!

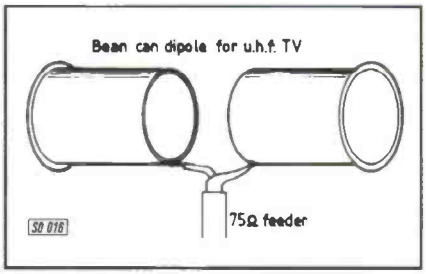
Look at your house and garden and notice possible places to set up the antenna. Disguise it as a washing line, running the feeder down the post and underground, then up the wall (painted to match if necessary). Run a length of wire under the edge of the roof around the house or up the wall to a chimney, or even disguise a loop antenna as a wind vane!

Have fun, I know I will! □

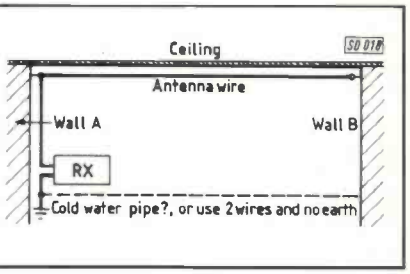
You can obtain worthwhile results without great expense or mathematics and have fun with antennas.

How to support your antenna

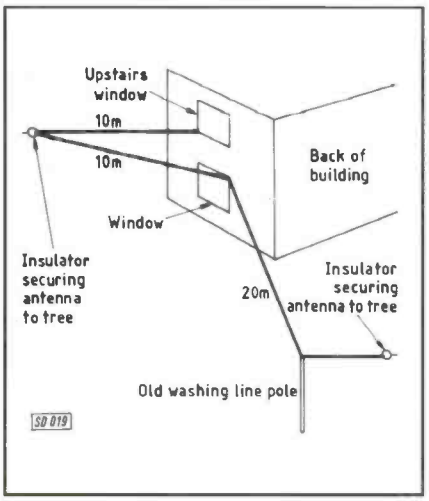




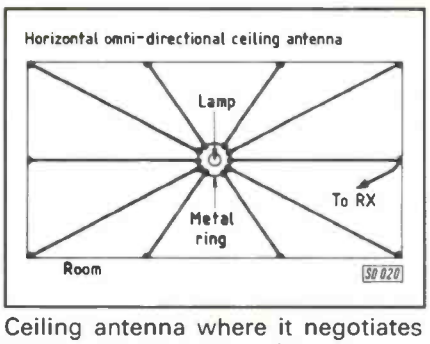
A cheap TV antenna !



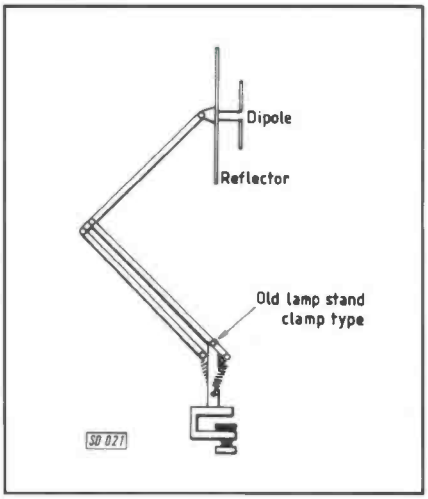
An indoor Option



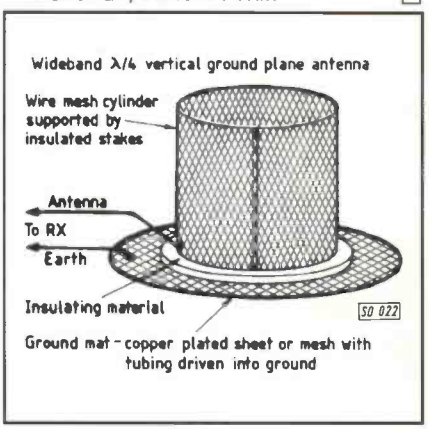
The author's dipole for 3.5 MHz bent to fit



Ceiling antenna where it negotiates the lamp in the centre of the room. Note: There is no electrical connection between the lamp and antenna.



Half-wave lampstand reflector.



Wide-band vertical

INEXPENSIVE VERTICAL ANTENNA

James Stirrat

A small garden can seriously hamper any short wave listener's attempts to construct a reasonable receiving antenna. So, if your garden is no bigger than a pocket hankerchief, try building this cheap and easy vertical antenna, which surprisingly makes use of items from your local garden centre.

After a long absence from the hobby, my interest in short wave listening was re-kindled by an article on restoring the Eddystone 940 by T.J. Wright in September 88 *SWM*. After reading the article I decided to resurrect a couple of old short wave receivers that had been banished to the loft, several years previous. A work bench was duly constructed in the rear of the garage and in time I had the resemblance of a working short wave listening den. The last thing to arrange was the antenna. Several random lengths of wire were strung from the back of the garage to the eaves on the house, but the close proximity to the house always brought interference from TVs, etc. The only answer was a vertical antenna, as space was too limited for anything else.

The gales of October 1987 dictated a personal preference for something which could be kept down at ground level most of the time, and could be quickly swung up when required for use. It had to be something inexpensive, but obviously had to safe. Various options were considered but the final solution was found at a local garden centre in the shape of "everlasting garden canes". These "canes" consist of steel tubing protected by a very strong heat shrunk plastics coating, capped with plastics at both ends and embellished to look like bamboo. The longest length the poles came in were 2.5m (approximately 8ft). However, these 2.5m poles were supplied in three different diameters; 11mm, 16mm and 22mm. I purchased one of each diameter in hope that they would fit together and make a single tapered pole. My thoughts must have been well founded as they did so quite nicely.

Construction

Using a hacksaw, I cut both ends off of the medium diameter pole, and then one end off both the large and small diameter poles. The three sections of pole then interlocked perfectly, the mock bamboo ring effect assisting in the process which was finished off with pvc insulating tape.

If the poles available at your local garden centre are not such a good fit, or you wish to make the joints more mechanically sound, then the fixing method outlined in Fig. 1 should be adopted. This method of jointing also allows a good electrical connection between the pole and the receiver feed wire. It should be noted, however, that once the hose clips have been fitted, the joints should be sealed with either self-amalgamating or pvc electrical tape, in order to prevent corrosion.

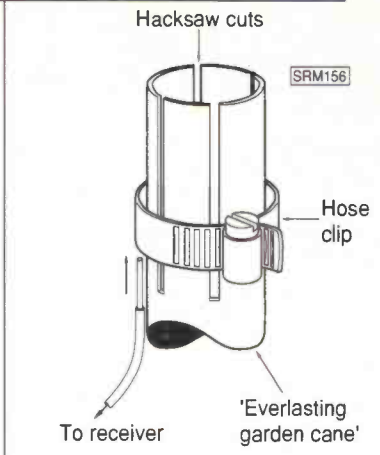


Fig. 1: Alternative jointing method

Installation

I wanted a quick and easy way to fit the antenna to the side of the garage wall so I used the "cup and strap" method. The cup in this case, consisted of a strong plastics beaker approximately 150mm deep and 65mm in diameter. The beaker was sunk into the soil at the foot of the garage wall, to receive the bottom of the antenna when required. The beaker could easily be substituted by the bottom half of a plastics lemonade bottle.

Finally, I fitted a plastics "tree strap", to the assembley shown in Fig. 2 which was then screwed to the garage wall directly above the ground cup, at a height of approximately 1.5m.

When not in use, the antenna pole rests on two ordinary kitchen hooks screwed into the garden fence. When required for use it is a simple matter to slot the base of the antenna into the ground cup and tighten the strap.

Final

For receiving purposes it was adequate to fix a single feed wire to the bottom of the middle section of the antenna. This arrangement has proved perfectly satisfactory for short wave listening and there is no reason to suppose that the pole could not be loaded up against an earth mat for transmitting, accepting the limitations.

The finished antenna is quite sturdy and sways without whipping, no doubt it could be used as a temporary support for a small v.h.f. or u.h.f. vertical antenna, with the coaxial feed up through the centre of the pole. The antenna has proved very successful and inconspicuous, the plastics coating being "garden" green. □

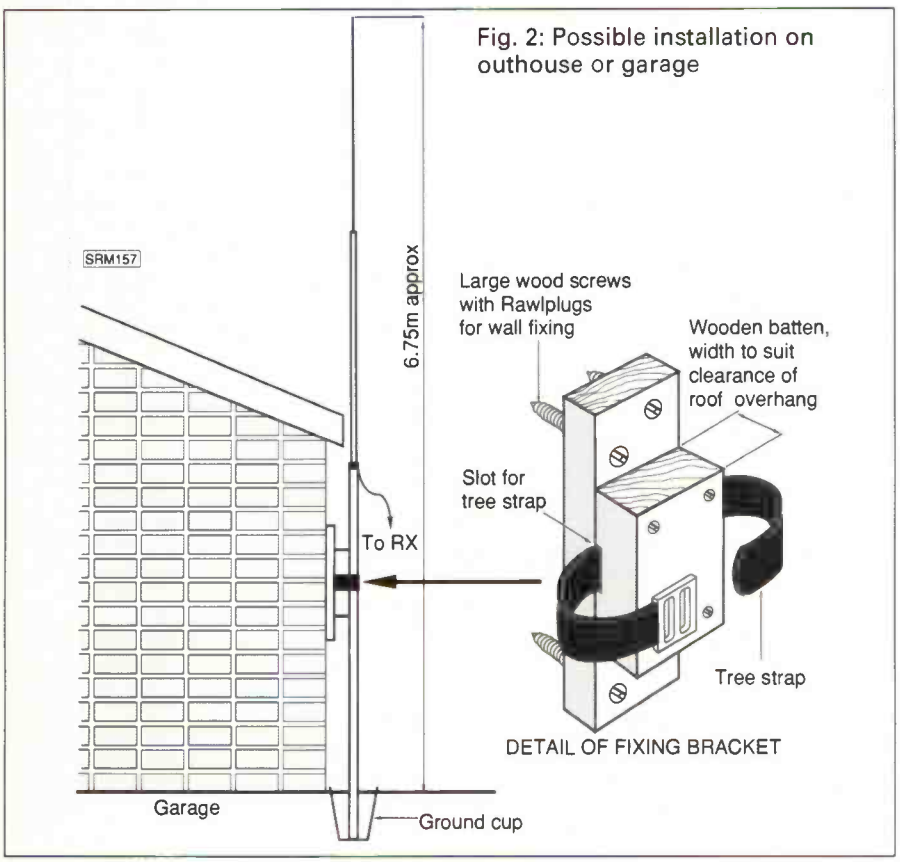


Fig. 2: Possible installation on outhouse or garage

INTRODUCTION TO DX-TV

Keith Hamer & Garry Smith
Part 19

We have already covered in some detail F2-propagation experiences during solar cycle 21 which reached a peak around 1979/80. Solar cycle 22 is rapidly approaching its peak and predictions indicate that the sunspot count will be higher than in 1979/80. Since October 1988, signals have been pouring in with encouraging results. While compiling this article there have been reports of Australian 50MHz activity from Finland. Perhaps of greater interest to the DX-TV enthusiast is the sighting of the Swedish PM5534 test pattern on Channel E2 and the identification of four Norwegian transmitters, also on E2, in Australia! So far Australian Band I signals have not been encountered (not knowingly anyway) in the United Kingdom. However, it is not for the want of trying! Although F2 activity is expected to die down somewhat after April, we should expect to see further signals during the autumn.

In this article, we will be discussing a few aspects of DX-TV which we have not yet covered in this series. These include colour and teletext reception, resolving the French TV system and ways of dealing with the problem of interference. But first, we have an update on the spectacular F2 reception conditions recently experienced and some important information concerning frequency offsets which should make identification easier if using a scanner.

Offset Frequencies

Some important data has been gathered recently concerning offset frequencies which can help in determining the source of F2 reception. Most countries make use of offset frequencies which help to reduce interference effects from other transmitters operating on the same channel. In many cases the offset varies by only a few kilohertz either side of the nominal vision carrier frequency but there are some that are as much as 80kHz away. Of course, a scanner is required to detect these offset frequencies with some degree of accuracy but there is an increasing trend for DX-TV enthusiasts to splash out and acquire such equipment in pursuit of their hobby. A scanner isn't only useful in detecting offset frequencies; it can be programmed to store all the various vision and sound carrier frequencies which can then be instantly recalled to check on impending reception conditions.

Details shown here are of transmitters located outside the European area which may be of use to enthusiasts with scanners in deducing the origin of the transmissions. The time of day will also play a part - the further east the country is, the earlier in the morning it should appear. Only offsets for the lowest v.h.f. channels Ch. AO (Australia) and Ch. E2 are given since most of the activity will be found at the lower end of Band I. There are scores of Channel R1 transmitters in operation throughout the USSR and China so it is unlikely that offset frequencies would be of any real assistance in helping to identify these transmissions.

Channel E2 (Nominal frequency 48.25MHz vision):

	Vision	Offset
Ghana	48.250MHz	Zero
Iran	48.245MHz	-5kHz
Dubai	48.250MHz	Zero
Malaysia:		
(West)	48.240MHz	-10kHz
(Sabah)	48.250MHz	Zero
	48.260MHz	+10kHz

The above frequencies are to within 5kHz.

Offset frequencies for the following countries using channel E2 are not known: Lebanon, Zimbabwe, Kenya, Sierra Leone and the Seychelles. If any readers can send us the missing details we would appreciate it.

New Zealand Channel NZ1 (Nominal frequency 45.25MHz vision):

Transmitter	Vision	Offset
Te Aroha	45.240MHz	-10kHz
Hedgehope	45.250MHz	Zero
Kaukau	45.250MHz	Zero

Australia Channel AO (Nominal frequency 46.250MHz vision):

Transmitter	Vision	Offset
DDQO Toowoomba	46.172MHz	-78kHz
ABMNO Wagga Wagga	46.240MHz	-10kHz

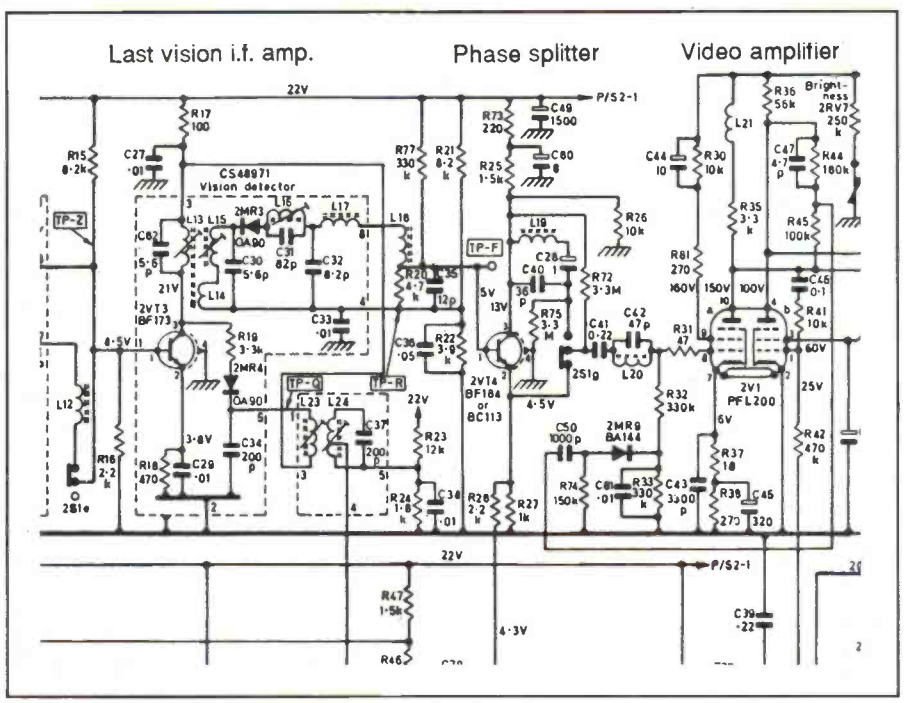


Fig. 1: Dual-standard receiver circuit (Bush TV161) with phase-splitter stage to provide positive or negative-going video.

Teletext Reception

A Teletext service is now broadcast by most European countries and these may be resolved during periods of good quality reception. A ghost-free signal is a necessity in order to avoid garbled text. So it goes without saying that tropospheric DX would be more obliging for such reception. Where the system is the same as that used in the UK, a normal Teletext set can be used.

In fact, there are a few video recorders being produced with Teletext facilities. The Grundig VS520GB is one example and according to the instructions (which seem far too complex for ordinary members of the public to tackle) there is a language-selection facility which presumably means that in some countries, such as West Germany, dual language text is broadcast. This facility might have some "novelty" value during

a good tropospheric opening. The machine will also receive Band I, II and III programmes which means all you need is an antenna and you have an instant DX receiving system, albeit via wideband i.f.s. In the Chester area, it is available from branches of Martin Dawes at around £399, which seems very reasonably priced, when one considers the facilities it offers.

When receiving Teletext, the header page will give some indication of the origin of transmission. Quite a few enthusiasts have reported successful results in obtaining identification. Often, when the main text page is incomplete, or garbled, there is sufficient information on the header page to enable accurate identification.

Over the past few years many broadcasters transmit sample text pages during test transmission periods and these may assist with identification.

Colour Reception

This generally demands a good-quality and steady signal. Reception is possible via enhanced tropospheric conditions and Sporadic-E. The latter can produce glorious displays of colour through phase reversal (wrong colours) or bursts of colour as the signal and quality varies rapidly. Two colour systems are commonly encountered in the UK in the course of DX reception: PAL and SECAM.

A receiver incorporating a SECAM decoder is necessary if you wish to obtain colour reception from countries such as Czechoslovakia, Hungary and the USSR. Pictures will appear in monochrome if a PAL-only receiver is used. Several manufacturers produce sets with PAL/SECAM decoders fitted (the JVC CX 610 GB, for example). Some of the recent "hi-tech" domestic receivers now available are fitted with PAL/SECAM decoders as standard.

Some receivers are equipped with NTSC decoders but beware, it must be suitable for System M NTSC transmissions. Some receivers will only cater for a modified form of NTSC which has a 4.43MHz subcarrier frequency. If you already own a receiver which will respond to System M NTSC then it will be worth attempting to receive the AFN-TV Europe transmissions from the Netherlands on Channel A80 (the equivalent of Channel E71/72) during an intense tropospheric lift. A few other AFN-TV bases exist in Europe but it is unlikely that you will receive them because of their relatively low e.r.p.s. The colour noise on a weak PAL signal will show fine speckly dots whereas with SECAM the noise is streaky, usually with a reddish tinge. NTSC colour will undergo wide changes in hue under adverse reception conditions.

French Reception

The transmission system used throughout France is 625-lines but has positive vision modulation which means the pictures will appear "in the negative" with poor sync when viewed on a normal receiver. Some manufacturers, Grundig for example, can supply receivers equipped for the French System L standard. Note that they will not unscramble Canal Plus transmissions, the majority of which are encrypted.

In days of old, when dual-standard TV receivers were plentiful in this country, viewing the French system was easily accomplished. Because the 405-line system used the same modulation sense as the French, the modification simply involved arranging for the vision detector to be switched into its "405" position when receiving France. A typical vision detector circuit from a typical dual-standard receiver, the Bush TV161, is shown in Fig. 1.

Even reversing the detector diode in a 405-line only set (so that it would detect negative-going vision) presented fewer problems and was met with success once the cathode bias resistor of the video amplifier was reduced in value slightly.

Snags

Unfortunately, those days have fallen by the wayside and attempts to modify a single-standard receiver, which detects negative-going vision signals only, has usually been frought with problems. Simply reversing the vision detector diode was not the real answer since d.c. coupling tended to upset the biasing arrangements of the video amplifier driver stage thus causing synchronisation problems and incorrect a.g.c. actions in some receivers.

Nowadays, the vision circuitry is cleverly contained within an i.c. Some enthusiasts have successfully added a video inverter stage after demodulation in order to present the video amplifier with the correct video signal when receiving French pictures.

Modification can have its problems such as insufficient space to mount extra circuitry or it may be difficult to implant any particular suggested design without involved modifications to maintain correct d.c. conditions throughout the video path.

For the budding d.i.y. constructor, Ambit (now Cirkit) once produced a narrowband i.f. module with switched positive and negative video outputs which provided a solution to the problem with French signals. These are no longer available and attempts to modify the Philips G8 family of i.f. modules for positive vision modulation was often met with instability. A basic single-stage inversion circuit is shown in Fig. 2. One problem that is usually encountered when inversion takes place after the detector is a slight streaking on certain captions or video content. This tends to occur irrespective of the original polarity.

External Inversion

Inversion can be more conveniently achieved outside the receiver especially if it has a video take-off socket. If you can record DX signals then the video output of the v.c.r. will provide a convenient take-off point. The external inversion stage can then feed an inexpensive vision modulator to convert the signal to a u.h.f. channel which then allows the French picture to be viewed on another receiver (see Fig. 3). A video inverter, the NV148, is commercially available which does just this and is useful when used with the D-100 system, especially when weak French DX reception is encountered.

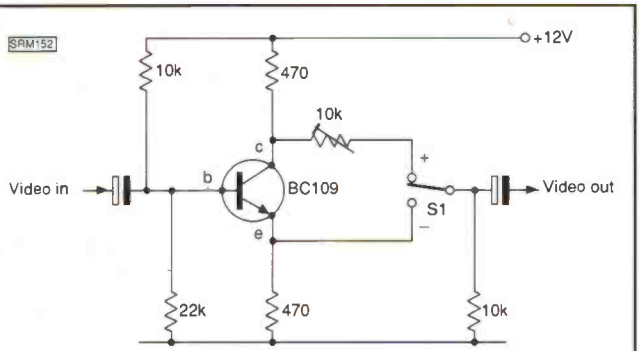


Fig. 2: Simple phase-splitter stage for providing +ve and -ve video sources.

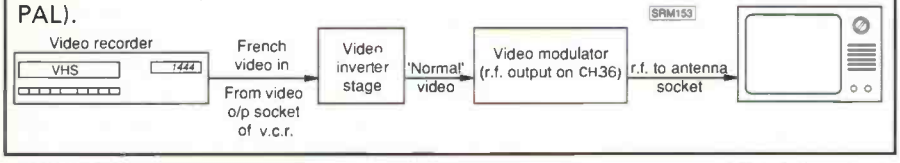


Fig. 3: External video inversion using a video modulator to allow the inverted signals to be viewed on a normal receiver. (Note that such a system does NOT convert SECAM to PAL).

INTRODUCTION TO DX-TV

Mobile DX Reception

This is one area of DXing which is widely practised by the amateur radio fraternity but for various reasons DX-TV enthusiasts have found it less attractive. It certainly adds a new dimension to the hobby and it is surprising how many UK transmitters can be received, even under flat conditions, once an elevated spot is found. The latter may be a problem in some areas of course!

For obvious reasons, a small portable receiver is best suited and one that will operate from a car battery. Some portables can work off torch batteries but their high current demand means that this mode of operation will be short-lived and expensive.

Hand-held antennas may be the best way of securing the best signal. At least one enthusiast takes to the local Welsh mountains armed with log-periodic arrays for Band III and u.h.f. and does exceedingly well. The log-periodic arrays provide a cleaner polar response than a Yagi and being hand-held they can be carefully orientated to reject unwanted co-channel signals.

Support

Some simple antenna support arrangement could be used if preferred such as a modified photographic tripod stand which should be strong enough to withstand the weight of a small antenna. If metal poles are used to provide a mast support then it is vital to ensure there are no power lines or electric fences close by to constitute any danger. These could also create interference so their presence is well worth avoiding.

Interference

Getting rid of adjacent interference signals is a problem for the DX enthusiast. If wideband antenna amplifiers and receivers with full bandwidth i.f. stages are used then problems are exaggerated. The use of equipment which provides reduced bandwidth i.f.s, such as the D-1000 system, does help.

Sometimes a notch filter is useful where a wideband receiver is used for, say, colour reception. Some interfering carriers can remove or attenuate the chroma subcarrier signal, so the inclusion of a notch filter can be beneficial provided that the interference is at least 200kHz or so away. A simple notch filter for Band I is shown in Fig. 4 which is reproduced by kind permission of Dave Lauder whose article on this subject appeared in a recent copy of *TeleRadio News*. The variable capacitor C1 is adjusted for minimum interference followed by fine adjustment of R1 for the deepest null.

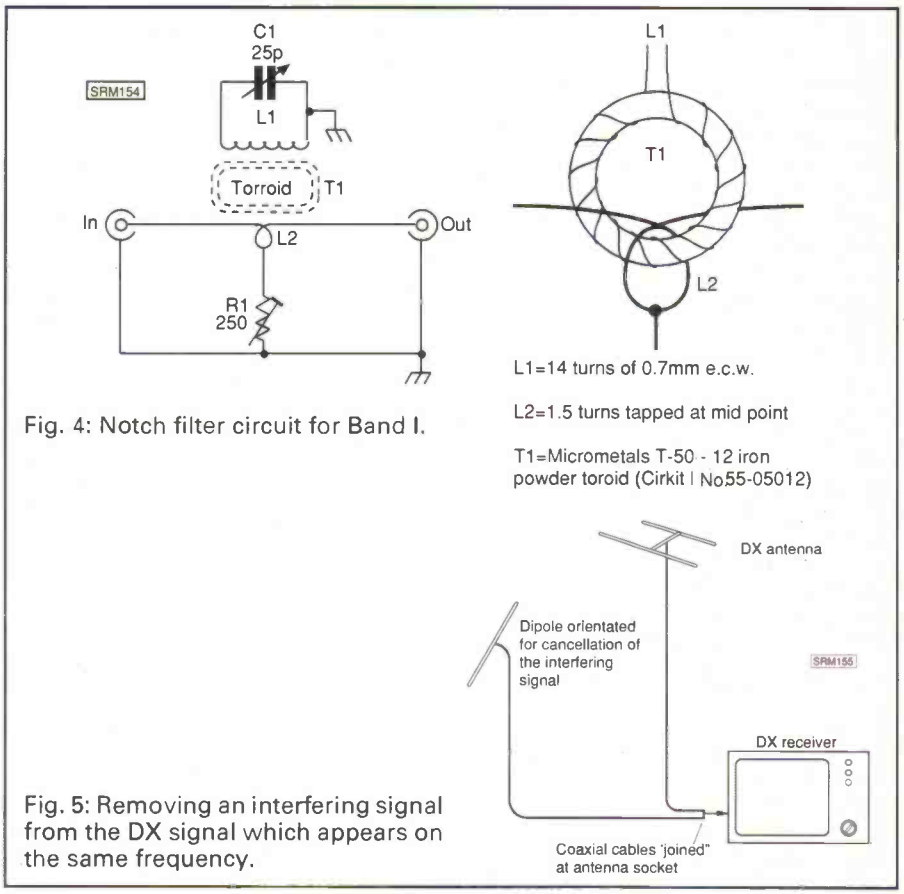


Fig. 4: Notch filter circuit for Band I.

Fig. 5: Removing an interfering signal from the DX signal which appears on the same frequency.

What happens if the interfering signal is on the same frequency as the signal you wish to receive? This situation is fairly common nowadays where illegal cordless phones still plague channel R1. Although the 'phone frequencies used do not exactly coincide with the R1 vision frequency at 49.75MHz, a notch filter cannot be used without severely attenuating the wanted signal. This is because there is a limit to how steep the response curve of the notch filter can be made. What is really required is a method of cancelling the interference by introducing an anti-phase signal into the system.

Cancellation

Years ago, when the 405-line service was in operation, enthusiasts living close to a Channel B2 transmitter would have its a.m. sound carrier flashing away over the E2 vision frequency. Both carriers were at 48.25MHz. Fortunately in the majority of cases the B2 signal was vertically polarised and the receiving array was horizontally mounted which provided some discrimination but very weak signals could easily be swamped.

Rotating the array obviously had some effect but even if the local or semi-local B2 could be nulled out, the array wasn't necessarily beamed at the wanted signal!

One idea which worked successfully was to cancel out the interfering carrier by introducing an out-of-phase signal of similar amplitude into the antenna system. This might sound very elaborate to arrange but in practice it consisted of nothing more than a dipole connected in parallel with the main DX feed close to the antenna socket of the receiver. It sounds crude, but it worked (see Fig. 5). The dipole could then be orientated in such a way as to phase out the interfering carrier provided that a signal of similar amplitude could be obtained.

One of the authors found that the most effective location for the dipole was at an angle of 45 degrees in the middle of a lawn. Positioning was very critical and final adjustment was only possible by carefully prodding the dipole with a broom handle until complete cancellation was achieved. It was necessary to monitor the channel to ensure that the interference was at minimum; in this case listening to the Channel B2 audio until it eventually disappeared. It was then possible to obtain channel E2 which was perfectly clear for African reception from the south. It should then be stressed that the dipole would need to be repositioned if the cancellation was required in other directions. The weather affected the phasing too, especially if the surrounding hedges and grass were wet.

Indoors

The antenna could be postioned indoors for easier access and adjustment or even hand-held. If a portable TV is used for DXing, the whip antenna could be used as a phasing antenna if it remains in circuit when an external antenna is connected to the receiver antenna input. Of course, it is important that the interfering signal is received at the same or greater amplitude than via the main DX antenna system for cancellation to occur. Fortunately, cancellation seems to work better with very strong interference which may provide a solution to problems of interference generated by your next door neighbour's word processor or fancy Teletext set which radiates all over Band I!

Mixture

A similar system has been successfully tried at u.h.f. to remove co-channel interference, but it should be stressed that this technique will only provide true cancellation at a specific frequency. The experimental system allowed excellent pictures to be viewed from the Sandy Heath transmitter on Channel 24 which was otherwise marred by interference from the vertically polarised Central TV relay at Kimberley a few miles away. Unfortunately, reception variations and phase changes meant that at times the Central TV sound channel would be present with a perfect Anglia TV picture!

Fixed Dipole

A more elaborate but electronic system was eventually constructed and described in an article by Roger Bunney in the January 1981 issue of *Television*. This enabled a fixed dipole to be installed on the mast and by carefully adjusting the phase shift and amplitude controls on the unit, complete cancellation of any interfering signals could be achieved. The unit worked well and would even remove strong harmonics from a CB installation a few doors away. The system was less effective with weak interfence because the dipole would not pick up enough of the unwanted signal to enable cancellation to take place. Nevertheless, it does provide a means of removing from Channel E2 severe interference generated by a word processor belonging to one of the authors.

It is hoped that the above experiences will provide a little glimmer of hope to those enthusiasts who are suffering from similar interference problems and that some of the suggestions will bring a cure. □

Addresses of Various Suppliers

Inverter Unit: The NV148 video inverter unit mentioned earlier is available in ready-built form with switching for positive and negative video from: **HS Publications, 7 Epping Close, Derby DE3 4HR.** Please enclose a 19p stamp for further information on this unit. Details of the D-1000 DX Converter system and *TeleRadio News* will also be sent.
Iron Powder Toroid (Cirkit No. 55-05012): **Cirkit, Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 441306.**

Abbreviations

a.g.c.	automatic gain control	NTSC	National Television System Committee *(TV Colour System)*
a.m.	amplitude modulation		
CB	Citizens Band		
d.c.	direct current	PAL	Phase Alternate Line *(TV Colour System)*
DX	long distance		
e.c.w.	enamel covered wire	SECAM	Sequential with memory (or Sequential colour and matrixing) *(TV Colour System)*
e.r.p.	effective radiated power		
i.c.	integrated circuit		
i.f.	intermediate frequency		
kHz	kilohertz	u.h.f.	ultra high frequency
MHz	megahertz	v.c.r.	video cassette recorder

PICCADILLY RADIO

Sharon George

Piccadilly Radio was "born" in 1973 when a group of people representing a cross section of the Greater Manchester Community applied to the Independent Broadcasting Authority, eventually being given the right to broadcast in the area.

The radio station is situated in the Piccadilly Plaza — a complex built in the '60s on a site previously occupied by warehouses which were burned out in the Manchester blitz of 1940.

By early 1974, the site had been transformed into a radio station. Expensive equipment was installed and Piccadilly's engineers worked long hours to make sure that everything was ready for the opening day, 2 April 1974.

Piccadilly Radio now has a regular weekly audience of around 1½ million.

This is the second in an occasional series of articles on local radio stations around the UK. Sharon George takes a look at Piccadilly Radio, Manchester.

Piccadilly's Studios

Visitors enter Piccadilly Radio through a smart reception at the Portland Street entrance of the Piazza — an office complex one floor above street level in Manchester's Piccadilly.

Photographs of the disc jockeys and station personalities cover the reception area, where callers are able to buy a selection of the station's merchandise.

The studio area is a large rectangle of rooms with a circulating corridor. The centre of this complex is the Master Control Room in which is housed technical equipment necessary for linking the station to its two transmitters — the m.w. (261m, 1152kHz) at Ashton Moss, Lancashire and v.h.f. (103MHz) in the hills of Saddlesworth near Oldham.

Also in the Master Control Room is the telephone equipment used during the regular phone-ins. This is used whenever they stage one of their popular "workshops" where experts will give advice to listeners without them having to face the ordeal of going on the radio.

Operators in the Master Control Room — where producers supervise operations — can look into the two main "open air" studios through large windows. It is there that the disc jockeys and presenters are housed during Piccadilly's 24 hours of non-stop broadcasting.

In 1974, when the station first went on-air, they closed down during the early hours of the morning, to open up again with the breakfast show. Since October of that year, the station has been a round-the-clock service.

The two main studios contain consoles which are self-operational. This means that broadcasters can operate all the controls necessary to broadcast music, speech and commercials without actually moving.

You can also find a small, self-operational studio used on the hour, every hour by the news reader. He (or she) prepares the news and then brings the scripts and taped items into the studio shortly before transmission. For five minutes, they are in complete control of the stations output, just as the disc jockeys are when on the air.

News

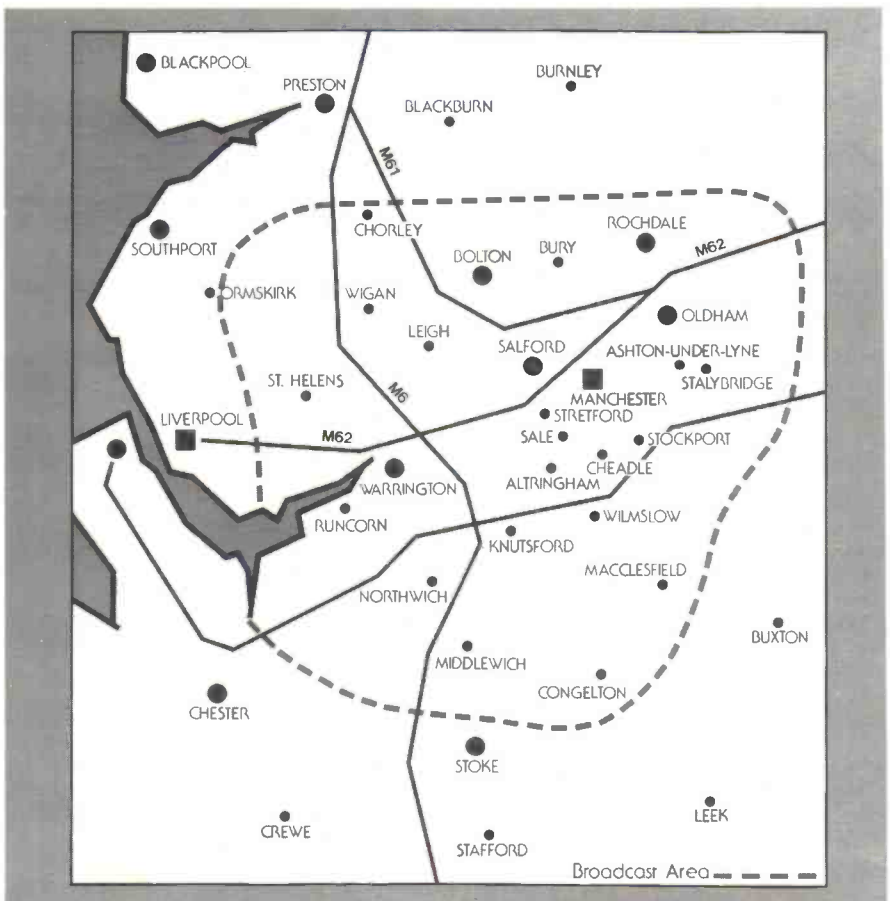
Close to the studios is Piccadilly's Newsroom in which a team of reporters and News Editors handle the flow of news from outside sources as well as from within. They work round the clock, following up stories from listeners, freelance journalists, reporters from other stations or newspapers, industrial and community organisations or from information obtained through the police, fire brigade and ambulance stations.

Reporters will go out on stories carrying portable tape recorders for interviewing. Every now and again, interviews will take place over the telephone using the small news studio to record the item, which is then edited before transmission. There are times when interviews have to be broadcast live during the news, either with a guest in the studio or by various broadcasting facilities which include lines into the Town Halls around Greater Manchester; the radio car which is capable of transmitting a clear signal over a wide area; and of course by telephone.

National and International news reaches Piccadilly from IRN (Independent Radio News). Their headquarters, based in London, houses another team of reporters who cover stories for the various stations in the Independent Local Radio Network. Audio output from IRN is recorded at Piccadilly via landlines along which a signal automatically switches on a tape recorder in Piccadilly's Newsroom to tape items which are offered to the network. Written material is sent via a teleprinter.

Commercials

They have their own Commercial Production Department as well as their own studio, which will provide ideas, scripts and the finished product complete



POPULATION DATA

Total survey area	3,690,000	Women	1,524,000
All Adults 15+	2,940,000	Housewives	1,344,000
Men	1,415,000	Housewives with children	492,000

(Source JICRAR 1987)

PICCADILLY RADIO

with sound effects, jingles or whatever the customer requires.

National advertising comes to Piccadilly from a separate source and commercials for these products may have been made at outside studios hired by the advertising agency which represents the manufacturer. Many of the big firms have their own departments to handle advertising.

Is Piccadilly all Pop Music?

Apart from all the news and sports programmes, Piccadilly caters for all tastes including regular programmes of classical music, current affairs, magazine programmes, documentaries and drama productions, as well as many specialist music programmes for fans of country music, jazz, rock, folk and "new wave". Daytime programmes are aimed mainly at the majority of the listening audience who want pop music and news.

Who Decides Which Records to Play?

The format for music is to play whatever the listener wants to hear, which means being as up to date as possible and ahead of the national charts whenever possible.

Records played regularly are on the "play list" which is compiled by a panel of their DJs who put forward a suggestion or nominate a new record for the list. Listeners are also asked to phone in, making it possible to draw up a list of their favourites for the "Hit Line". If they like it they'll vote for it, Piccadilly will continue to play it and it will become a hit.

Specialist music programme presenters select their own music.

Reception

They welcome reception reports from listeners outside their area. You get a letter from their chief engineer confirming your report and telling you a few more details about the station. If you hear the station, don't forget to tell Brian Oddy for the local radio section of "Seen and Heard" each month in *Short Wave Magazine*.

Transmitters

MW

Piccadilly's medium-wave service on a wavelength of 261m, is broadcast from the IBA transmitter at Ashton Moss, Lancashire (Grid reference SJ925994).

The four guyed masts, each 71m high, were erected in 1973 to form the IBA's first directional antenna array. This "end-fire" arrangement, with slightly unequal mast spacings, gives a main transmitted beam on a bearing of 250°, with off-beam cancellations forming a deep null in the direction of Birmingham; where 1152kHz (261m) is again used for the ILR service.

VHF FM in stereo

Situated in the hills east of Oldham, 390m above sea-level, the v.h.f. transmitter beams out across Greater Manchester on 103MHz. The antenna, radiating with an e.r.p. of 4kW, transmitter has and is mounted on the same IBA mast as the Saddleworth Television repeater, at grid reference SK987050. The stereo transmissions have equal horizontal and vertical components forming a circularly polarised signal which is equally suitable for reception on roof-top antennas, car radios or portable receivers. □

Abbreviations	
e.r.p.	effective radiated power
IBA	Independent Broadcasting Authority
ILR	Independent Local Radio
IRN	Independent Radio News
kHz	kilohertz
kW	kilowatt
m	metre
MHz	megahertz
m.w.	medium wave
v.h.f.	very high frequency

SERVICES

Subscriptions

Subscriptions are available at £17 per annum to UK addresses and £19.00 overseas by Accelerated Surface Post outside Europe. For further details see the announcement on page 15 of 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 £27.00 (UK) and £30.00 (overseas).

Queries

We will always try to help readers having difficulties with a *Short Wave Magazine* project, but please observe the following simple rules:

1. We cannot give advice on commercial radio, TV or electronic equipment, nor on modifications to our designs.
2. We cannot deal with technical queries over the telephone.
3. All letters asking for advice must be accompanied by a stamped, self-addressed envelope (or envelope plus international Reply Coupons for overseas readers).
4. Write to the Editor, "Short Wave Magazine", Enefco House, The Quay, Poole, Dorset **BH15 1PP**, giving a clear description of your problem.
5. Only one query per letter, please.

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past 10 years are available at £1.50 each, including post and packing to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style *SWM*, are available price £3.95 to UK addresses, or overseas, including post and packing. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Please note that Volume 45 finished with the December 1987 issue, making nine issues in the volume. In future each volume will run from January to December.

Ordering

Orders for p.c.b.s., back numbers and binders, *PW* computer program cassettes and items from our Book Service, should be sent to **PW Publishing Ltd., FREE-POST, 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.

Components for SWM Projects

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

The printed circuit board for the *SWM* Audio Filter (SR001), July '87 issue, is available price £2.75. The printed circuit board for the *SWM* Active Weather Satellite Antenna (SR002), June '88 issue is available price £4.20. Orders to Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Price of p.c.b.s include VAT and P&P.

STARTING OUT

Brian Oddy G3FEX

A good deal of expertise will have gone into the design of a modern amplitude modulated (a.m.) broadcast transmitter to ensure that it will not interfere with the reception of other services, but all types of transmitter are capable of causing interference when they are operated incorrectly. For example, an over-modulated a.m. transmitter will cause severe interference to transmissions on adjacent channels. The spurious signals which also arise, can result in "splashes" of interference on frequencies well removed from the main transmission. Although regular checks and adjustments will help to ensure that a transmitter is operating correctly, from time to time a fault condition is bound to arise which may result in parasitic oscillations and the generation of harmonics and other spurious emissions. Such faults must be quickly rectified by transmitter maintenance engineers if interference to other services is to be avoided.

Modern commercial installations frequently employ single sideband (s.s.b) and independent sideband (i.s.b) transmitters. To avoid distortion and interference to other services on adjacent channels, the r.f. amplifiers therein have to be operated in a truly linear manner. Various forms of data transmission are also used and frequency shift keying is commonly employed. Some keyed carrier (c.w.) transmitters are still used to convey messages in high-speed Morse code to distant locations. The keying circuit has to be carefully filtered, otherwise the sharp make-and-break can cause transients which, in theory, contain frequency components which extend throughout the entire radio spectrum. In practice they may be strong enough to cause serious interference to the reception of other services in the vicinity of the transmitter. The holders of amateur radio transmitting licences are fully aware of all of these problems, but difficulties sometimes arise in built-up areas because their antenna system may be in very close proximity to a receiver.

Although the interference may be directly attributable to the operation of a local transmitter, more frequently the key factor is the design of the first stage in the receiver involved. A receiver is basically designed to process any of the minute alternating signal voltages which are induced in the receiving antenna as the electromagnetic waves associated with each signal pass by. The peak-to-peak potential produced by the more distant signals is likely to be only a few microvolts, but the induced signal voltage from a local transmitter may well be several hundred millivolts.

When a receiver is located close to a transmitting station undesirable effects often arise which may interfere with the reception of other wanted signals. Some of them may be eliminated by installing add-on devices at the receiver, but a knowledge of each of the several types of interference, and their cause, is desirable if these problems are to be overcome.

The input tuned circuit(s) in a receiver may be capable of selecting any one of the tiny signals from the antenna and rejecting others, but when the potent carrier from a local transmitter is turned on it may not be rejected and an effect known as **blanketing** may arise. Once the carrier reaches the input of the transistor or the control grid of the valve used in the first stage it will set up a bias potential which will cut down the stage gain and cause either partial or total blocking of the receiver. A marked reduction on the volume of a received programme will be observed when partial blocking occurs, but total blocking will prevent the reception of all broadcasts irrespective of their frequency. If the local carrier is amplitude modulated with speech or music a very distorted sound will emanate from the receiver. Keying the carrier will result in a very annoying variation in the volume of a received broadcast. The area in which these effects are observed will be directly proportional to the power of the transmitter.

Using an outdoor antenna with the receiver may well aggravate matters, especially if the resonant frequency of the antenna is close to that used by the local transmitter. Portable receivers which employ a built-in antenna are often less susceptible to this type of interference.

Wavetraps

To avoid these effects it is essential to prevent the local carrier from reaching the first stage in the receiver. This can usually be achieved by installing an add-on device known as a wavetrap as close as possible to the receiver antenna/earth terminals. The complexity of the **wavetrap** required will depend upon the severity of the interference. Simple wave traps consist of either a series or parallel tuned circuit, but a combination of them is often used in the more complex traps. The properties of series and parallel tuned circuits have already been outlined in the series - see *SWM* January '88.

When only a moderate amount of interference exists it may be possible to effect a cure by connecting a series-tuned (acceptor) wavetrap between the receiver antenna and earth terminals and then tuning it to the frequency of the local transmitter. In more severe cases it may be necessary to install a parallel-tuned (rejector) trap between the antenna and the antenna terminal on the receiver in addition to the series trap - see Fig. 1. Interference to a domestic portable receiver which employs a built-in loop antenna may be eliminated by adding an auxiliary winding around the periphery of the loop, connecting a small variable capacitor (trimmer) across its ends and tuning it to resonate with the local carrier.

Another effect, known as **cross-modulation** may occur. Unlike blanketing, this effect can be tuned in and out. It can be easily recognised by the fact that the modulation applied to the local transmitter carrier can be heard on each broadcast signal as it is tuned in, however there is no trace of it on unoccupied channels. This situation arises because the r.f., or mixer stage, in the receiver is being driven into a non-linear state by the local signal. Consequently what is known as third order intermodulation occurs, whereby each broadcast signal is modulated by the local signal. It can be shown that the depth of cross-modulation will depend solely upon the strength of the interfering signal.

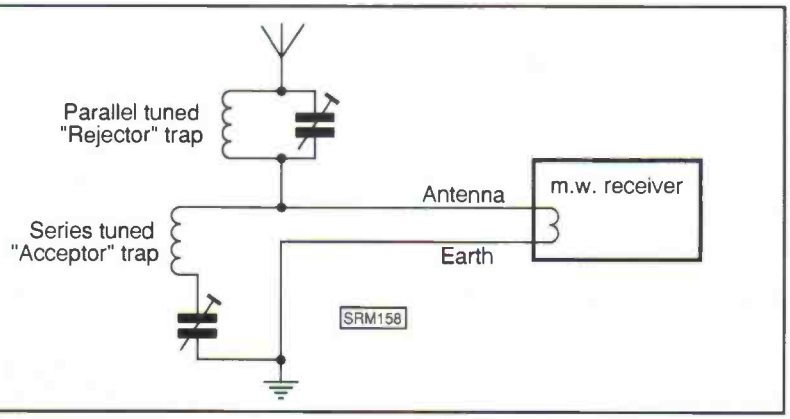


Fig. 1

As far as m.w. reception is concerned, the best way to tackle the problem is to install a wavetrap at the receiver antenna terminal and tune it to the frequency of the interfering modulated carrier. Owing to the design of the r.f. and mixer stages some receivers are more susceptible to these effects than others - those which employ bi-polar transistors or sharp cut-off pentodes being generally inferior to those using f.e.t.s or variable-mu valves.

Attenuators

Receivers which are subject to cross-modulation problems in the medium wave band often exhibit similar effects on their short wave ranges. Many s.w. broadcasters use a very high power transmitter with a high gain directional antenna to ensure that their signal is both strong and clear in their selected target area. In practice, some of the signals are so potent that they cause cross-modulation problems in some receivers, especially in transistorised sets, which are generally less able to handle strong signals than their valve counterparts. One way to ease the problem is to install an attenuator in the coaxial cable linking an antenna tuning unit (a.t.u.) to the receiver. Three fixed attenuators, providing a choice of 10dB, 15dB or 20dB and suitable for use with 50 ohm coaxial cable, are depicted in Fig. 2. It can be shown that attenuating the incoming signals by 1dB will reduce the interference by 2dB. These add-on devices do not provide a complete answer to the problem, because all incoming signals will be equally attenuated and this may result in the weaker ones becoming inaudible. In view of this, only the minimum attenuation necessary to eliminate the problem should be used.

A number of additional effects may occur when a receiver is used in the vicinity of a s.w. broadcast station. Transmitter output powers in excess of 100kW may be involved and it is extremely difficult to suppress the harmonics of the final frequency entirely. Despite the use of extensive screening and filtering, the very low levels of harmonic energy which remain may cause problems to local s.w. listeners - for example, the second, third and fourth harmonics of a broadcast on 7.120MHz in the 41m band could interfere with reception on 14.240MHz, 21.360MHz and 28.480MHz in 20m, 15m and 10m amateur bands. During periods of exceptionally good propagation conditions they may also reach listeners in distant places via sky wave paths.

Perhaps the most common problem facing the short wave listeners who live nearby is that an image of a broadcast in one band will appear in another. The manner in which image signals arise in superhet receivers has already been detailed in this series (*SWM* February '88), but it is worth remembering that the basic cause is inadequate selectivity in the receiver front end and that an **image** signal originates from a spot twice the receiver intermediate frequency (i.f.) away from a wanted signal and on the same side as the local oscillator.

Unfortunately the harmonics of the local oscillator signal will also beat with any of the broadcasts from the s.w. station which reach the mixer input and may result in them being converted to the receiver i.f. When this occurs, the s.w. broadcast concerned will be on a frequency corresponding to a harmonic of the local oscillator plus or minus the receiver i.f. As an example, consider the effect of tuning a m.w. superhet receiver to 1015kHz while the nearby s.w. station is broadcasting in the 75m band on 3.975MHz. If the receiver i.f. is 465kHz, the local oscillator will be set to 1015 + 465 = 1480kHz. The third harmonic of the oscillator frequency, namely 4.440MHz will beat with a broadcast on 3.975MHz and produce a 465kHz i.f., consequently the broadcast on 3.975MHz will be heard on 1015kHz. A similar situation can arise when a m.w. receiver is operated near to an amateur transmitting station - the listener is very likely to blame the amateur for the intereference, whereas it is in fact a function of the receiver!

If any two of the potent s.w. transmissions from the station drive the first stage of a nearby m.w. receiver into a non-linear state they will beat together and produce a difference signal - this will be in the m.w. band if the s.w. carriers are suitably spaced. The difference signal is often referred to as a phantom because it will disappear when either of the s.w. carriers is turned off. If a m.w. broadcast exists on the **phantom** frequency a hetrodyne whistle will ensue, but it may be possible to tune in to the broadcasts on either side of the phantom. The phantom can be eliminated by preventing one of the s.w. carriers from reaching the first stage by installing a wavetrap. When the frequency difference between the two s.w. carriers corresponds to the receiver i.f. an untunable type of interference may exist.

Surprising as it may seem, a phantom signal can also arise in a location well removed from the receiving site! When the two carriers are applied to the junction of two oxidised metal objects, such as a joint in the wires of a fence, rectification can occur and the phantom will arise. It will then be radiated from the fence which will act as an antenna. It is often very difficult to locate the source, but a portable receiver with a directional antenna may enable it to be tracked down. Once found, the joint must be properly bonded together.

In some coastal areas the long wave ship to shore c.w. transmissions may cause **i.f. breakthrough** in superhets which employ an i.f of around 450-470kHz. This may be prevented by installing a wavetrap tuned to the i.f. at the receiver antenna terminal. □

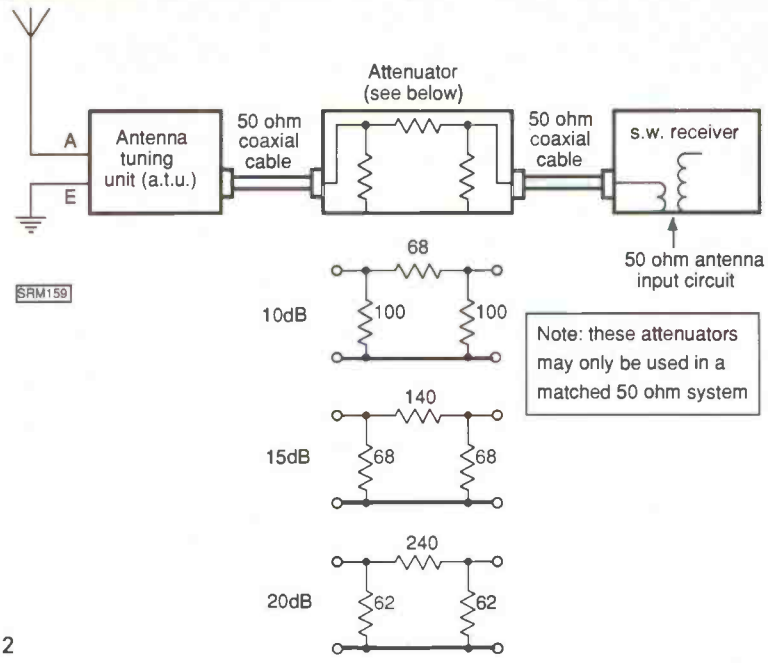


Fig. 2

Abbreviations	
a.m.	amplitude modulation
a.t.u.	antenna tuning unit
c.w.	continuous wave (Morse)
dB	decibel
i.f.	intermediate frequency
i.s.b.	independent sideband
kHz	kilohertz
kW	kilowatt
m	metre
MHz	megahertz
m.w.	medium wave
r.f.	radio frequency
s.s.b.	single sideband
s.w.	short wave

Lee Electronics

NORMAN
G4THJ

SR STANDARD®

£575 (PSU extra)

★ AX 700E ★

AT LAST — a scanner from Standard! For longer than I care to remember people have been asking why Standard do not make a scanner — well now they do. Unfortunately I only have a Japanese leaflet here in the shop, so I can't tell you too much about it, but you can see from the photograph that the AX 700E has maintained Standard's reputation for innovation. The strange looking liquid crystal display not only shows the frequency, mode and so on, it is also a panadaptor! For those of you who are new to scanning I had better explain what that is. The vertical line on the left hand side of the display is to show signal strength and the horizontal line along the bottom is the frequency range. This range can be set to 100, 250 or 1000kHz. The frequency displayed at the top is the frequency at the centre of the line. In other words, if the displayed frequency is 14.50MHz and the width of the display is set to 1000kHz, then the left hand side would be 145.00MHz and the right hand side would be 146.00MHz. Now comes the magic. Every time a signal comes up within that frequency range (i.e. 145-146MHz), it will show up as a spike on the display. The height will show the signal strength and the position will indicate the frequency. By simply turning the tuning knob a cursor can be slid along to line up with the new signal and its exact frequency will be displayed at the top of the screen! To receive the new signal, just press a button and that signal becomes the one that is heard and the display will shift to place it in the middle of the screen. The width of the spikes is governed by the setting of the step size (10, 12.5, 20 or 25kHz) so you can see that it is possible to monitor the activity on up to 100 channels simultaneously. If, for instance, you are looking for a specific signal but you only know the band that it is in and not the spot frequency, just set up the appropriate band edges and then sit back and watch the display. Any signals that then appear can be instantly spotted and tuned to in seconds. That's what a panadaptor can do for you!

As for the rest of the scanner, it covers **50 to 904.995MHz** with AM and FM (wide & narrow), it is powered by 13.8V dc and it measures just 180mm W x 180mm D x 75mm H. There is a lot more to it but I can't decipher Japanese, but we should have some English leaflets by the time that you read this ad. and may be even some radios, so come into the shop and see for yourself. You can even play with our new active antenna which should be ideal for use with this set.

Norman G4THJ

SEE US FOR ALL YOUR SCANNER AND RECEIVER NEEDS

We stock scanners and receivers by **Bearcat** — **Black Jaguar** — **Yaesu** — **Icom** — **Uniden** as well as most accessories such as plugs and power supplies and a range of antennas including our new active scanner antenna at just £89.95 (plus PSU).

400 EDGWARE ROAD,
LONDON W2
01-723 5521 Tlx 298765

BARCLAYCARD VISA Access

Normally 24hr despatch but please allow 7 days for delivery.

TRADE ENQUIRIES WELCOMED
PLEASE PHONE 01-450 9755
★ STRICTLY TRADE PLEASE ★

OPENING TIMES:
9.30am-5.30pm Mon-Fri.
10am-4.30pm Sat.

Normally 24hr despatch but please allow 7 days for delivery

FURTHER THOUGHTS

Unfortunately, Figs. 1 and 2 referred to in the "Scanning" column of June *Short Wave Magazine*, fell off the page! They are shown below

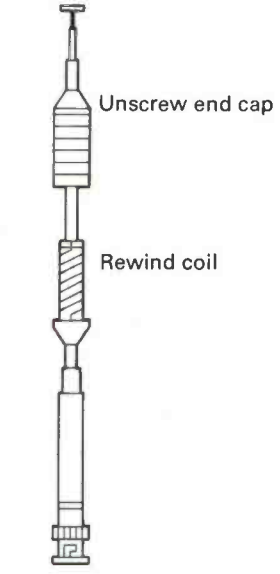


Fig.1

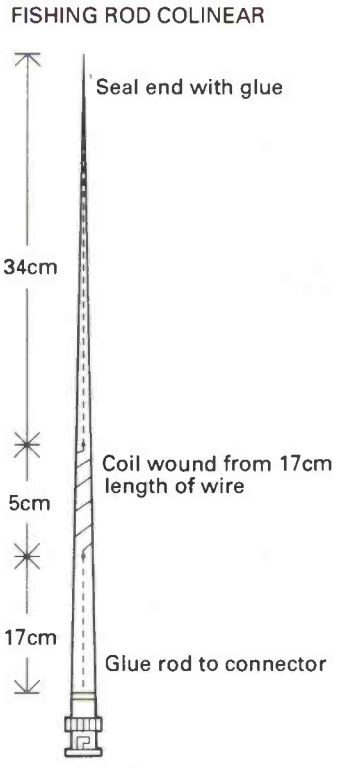


Fig.2

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.

SEEN & HEARD

AMATEUR BANDS ROUND-UP

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

This month, let's take a closer look at how radio signals from the transmitting station are propagated into your receiver. First, we'll look, in very general terms, at the v.h.f. and u.h.f. bands, which in "standard" terms cover respectively 30-300 and 300-3000MHz. These bands are affected in different ways from the h.f. type of world-wide propagation using the F layer.

Let's start with the rock-bottom base condition, namely the totally dead band. In fact, a signal from the antenna will propagate along the ground until, as a result of the curvature of the earth, it starts rising again. Thus the maximum distance which can be tolerated between two stations, A and B, would appear to be a function of antenna heights such that the two beams can just see each other over the earth's curvature. In practice, the possible distance is rather more, simply because the wave tends to be "held back" and so follows, to some degree, the earth's curve.

However, you won't have been on the band very long before you realise that other effects can, and do come, into play. First, the ground isn't flat, but creased into hills and valleys; I can look out of my window here and see the Mid-Wales repeater about 5km away - and some 400m higher! The earth in that hill will act as a total barrier to propagation around here if we just push our v.h.f. or u.h.f. signals straight at it. Walk along a canal towpath and under one of the old brick bridges while watching the S-meter and you will see that the signal all but disappears. In other words our receiver cannot "see" through earth or brickwork of any thickness.

At h.f., we talk of reflection from the ionosphere, but in fact the ionosphere refracts or bends the waves back to earth. (Were it truly reflection, of course, everything that went up would come back down again, and everything external to the ionosphere would be reflected back whence it came.) At v.h.f. also, ionisation can result in signals from farther away being received; at low v.h.f., and around the equinoxes near a sunspot peak, we may even have F-layer world-wide propagation. Sporadic-E patches may give us propagation over particular paths. These are unpredictable save to say they mostly seem to happen in the afternoons between April and October, and that they involve both stations aiming signals at the patch of ionisation.

Another ionisation effect is that of the aurora. Here the noticeable thing is that all the signals come from a direction north of the one would expect, and that what is transmitted as a T9 signal reaches the other end as a rough, raspy one; it is copiable easily on c.w., with difficulty on s.s.b., and there is rarely any hope of making sense of a.m. or f.m.. If the station is, say, to your west, you may find, as you crank the beam from west towards north, the signal changes from T9 to T2, as you go from direct to aurorally deflected signal. It is the data yielded by the logs of a v.h.f. contest which provided the key to unlock the secrets of a radio aurora event. At the start of an auroral event you may expect to be looking northward, and as the event continues so your beam will swing more and more easterly. The end of the auroral event is quite sudden.

Letters

Which brings us neatly to the letter from **Leo Barr** (Sunderland) who has a Matsui 4099. Leo has been scanning our bands occasionally, using just a random length of wire up in the loft, which he feeds with a length of coaxial cable to the set, the coaxial screen being earthed to a cold water pipe as it enters the attic. This has yielded about four signals on Top Band in four months, The 3.5, 7 and 14MHz bands usually teem with signals, but alas not a lot is heard on 28MHz. Now, Leo wonders why, when he does hear a signal on 28MHz, N8II working a G in Newcastle, it should turn out that the US station is much louder than the G. There are, in essence, two answers.

First, the relative signal strengths: the output of the transmitting antenna can be divided into two components. One, called the ground wave, travels along the ground like a v.h.f. signal, and is gradually absorbed by buildings, trees and whatever. The other component, known as the sky wave, is fired upwards - at as low an angle as one can manage, admittedly - and so is unaffected by absorption in ground-based objects. This wave will go on up until it reaches the F layer which may be as high as 500km in equatorial regions. It is then bent round (refracted) and returns to earth, maybe a couple of thousand km or more away. Clearly, between the end of the groundwave - maybe 150km or less - and the point of arrival of the sky-wave, there is an distance where the signal is inaudible. This is called the skip distance. With amateur antennas at the lower frequencies, the radiated angle is often almost straight up, and the returned skywave may appear much closer to home, so the skip distance falls; on 3.5MHz, the ground wave and the skywave return may overlap, in which case signals in the area of the overlap will often display serious fading. This is because the skywave and the ground wave travel different distances to reach the same antenna; depending on the movement of the ionosphere layer, the two may augment or cancel each other and fading results.

Leo's second problem is his antenna arrangement. Let us assume he has 10m of coaxial cable in the line up to the loft entry. Now, while the coaxial cable does screen out some of the domestic noise, it needs to be matched to whatever impedance the random length wire happens to offer at the frequency in use. If this is not done, there are two effects: 1. The signal picked up on the antenna wire isn't all pushed down the coaxial cable to the receiver, and 2. Since most coaxial cable runs around 30pF to the foot, we can say we have used the cable to connect an unobserved 900pF capacitor between the antenna pin and ground! That 900pF will bypass most of our signal to ground and at the same time totally detune the receiver front-end. I would suggest that the earth is taken off the water-pipe, the coaxial screen is either totally removed or at least is disconnected from the coaxial plug shell and a recheck is made of the signals received. To get a decent comparison, find a signal which is pretty steady in level, whether a broadcaster or amateur. Check signal level and note. Now alter the antenna, and repeat the check. You will probably find much more signal input, but a tendency, alas to be annoyed by TV timebase and similar noise.

Once this rearrangement has occurred, I would suggest a ground radial can be draped around the room under the carpet; now feed the antenna wire and the "earth" wire to the terminals of an antenna tuning unit, which in turn feeds coaxial cable to the receiver. The addition of the a.t.u. will probably give you a peak of up to two or three S-points as it is tuned up, over and above the profit you got from the removal of the coaxial feeder; the result should be quite spectacular. Practically, you can pre-set the a.t.u. to each band and if it is sharp enough to need a slow-motion drive it isn't at the right setting!

WAB Awards

Although this is to a considerable degree a transmitting activity, there are categories for the s.w.l.; and of course, as is well known the whole programme results in some surplus funds which are channelled to such good causes as the Radio Amateur Invalid and Blind Club. Details from Brian Morris, G4KSQ, 22 Burdell Avenue, Sandhills Estate, Headington, Oxford OX3 8ED.

The Bands

D. Walmsley is primarily a c.w. man, though he admits to occsionally putting on a suitably apologetic look and snapping up a trifle here and there on s.s.b.. The latter included ZC4KM and ZS6BIG while the keyed stuff included a load of DX countries in all Continents, and spread over all bands from 1.8 to 30MHz. EA8AB was noted on every band between 3.5 and 24MHz, being missing only on the 1.8 and 28MHz listings.

Now to **Ted Trowell**, who is also normally a user of all the bands between 1.8 and 30MHz; this time, though, Ted records nothing of significance on 1.8MHz, where around mid-day there was often virtually nothing to be heard on some days, other days being normal. Ted uses a G5RV antenna, which is hauled down for maintenance at regular intervals.

D. L. McLean notes how 28MHz would open up on the short path around 0700-1200Z to VK-ZL-JA-Asia, while the same general area would be covered long-path on occasion between 2100-2300; Yanks were noted as early as 1100 and sometimes stayed until 2300Z. South America was sometimes audible till midnight, with the LUs the last to leave the stage. On 21MHz the long path to VK and ZL opened 0600-0800Z, then changed to short path till noon. W/K/N signals were heard from 1100 to midnight, South Americans from early evenings until the small hours. Africans have been pretty scarce by and large.

Glenn Greed runs a Heathkit HW9, into a low low antenna - nearly four metres high at one end down to 1.6 metres at the distant end. The antenna wire owes nothing to insulators other than its own coating, and so far some twenty countries in three continents are "in the bag".

When considering the DX worth of, say a W, one needs to consider where he actually is situated. If, for instance, the station happens to be in California or Arizona he is normally reckoned far more DX worthy than say a W1 on the eastern seaboard; or again, a W0 in N. Dakota is a far rarer bird than one in Missouri. That having been said, if you are sitting on the eastern side at the foot of a very steep mountain, then ANY W will come as rare DX! So, for instance, **Leslie Sargent** probably has just such a reason for his choice of best DX this time from the quadrant between West and South.

W. Shackleton, living up on Tayside, prefers the WARC bands, in particular 18 and 24MHz, with simple equipment. Wallace mentions that on 18.100 there is a Brazilian beacon to be heard most of the time, transmitting its power output and location along with its call; and sometimes the IK6BAK/BEACON job on 24.915MHz is to be heard. Beacons of course are put there for us to obtain some idea of the state of conditions.

Yet another addict of the WARC bands is **N. Dawkins** who mentioned ZD8BOB, LU1HDC, LU2AAW, VK6AKG, EA4EFV, W8VS, 5B4OG, VE1ADJ, VE3FGG, AB4KL, KC2DC, W8ZCQ, VK7RNC, W1AQE, W0IL, K2BGI, K4UL, K2SWZ, VK2OI, W3ANK, N2FHT, VK6AKG, VK2OI, ZL2APW, ZSs, VE5, EA/SM2PDW, KD3DK, CT4AH, VE1BY, VK1FT, FY5AU and WA1PFC. All this lot were booked in over a period of ten days on 18MHz.

So there it is. Don't forget, this column covers the whole spectrum of amateur radio. Tell me what you have heard and done and you encourage others to experiment and to be more active. See you next time.

The next three deadlines are:
July 17, August 21 & September 18

DECODE

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

Rally Calendar

Now that our daughter Ruth has reached an age where it is comparitively easy to travel, I will be attending a lot more radio rallies around the country.

Our first rally this year was the Northern Mobile Rally at Harrogate on May 21 which we thoroughly enjoyed. The organisation at this rally was really excellent and our life was made much easier with a tractor supplied to get the stand and all the books from the car to the hall and *vice versa* . The final point which really won us over was that they even supplied a child minder to look after Ruth for a couple of hours in the afternoon!

One of the main reasons for attending these rallies, at least as far as I'm concerned, is to meet some of my readers and hear your views on what you want from the magazine in general and this column in particular. Dates and venues that have been booked so far are:

August 13 (pm) - Hamfest, Wimborne, Dorset.
September 3 - Telford
October 27/28 - Leicester
November 4/5 - Llandudno

In addition to meeting readers and hearing your views on the magazine and radio in general, I hope to be able to take along stocks of my Frequency List so you can pick-up a copy of the latest version. The printing and photo-copying costs are normally paid for by the three stamps, so I may have to make a small charge of, say, 10p per copy at the rally to cover my costs.

So if you live near any of these rally venues, please come along and introduce yourself.

Commodore PET

This computer has been around for some time now, but I have recently had a letter from **Simon Lewis** of the Commodore Radio User Group[1] asking if anyone is still using one of these machines for RTTY or any other utility modes. If you do have one of these computers please drop me a line and I will pass the details on to Simon.

For those of you who may not have heard of this group, as the name implies, they specialise in Commodore computers and have plenty of expertise on the older models. So if you need any help, why not enquire about membership from the address at the end of the column.

Readers' Letters

Ern **Warwick** has sent me a copy of a rather confusing contact that he monitored. The question being what was it? The station was heard on 14.086MHz using the callsign UA3AKR and seemed to be an automatic station.

Well, the answer is actually quite simple as the station is an amateur RTTY bulletin board system which is active on the 7MHz and 21MHz bands in addition to 14MHz. These stations are usually quite easy to recognise as the abreviation RBBS usually appears quite frequently after the station's callsign. If you have the time to monitor these bulletin boards can be quite a useful source of propagation news. It all depends on another amateur accessing the station and requesting the appropriate information.

Mr D. Brough, Cardiff asks how to get a utility monitoring station going for his father. The present set-up is a Lowe SRX-30 receiver with a long wire antenna. The preferred modes are c.w. and RTTY though he would be interested in any other modes that may be available.

I'm not very familiar with the SRX-30 but providing it has a stable v.f.o. and a good b.f.o. for s.s.b. reception it should be suitable for utility monitoring. With regard to computer interfacing, he has access to an Amstrad 6128PC which simplifies things somewhat. There are basically two options depending on the depth of your pocket. The first is to set yourself up with an AEA PK-232 or Kantronics KAM intelligent terminal unit, which will enable reception of RTTY, ASCII, ARQ, FEC and FAX with the capability to receive more modes as suitable software is released.

The second and cheaper option is to purchase suitable decoding software which can be run on the Amstrad. The only snag here is that the 6128 is not really very well supported, so you don't get a wide choice of software. Having said that I understand that J & P Electronics[2] can supply a very good program.

As well as sending in a very comprehensive log, **Rob Filby** of Bridlington, has sent details of his station which has evolved after some eleven years of monitoring. The receivers currently in use are a Racal RA-117E and a Trio TS-930S transceiver. Rob has the choice of three antennas, depending on the band and conditions. These are an 8.7m, ex-army, vertical whip, 34m G5RV and a 50m long wire. With such a good choice of both equipment and antennas it's not surprising Rob has managed such an impressive log. All that's missing from his report is a description of his decoding equipment, but perhaps he will send me these details later.

John Hunt's request for an RS-232 terminal unit for use with his IBM PC has brought the same suggestion from two readers, **Dave Brown** and **John Kelday**. Both Dave and John use the TU-1000 from Maplin Electronics with great syccess. This terminal unit can handle the normal 170Hz, 425Hz and 850Hz shifts as well as providing a variable shift from 0-1000Hz. The cost is in the region of £50 in kit form and is ideal for the newcomer to construction, especially if you can get access to some expert help if you hit a problem.

Another terminal unit that may fit the bill is the Versaterm from BARTG. This unit also has an RS-232 output, but is slightly limited as it can only handle 170Hz and 425Hz shifts. The Versaterm is only available in kit form and as with the Maplin unit, it costs about £50.

These are the only two units to come to light so far, though if you know of any others, please let me know.

Brian Cole of Telford has just bought himself the latest Lowe HF-225 receiver which he is currently using with an ERA Microreader for utility station monitoring.

Brian's only problem at the moment is that he can resolve amateur RTTY easily but finds it difficult to copy commercial stations. I have not used the Microreader myself, but reading through George Dobbs' review in the May *SWM* it seems this aspect of the performance takes a little practice to master. There seems to be two areas to watch - first setting the gain control on the back panel which is covered in the handbook and secondly, careful adjustment of the tuning.

I would also suggest that any newcomers to RTTY start with some of the well known and easy to decode signals such as: CTK Prague on 17.525MHz and TASS Moscow on 12.315MHz.

Schedules

Only one schedule this month, again from The Netherlands. The station concerned is CTK Prague which transmits news to Africa and Asia in English and French. Although apparently beaming in the wrong direction for reception in the UK and Europe, the signals are usually very strong and easy to copy. The mode used is 50 baud RTTY with a shift of 425Hz.

5.917MHz, 1710-1800UTC, Sun-Fri, English
8.1425MHz, 1800-1900UTC, Sundays, English
9.353MHz, 1900-2000UTC, Mon-Fri, English
9.353MHz, 1910-2010UTC, Sundays, English
13.6475MHz, 1010-1110UTC & 1510-1600UTC, Mon-Sat, French
13.6475MHz, 1430-1500UTC, Sundays, French
13.6475MHz, 1230-1315UTC, Mon-Sat, English
15.8975MHz, 1400-1500UTC, Mon-Sat, English
15.8975MHz, 1510-1600UTC, Sunday, English
17.525MHz, 0600-0700UTC & 1130-1215UTC, Mon-Sat, English
17.525MHz, 1610-1700UTC, Daily, English
18.985MHz, 0710-0810UTC & 0850-1000UTC, Mon-Sat, English

Don't forget, if you have any recently received schedules please drop me a line with the details.

Ships' Callsigns

Regular readers will remember that in the May issue I printed a plea from Chris Swann for a publication that lists ships' callsigns. I have had many replies to this and am glad to find that there is a publication, the only snag is the price. As I'm sure you can imagine compiling and updating an international publication of this type is a fairly onerus task and when combined with the relatively small demand the price is bound to be high.

Now to the details, the information is supplied in two volumes the first giving an alphabetical list of ships' names while the other gives, alphabetically, the ship's call followed by its name. The publication is titled *ITU List VII A - List of Call Signs and Numerical Identities used by Maritime Mobile - Satellite Services.*

With a title like that you can understand why, in the trade, it is often known as the BLUE LIST or BLUE BOOK!

Your next question of course is where can I get a copy and how much? If you want to contact the ITU direct the address is: Sales Service, International Telecommunications Union, Place des Nations, CH-1211 Geneva 20, Switzerland

The latest price I have is 52 Sw. Francs which is approximately £19.20, but I would recommend you contact them for a firm price before you send off your order.

An alternative supplier is Kelvin Hughes Ltd. who's head office is in London phone 01-500-1020, although I have not checked the availability with them.

My thanks to the following for this information: **G.D. Massey, Geoff Halligey, Richard L. King** and **Vernon Young**.

If any of you have located any useful publications dealing with utility stations please drop me a line with the details. You never know, if it is likely to be popular, I might be able to persuade the *SWM* book service to stock it.

Frequency List

Several readers have sent in logs for me this month which have now been included in the latest list. If you would like a copy of my Frequency List, which covers stations heard by readers during the last three months, just send three stamps with your request to the address at the head of the column. Incidentally, it is a great help to me if you include details of the equipment you are using. By doing this I am able to see which are the most popular programs and

The next three deadlines are:
July 17, August 21 & September 18

SEEN & HEARD

computers, etc. for utility listening.

The first log for this month was sent in by **Chris Swann** of Wargrave. I'm sure Elaine will curse him, as the log was some four pages and Elaine has the job of entering it all on the database!

Chris is using one of the Technical Software decoding programs and all is working well except that he needs to find out if there is a way to stop the Russian Cyrillic transmissions reverting to numbers.

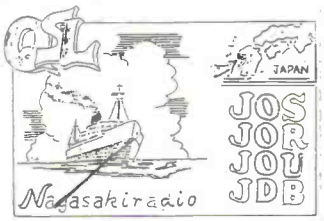
He has also found a couple of unidentified stations he would like to put a name to. The first station is on 4.215MHz, RTTY, 50 baud, 425Hz shift and seems to send endless RYs. The second uses 7.698MHz RTTY, 50 baud, 425Hz shift and sends Ks plus some sort of coded message. If you've any answers to these drop me a line.

The second list came from **Jan Nieuwenhuis** and had virtually all the stations fully identified. The only exception being 19.1115MHz RTTY, 50 baud which was thought to be MFA Jakarta, though the callsign was missing.

The next log was from **Gordon Spencer** who has managed to log a very wide range of signals. The only dissapointing news from Gordon is the vast amount of illegal operation which is occuring between 25 and 27MHz.

Another list for this month came from Rob Filby who has supplied a comprehensive list of RTTY only stations from as far afield as Chile, Tahiti and China. Well done Rob. Thanks also to Chris **Norfolk** for his contribution.

Now for this month's frequencies which are presented in the normal format i.e., frequency, mode, speed, shift, callsign, time and notes:



That's it for another month and thanks to all the readers who sent in information, I'm just sorry I couldn't mention you all.

1) CRUG, S. M. Lewis GM4PLM, 22 Whiteford Avenue, Bellsmyre, Dumbarton G82 3JT

2) J&P Electronics, Unit 45, Meadowmill Estate, Dixon Street, Kidderminster DY10 1HH

0.053MHz FAX 90/576 RTO 2045UTC Moscow Meteo
3.0495MHz FAX 120/576 DHJ58 2047UTC German Navy
9.14MHz RTTY 50/R ? 1827UTC TASS English news
9.9825MHz FAX 120/576 KVM70 0546UTC Honolulu Meteo
10.408MHz RTTY 50/? 9VF63 1735UTC ANSA Singapore
12.658MHz CW ?/? JNA 2025UTC Tokyo Radio
12.99015MHz RTTY 50/N URD 1457UTC Leningrad, Russian text.
15.5085MHz RTTY 50/? SOP250 1650UTC PAP Warsaw
17.623MHz RTTY 50/R ZAA6 0919UTC KUNA Kuwait
18.3635MHz RTTY 50/? 9PL 1720UTC Kinshasa Air

COMMANDING OFFICER
U S NAVAL COMMUNICATIONS STATION PHILIPPINES, R P
BOX 2
FPO SAN FRANCISCO CA. 96656

N P O

TO Jan Nieuwenhuis
CONFIRMING OUR TRANSMISSION ON 12867 KHZ
AT 1255 GMT DATE 29 November 1987
TRANSMITTER USED AN/FRT-39 RADIATED POWER 10 KW
ANTENNA USED OMNI-Directional

The next three deadlines are: **July 17, August 21 & September 18**

INFO IN ORBIT

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

Introduction

I am very pleased to have been given the opportunity by Pat Gowen and the Editor of *Short Wave Magazine* to write this column. As regular readers will know, Pat is closely involved with environmental groups and wishes to spend more time on that worthwhile subject. However, he has kindly agreed to continue to contribute material to the column.

A number of readers of this column are beginners in satellite operations while others are very experienced. I hope to provide something for everyone each month, my aim being to keep you up-to-date, particularly with weather satellite matters.

Between the late sixties and the early eighties I was working in solar research, followed by a close involvement with the British space effort notably operating the Ariel (UK) series of satellites and then the international IRAS satellite project.

In recent years I have been listening to and analysing satellite signals and data as an amateur. I hope to pass on some hints to newcomers to the field and if you want to add your own tips and perhaps send in pictures of yourself with your equipment or results, or to ask questions that may well be of general interest I am keen to hear from you.

I have already received a number of queries from as far away as Australia following a review of my space activities in a national scientific weekly so I am aware of the tremendous interest in this field. If you want a personal reply please remember to enclose an s.a.e.

Acton in Space

Acton High School is actively involved in the design and launch of rockets as part of the school's education programme. **Magdalena Jarzykowska** writes to tell me of their Space Club activities. All being well, on May 17 they hope to "launch Acton 3 to a height of some 2000 feet and return signals back to base from its transmitter to enable the members to calculate its height."

Magdalena continues "Shortly after, Acton 4 will lift off, rising about 5000 feet with a payload designed to focus on the protection of the environment." As if that activity was not enough, this June a group of students are to send a biological experiment to Moscow to be launched on the Russian Bio-Cosmos. They have received help from Gerry Webb of Commercial Space Technologies Ltd amongst others. Incidentally Gerry and I used to be colleagues at the Appleton Laboratories - its a small world!

I am sure that we all wish Magdalena and the space club the best of luck with their ventures. Stop Press News just received from **Wendy King** - unfortunately the rockets didn't reach the heights hoped for. The work continues.

Pat Gowen G3IOR writes to mention that Cosmos 1870 is in a low earth orbit and is boosted every 3 - 4 weeks. Pat adds that, "it is very bright because it is as big as a bus!" As well as looking out for it, try listening on 180MHz (sidebands on 179.875 and 180.125MHz). The satellite has recently been boosted again. I shall see if orbital elements can be obtained for this Cosmos.

Pat also reminds us that MIR can still be heard on 160.000MHz (sidebands on 159.875 and 160.125MHz) when it is over its home. The new refurbishing crew will be returning to MIR in late August, headed by Vladimir Dzjanibecov who also headed the SALYUT-7 refurbishing mission. Finally, for those lucky enough to visit the Paris Air and Space show this summer, Pat says that BURAN will be on display.

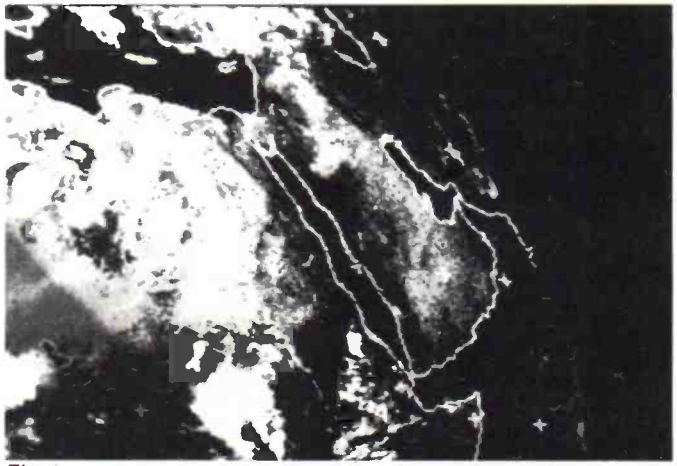


Fig.1

USA Shuttle

Listeners keen to follow the launches of American Shuttle missions should listen in to Voice of America on 6.024MHz, writes **Leslie Sargent** of Runcorn. He is an electronics engineer and the monitoring of space shuttle launches is a regular activity of his. He heard live communications between the astronauts and Mission Control during the *Atlantis* launch on May 4, including the "All clear to launch" given at 1843UTC. Leslie provides the following address for anyone wanting to obtain more information on the Shuttle:

Information Office
John F Kennedy Space Centre
Kennedy Space Centre
Florida 32899
USA

GUIDE TO FACSIMILE STATIONS

(9th edition — June 1989
320 pages. ISBN 3-924509-69-7
GBP 14. — or DEM 40. —

Reliable and easy-to-use FAX equipment is now available for less than 200 GBP. It prints weather charts, press photos, satellite pictures etc, with excellent resolution via a standard Epson-compatible dot matrix printer on ordinary paper. The interest of mariners, yachtsmen, pilots, radio amateurs, monitors and meteorologists around the world in the reception of FAX transmissions has subsequently exploded during the past three years. Apart from the hardware mentioned, the potential user needs detailed and up-to-date schedules of those FAX stations. That vital information is published since the early seventies in our international reference books like the FAX GUIDE.

The numerical frequency list covers 380 frequencies — from VLF to UHF — of FAX stations which were monitored in 1988 and 1989. Frequency, call signs, name of the station, ITU country/geographical symbol, technical parameters of the emission, and details, are listed. All frequencies were measured exact to the nearest 100 Hz. The alphabetical call sign list covers 228 call signs, with name of the station, ITU symbol, and corresponding frequency(-ies).

Schedules of 93 FAX stations on 338 frequencies are listed alphabetically, including the latest schedules of Bracknell Meteo, the new METEOSAT-4 operational since 19 June 1989, and Royal Navy London. Additional chapters cover

- Comprehensive list of equipment on the market for both FAX and meteorological satellite reception, with photos and manufacturer's addresses.
- Detailed explanation of the technique used for the transmission of FAX pictures.
- Regulations on technical characteristics of FAX equipment, including all CCITT and WMO standard test charts.
- Comprehensive list of both geostationary and polar-orbiting meteorological satellites, with full technical data. Detailed explanation of APT PREDICT and FANAS polar-orbiting satellite position data codes.
- Radio amateur FAX activities.
- 225 abbreviations.
- 61 stations addresses in 36 countries.
- 240 sample charts and their interpretation (thereof 24 from British stations).

Further publications available are **Guide to Utility Stations**, Air and **Meteo Code Manual, Radioteletype Code Manual**, etc. Write for detailed catalogue of publications on commercial telecommunication on shortwave. All manuals are in the handy 17 x 24cm format, and of course written in English.

Prices *include airmail* to anywhere in the world. Payment can be by cheque, cash, or International Money Order. Postal Giro Account; Stuttgart 2093 75-709. Dealer inquiries welcome — discount rates and pro forma invoices on request. Please order from

KLINGENFUSS PUBLICATIONS
Hagelloch, D-7400 Tuebingen, Fed. Rep. Germany. Tel. 01049 7071 62830

WORLD'S SMALLEST WEATHER STATION

The new TW-2 Micro Weather Station includes a computer, precision wind vane and speed sensor with mounting hardware and 12 metres of cable.

Only £119.95 plus VAT

Post and packing £5.00
Ideal for home, radio shack, boat or caravan
ACCESS AND VISA
12 months warranty

Features

- Wind Speed
- Wind Direction
- Wind Chill
- Wind Gust Record
- Temperature
- High/low temp record
- Time of Day
- Autoscan
- Operates from batteries, 12 volts or mains (option)

ICS Electronics Ltd. Unit V, Rudford Industrial Estate, Arundel, West Sussex BN18 0BD Phone: 0903 731101

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.

See us at the BBC ACORN user show '89

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 88.108MHz 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

SEEN & HEARD

Satellite Predictions

I would like to hear from readers what type of satellite orbital data you would most like to have printed here. Also for the cost of an s.a.e I will be happy to send any reader a copy of the latest Kepler elements that I am using. My files are usually up-to-date with all known weather satellites and a selection of others such as the UoSATs, etc.

Weather Satellites

Met 3/2 had been on 137.40MHz in mid-February during a period of problems, then reverting to 137.85MHz with continuing problems. It had been off for several weeks when on Tuesday May 16 we were treated to a near overhead pass at 0908UTC. After discussing the picture with **Reverend James Brown** of Porthcawl who has been looking at weather satellites for some years we established that my Kepler elements for this satellite were probably a little dated so I decoded some new ones from those transmitted by UoSAT-2.

I would be very interested to know whether anyone knows of any official announcements about the operation of this or other Russian meteorological satellites. I wonder whether news releases on foreign satellite operations are made by the News Agencies via their RTTY broadcasts?

Other Russian weather satellites currently operating are Met 2/16 on 137.40MHz, 2/17 on the same frequency, and 2/18 on 137.30MHz. With both 2/16 and 2/17 using the same frequency there can be problems and during recent weeks the two satellites have been coinciding over the UK during the afternoon, causing the most curious effects. On April 23 Met 2/16 came over my horizon at 1627UTC followed at 1634UTC by Met 2/17. The picture was adjusted for Met 2/16 and as the two signals interfered with each other, one and then the other would dominate causing the picture content to change every few seconds. This interference will continue until the two satellites slowly separate their pass times.

Another notable feature of the Meteors during recent weeks has been the night-time transmission of 20 lines per minute infra-red data from both Met 2/17 and Met 2/18. Usually the Mets switch off when they enter eclipse but currently you will hear the recognisable signal of these slow-scan Meteor infra-red signals. Rev. James Brown, an experienced satellite expert, tells me that he did once modify his framestore to display such pictures.

Shower clouds add a characteristic signature to the signal - something like the sound of walking in crunchy snow. Listen for it next time you see shower clouds on the picture.

The American NOAAs continue to provide a reliable source of weather pictures. NOAA 10 transmits APT data on 137.50MHz and high resolution data on 1698MHz. The evening passes over the UK now provide visible pictures because of the longer daylight hours. Also on these passes you will see that the land, including the UK is often warmer than the sea and so it is darker, whereas in winter we see it lighter than the sea. This can sometimes make land masses difficult to identify.

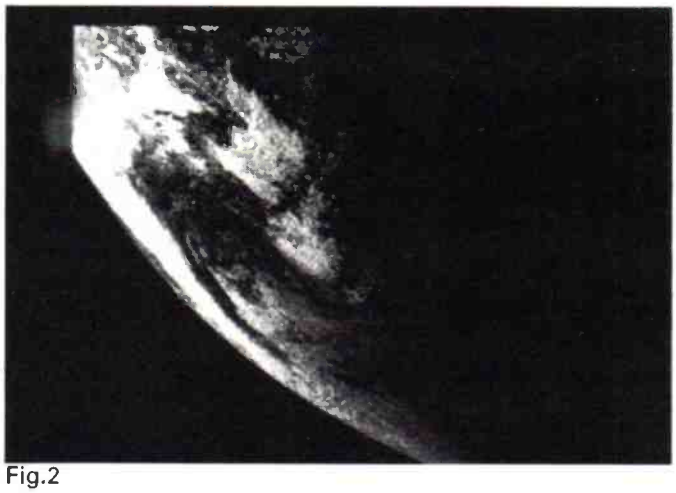


Fig.2

An interesting effect to see during the spring and summer months is that of reflected sunlight or "sunglint" from the oceans and seas, particularly the Mediterranean. When a satellite passes over a stretch of water in daylight, it can catch a reflection of the sun off the water. On almost every pass of the weather satellites you will see this effect and although very picturesque, it can make it almost impossible to recognise certain places such as Sicily.

NOAA 11 continues to provide good quality pictures, on 137.62MHz. It passes over the UK during the early afternoon travelling north and the early hours of the morning travelling southwards.

NOAA 9 is currently back in normal operation having had more problems. On April 19 I was quite amazed to pick up its signal on 137.50MHz instead of the usual 137.62MHz. It remained on that frequency for a couple of days and then returned to 137.62MHz where I saw it on April 22 at 0737UTC. The picture was very poor and appeared to be in four sections, though I suspect that might have been a misinterpretation.

Later on April 22 at about 1548UTC it was working normally, but the next day at 1406UTC it was faulty. On April 30 the transmission had changed completely as listeners would have noticed. The visible picture was black and the infra-red was just a grey scale. I logged similar passes until on May 5 at 1502UTC when NOAA 9 was back to normal. Since that time it appears to be working well.

If you are regularly listening to the NOAA data, try tuning into the beacon frequency instead. The NOAAs use 136.77 and 137.77MHz. It is possible that some of the earlier NOAAs may have their beacons on for periods of "housekeeping" checks, that is when the controllers wish to check out the on-board systems, so you may occasionally pick up such a beacon when NOAAs 9, 10 and 11 are not around.

Fig.3

Geostationary Satellites

Meteosat 3 continues to transmit wefax pictures on both 1694.5 and 1691MHz as well as the digital data also referred to later. Meteosat 4 is in position and due to replace Meteosat 3 at the beginning of June. Testing of Meteosat 2 was carried out at the end of March and Meteosat 4 has been testing on several afternoons during May.

On May 11 at about 1200UTC, the Meteosat signal changed from the recognisable Met 3 "swish" (which is caused by faulty transmitting dipoles) to an almost steady tone, which I presume was Meteosat 4. The pictures transmitted were tagged Met 3 and were virtually noise free and stronger than the signal that I have been seeing so I believe we will see better quality data.

A section of a whole earth disk from Meteosat 3 showing the eastern mediterranean sea, Saudi Arabia and the Sudan taken last year can be seen in Fig. 1.

GOES-E has been drifted westwards much to the disappointment of many users in the UK, including me! It has supplied excellent pictures from not only its own sensors but has retransmitted pictures from GOES-W which was positioned much further west, plus processed pictures from NOAAs 9 and 10 - truly an excellent data provider. The GOES-W spacecraft imager bulb failed, as anticipated.

While GOES-E was providing a strong signal I took many recordings and Figs. 2 and 3 are two such pictures. They show the visible-light pictures of the south-west and north-west quadrants. Therefore Fig. 2 shows the southern Pacific Ocean and Fig. 3 shows the northern Pacific Ocean each taken at midnight in late autumn. There are plans to replace GOES-W and I shall pass on more information when it comes to hand.

Meteosat Digital Transmissions

Many readers of this column are already receiving the wefax transmissions from Meteosat which are broadcast on both channel 1 and 2. You can also hear the digital pictures being transmitted at the published times.

I recently visited Polytechnic Southwest in Plymouth to see Graham Wade in the Department of Communication Engineering. He has set up a 2m dish on the roof to receive Meteosat digital data.

The digital pictures are quite spectacular and cover slightly different areas compared to the ones transmitted in wefax format. If any readers are already using the digital data perhaps they could send in some information and perhaps a picture or two?

The next three deadlines are: **July 17, August 21 & September 18**

SEEN & HEARD

BAND II DX

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

"Today in West Germany around 27 million radios are registered by the German Post Office, wrote **Max Wustrau** (Bedford). He pointed out that, "from 87.5 to 107MHz you will hardly find a gap where no stations can be. Music, comments, news and sport - the channels are full to the brim. The competition between stations increases from month to month. Twenty years ago there were about 250 v.h.f. stations in West Germany, now there are 846 stations on the air, including 170 private stations and another 170 private stations are in the planing stage." Max tells me that Bayerischer Rundfunk went on the air on 28 February 1949 and on the following day Nord-West Deutscher Rundfunk used a v.h.f. transmitter in Hannover. Very soon transmitters were "firing up" from Hamburg, Kassel, Nuernberg and Stuttgart and a year later stations from Feldberg, Koeln, Wendelstein and Wuerzburg went on v.h.f.. "Where will it all end?" asks Max. Many of us would like to know the answer to that one Max, especially as we watch Band II gradually filling up with new stations in the UK.

Reports

During the tropospheric opening on April 19, **Simon Hamer** (New Radnor) received several stations from Belgium, Eire, France and Holland, plus BBC Radios Scotland and Ulster and ILR Radio Clyde. While the barometer varied slightly around 30.1in (1019mb) over the next few days and a weather system was moving, I logged several strong signals from France at various spots in Band II. The pressure was just beginning to fall, as rain threatened at noon on the 23rd and at 1845, several Continental stations, predominantly German, were heard between 98 and 103MHz.

Short lived tropo-openings can occur at any time when the barometer is high and I experienced this on the 28th. The day began bright and sunny with the pressure rising from 30.0in (1015mb) at 0600 to 30.2in (1022mb) at noon. By 1100, Joan and I were *en route* to Polsden Lacey, near Dorking in Surrey. During the afternoon those wispy clouds were building up and a cold wind was developing. I checked Band II with my Plustron TVR5D at 1430 and 1700 and found conditions normal. However, as we neared home Joan noticed a giant halo in the atmosphere which appeared to surround the setting sun. The weather was definately changing and on arriving home I found a dozen French stations and numerous "warbles" between 87.5 and 103MHz. By midnight the pressure was falling and at 0800 it was raining. This apparent solar halo was mentioned by the TV weather presenters. At 2000 on Saturday February 25, I recorded a very low pressure of 28.3in (appox 958mb) which can be seen on the barograph chart for that day in Fig. 1. This was the end of a long slow fall which began at 30.4in (1029mb) at 0800 on the 21st. It is interesting to note that at 2200 on the 20th, just a few hours before this fall began, I saw an extremely large lunar halo. In my experience, they are a bad weather indicator so keep an eye open for them readers, but please remember, that when these halos are seen, the moon or the sun is only acting as a light source which is exposing the phenomenon within our atmosphere.

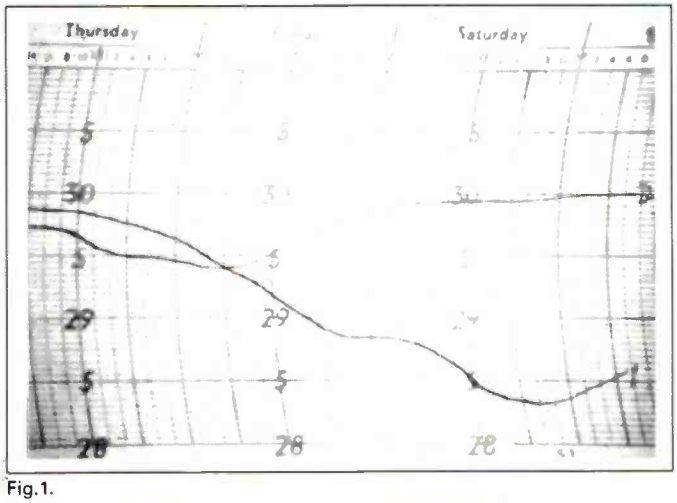


Fig.1.

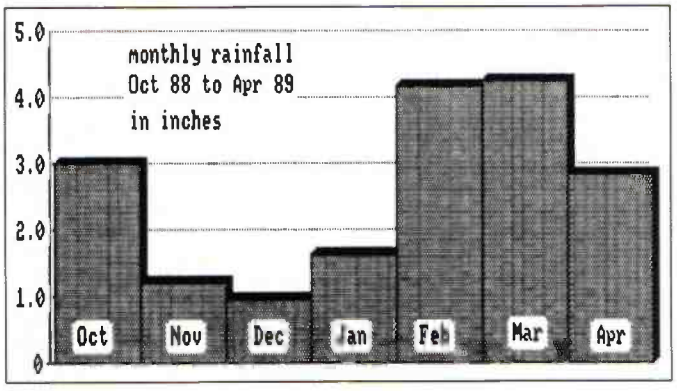


Fig.2.

The upper trace in Fig. 1, Saturday March 4, is the start of the early March high which followed after the week long climb back from the "pit". While talking about the weather, the bar-chart in Fig. 2, prepared with the graphics section of the Mini-Office program on my Amstrad PCW8512, represents the amount of rain which fell at my home in Sussex between October 1988 and April 1989 inclusive.

I logged French and German stations between 98 and 102MHz at 2030 on April 30, voices which sounded to me like Belgian, Dutch and French on 13 spots within the band plus IRN Birmingham around 102MHz at 1800 on May 2, 8 Continentals from 87.8 to 102.5 early on the 3rd and several very strong French stations at 1000 on the 7th. The pressure was again falling on the 9th and while the prevailing fine weather was on the change, Band II gradually opened up. I logged a lone French station around 100MHz at 1045 while parked near Ardingly in Sussex, 3 foreign voices, plus a few "warbles", between 98 and 105 at 1415 from Sissinghurst Castle in Kent and at least 5, much stronger, French stations, plus more "warbles" from home at 2300. However, next morning, at 0800, I counted 15 powerful foreign voices, including Belgian, French and German, plus programmes from Invicta FM, Radio 210 and an ILR news programme from Wales. In addition I heard BBC Radio Bristol on 95.5MHz and two French programmes between 98 and 100MHz at 1630 on the 10th and Radio Bristol plus a few "warbles" and Continental voices throughout the band at 1845 on the 15th.

The next three deadlines are:
June 19, July 17 & September 18

TELEVISION

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

"After several years of experimental television transmissions relayed from the Baird Studio at Long Acre, the BBC installed, at Broadcasting House, a complete television transmitter working on the Baird system and regular television programmes are radiated four nights a week," wrote Douglas Walters in the *Daily Herald Wireless Handbook* published in 1934. Doug, the newspapers Technical Radio Correspondent further explained that the vision signals were transmitted from the London National station and the sound accompaniment was radiated on the Midland Regional wave-length. Two radio sets were required for this system, one for the vision signals which were fed to the "televisor" and the other to receive the sound. A more detailed explanation of the mechanical system and the later viewing of a cathode-ray tube can be found in *The Book of Practical Television*, Fig. 1, published in 1935. I have copies of these technical gems in my archives and I suggest that readers interested in vintage radio and television should keep an eye open for them in second-hand bookshops.

Picture Archives

Pictures received via an "F2" opening often have multiple images and are difficult to identify. However, **Lt. Col. Rana Roy** (Meerut, India) caught one of these on Ch. E2 (48.25MHz), Fig. 2, with his camera, at 2225 on February 26.

At 1238 on 6 June 1988, **Neil Purling** (Hull) photographed one of those typical Sporadic-E fades while he was watching the test-card from Norge Gamlem, Fig. 3, on Ch. E3. Later, around 1900, he received the German ARD1 logo, Fig. 4, on Ch. E2. The Sporadic-E season usually provides some interesting pictures and in July 1986, the late **Len Eastman** (Bristol) received a weather chart from Spain, Fig. 5. He watched one of their regular Sunday morning programmes, Fig. 6, in July 1987. In June 1988, **David Glenday** (Arbroath) added the Czechoslovakian test-card SR1TV Bratislava, Fig. 7, on Ch. R2 (59.25MHz) and a Hungarian programme listing, Fig. 8, on Ch. R1 (49.75MHz) to his DX log.

Band I

"April was a disappointing month for DX, but May started off well with both tropopherics and Sporadic-E in evidence, wrote David Glenday who received pictures from Spain (TVE1) on Chs. E2/3/4 (48.25, 55.25 and 62.25MHz) and Italy on Chs.Ia/b (53.75 and 62.25MHz), during the early evenings of May 5 and 6 respectively.

GAREX ELECTRONICS

WEATHER SATELLITE SYSTEMS

★ NEW ★ NEW ★ NEW ★ NEW ★ NEW ★ NEW ★

SPECTACULAR NEW ATARI ANIMATED SYSTEM

Garex are proud to announce that they have been appointed sole UK dealer for this incredible new Timestep product. Following on from Timestep's phenomenal success in the education market a special low cost Atari ST version of their animation system is now available. Simply plug in your existing receiver to view amazing pictures. For the ultimate, add a Meteosat receiver for unbelievably smooth 15 frame animation that is completely automatic once set up. Just watch the clouds roll by! New pictures are added twice an hour if required, the oldest being discarded automatically. This sophisticated package will run on any Atari ST1040 and compatible colour monitor, comes complete with all software and colour-keyed Atari interface unit. £299.00
Optional 16 grey scale adaptor for colour monitor £24.95

For those who would like a one-stop-shop, we offer the complete package of a ready-to-run system: Meteosat Dish & Receiver, Atari Interface Unit, Grey Scale Adaptor, 14" Colour Monitor, Atari ST1040 Computer, Software (including Demo-disc) AND, OF COURSE, ALL PLUGS AND CABLES.
On your doorstep £1,695.00

COMPACT FRAME STORE SYSTEM

The basic MICROWAVE METEOSAT system, no complications, a complete plug in and go package requires no computer, no software, and can be up and running, including dish alignment within 10 minutes. Nothing more to buy: Dish, Microwave Receiver, Frame Store, 12" B/W Monitor AND ALL PLUGS AND CABLES. Designed by Timestep, supplied by Garex. £995.95

137MHz VHF SATELLITE ACCESSORIES

137MHz Active Antenna + 35m cable £74.75
137MHz 10 channel Receiver £155.25
SAE for full details and prices of other 'separates'.

★★★★★★ ★★★★★★ ★★★★★★ ★★★★★★

GAREX VHF RECEIVERS

The celebrated Timothy Edwards designs now owned & manufactured by GAREX.

★ A simple but versatile design capable of covering spot frequencies in the range 25-200MHz.
★ Excellent sensitivity (typically better than 0.4μV for 12dB SINAD).
★ Double superhet (10.7MHz and 455kHz IFs).
★ Choice of IF bandwidths from "W-SAT" to "12.5kHz" PMR standards.
★ The basic receiver is single channel crystal controlled.
★ Multichannel option.
★ 2 watt audio output stage having a low quiescent current.
★ Size: 153 × 33 × 13mm. ★ Requires 10-14V DC supply.

PRICES Stock Versions: (fully assembled, aligned & tested boards) 6m, 4m, 2m & Weather Sat. £49.95
Complete cased versions & special options: details & prices on request. Crystals can be supplied if required; most popular 2 metre frequencies and the currently active Weather satellites are readily available. Crystal prices on request.
★ Mains power supply module: £15.50

GAREX VHF PREAMPLIFIERS

★ Compact size: 34 × 9 × 15mm.
★ Up to 26dB gain.
★ Can be made for any frequency in the range 40-200MHz.
★ 3dB bandwidth ±3MHz (at 145MHz).
★ Uses BF981 (0.7dB NF at 200MHz).
★ Input & output impedance 50 ohms.
★ 1dB compression: +10dBm.
★ Saturated output: +15dBm.
★ Supply voltage 8-17V DC at 5-10mA.

Stock Versions: (fully assembled, aligned & tested boards)
6m, 4m, 2m & Weather Sat. £11.45
Airband 118-136MHz (Reduced Gain) £11.45
Other frequencies in range 40-200MHz £13.75

★ HIGH PERFORMANCE ★ 2 metre PRE-AMPLIFIER

★ 3 Band-pass stages for improved selectivity.
★ 16dB gain with 1dB NF. ★ Switches 35 watts.
★ RF switched (fail-safe action): gas-filled relays.

Assembled, tested £42.50
Boxed Version £49.95
Gas-filled Relays as used in pre-amp: £4.95

MAIN DISTRIBUTORS FOR REVCO ELECTRONICS LTD.

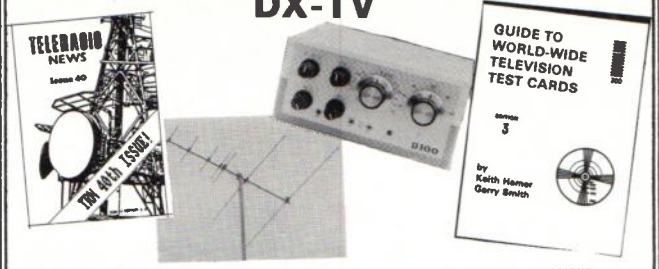
Prices include UK P&P and 15% VAT
Ask for details of our Interest Free Credit

GAREX ELECTRONICS

HARROW HOUSE, AKEMAN STREET, TRING HP23 6AA
TEL: TRING (044282) 8580
and CHEDDINGTON (0296) 668684

Callers by appointment only

DX-TV



★ DX-TV AERIALS – VHF and UHF ★ MASTHEAD AMPLIFIERS ★ DISTRIBUTION EQUIPMENT ★
★ D-100 CONVERTER SYSTEMS ★ TECHNICAL PUBLICATIONS – DX TV ★
★ SATELLITE TV BOOKS ★ VIDEOS – Propagation and How to DX ★
★ AERIAL HARDWARE for DIY construction ★

GUIDE TO WORLD-WIDE TELEVISION TEST CARDS – Edition 3 is now available featuring the most up-to-date selection of pictures with over 200 test cards, clocks, captions and news intro's etc, plus lots of additional information to help you identify your DX-TV reception. Price: £4.95

TELERADIO NEWS is a DX-TV magazine available by subscription. Issue 40 looks at F2 TV DX in the UK, offset frequencies, cancelling unwanted signals, USA 30-50MHz users, African Band I TV, a TV DX crystal calibrator, NICAM stereo*plus* news and logs from around the world. Price: £6 for 6 bi-monthly issues.

TV-BILDKATALOG (2nd Edition) – A detailed guide to European test cards and captions plus useful information with maps, etc. Price: £8.95

TELERADIO NEWS DATA FILE (BAND I/II) – Lots of useful info about channels and systems. It includes a European photo guide with test cards, clocks, etc. There's also a handy Band I/II transmitter map with a list of TV stations you're likely to encounter via SpE. Price: £5.99

"DE-LUXE" D-100 DX-TV CONVERTER SYSTEM (Reviewed in *Television*, Dec. '88 issue).
★ Multi-system sound via an FM radio ★ Wide and narrow IF bandwidth selection
★ VHF/UHF – covers virtually every terrestrial TV channel you're ever likely to encounter! Includes NZ Ch1 (45.25MHz), special Eastern-bloc channels in Band II, 70cm ATV – even Ch. A80/E72 for AFN-TV Soesterberg from the Netherlands
★ Instructions and systems map of Europe supplied. Price: only £89.99

VF-406 DX-TV ARRAY – A compact but efficient array with wideband coverage of Bands I and III (see inset photo) ★ Separate download outputs ensure maximum efficiency enabling individual filtering/amplification options. Price: £27.95

VF-406 with Fringe Electronics Band III mast-head amp. (20dB gain and 1.8dB noise figure) £38.95.
Amplifier also available separately at £13.45
Recommended PSU: P1215 £13.45. ..... P1215/2 (Twin output – feeds 2 TV's) £15.45

3-ELEMENT BAND I ARRAY – Covers channels E2 to E4. Price: only £24.95

★ WE CAN SUPPLY A WIDE RANGE OF VHF & UHF DX AERIAL SYSTEMS AND ACCESSORIES ★
Send two First Class stamps (or 3 IRC's) for our full product range.

All prices include UK P&P/carriage. Overseas enquiries welcome.

HS PUBLICATIONS

7 EPPING CLOSE DERBY DE3 4HR ENGLAND
Tel: 0332 381699

Items normally despatched within 10-14 days. Callers by arrangement only.

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

SEEN & HEARD

Fig.1. Vintage technical book


Fig.2. India


Fig.3. Norway


Fig.4. West Germany

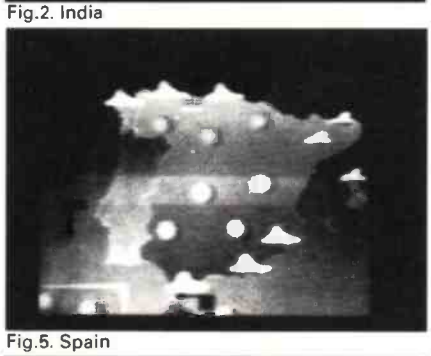


Fig.5. Spain


Fig.6. Spain

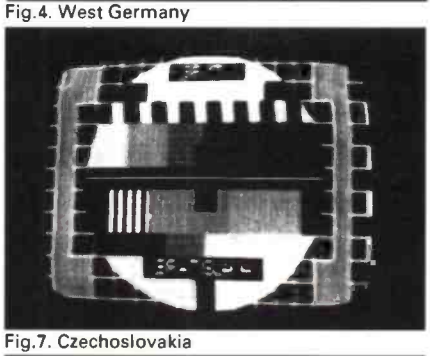


Fig.7. Czechoslovakia


Fig.8. Hungary


Fig.9. Austria

Fig.10. France

Fig.11. Italy

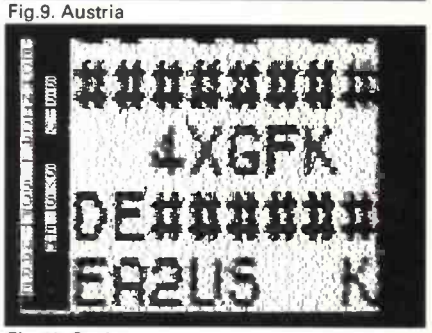


Fig.12. Spain

Simon Hamer (New Radnor) caught a glimpse of Iceland (RUV Island) on April 15 and during a longer opening on May 5, he received the news from Italy (TG-1) and the USSR (BPEMR) and logos from Spain's TVE. While a Sporadic-E disturbance was in progress on the 6th Simon saw *Zgit Im Bild* from Austria (ORF-FS1) on Chs. E2A (49.75MHz) and E4, news (Zpravy) and (Taggesshau) from Czechoslovakia (CST-1) and West Germany (ARD) on Chs.R1/2 and E2/3/4 respectively, adverts from Hungary (MTV1) on Chs. R1/2, a test-card from Sweden (SVT1 Kanal-1 Sverige) on Ch. E2 and programmes from Denmark (DR), Norway (NRK) and Yugoslavia (JRT-1 ZAGREB) on Chs. E3 and 4.

In addition, Simon received "pings" of test cards, via meteor trail reflection, from Czechoslovakia and the USSR on April 21 and Sweden on May 7. Neil Purling also reported seeing a "ping" of test-card from Poland (TVP) on Ch. R1 on May 2, and, via Sporadic-E at 1615 on the 5th he watched a music programme, followed by an episode of *Fraggle Rock*, from TVE. "The Spanish broadcast was received using my Triax pre-amp and D100 converter feeding a Pye colour set," said Neil, adding, "the D100 gives very good gain when set on narrow i.f. bandwidth compared to the wide setting."

Between April 15 and May 10, **Edwina** and **Tony Mancini** (Belper) received clocks and logos from West Germany (ARD, ARD/ZDF, Bayern Studio) and Italy (RAI UNO), logged test-cards from Czechoslovakia (CST-1), West Germany (ARD SWF-Baden and NDR1), Holland (PTT-NED1), Iceland (RUV Island), the Norwegian regionals (Bremanger, Kongsberg and Melhus), Poland (TVP1), Sweden (SVT Kanal-1) and programmes, sometimes in colour, from Hungary (MTV1), Portugal (RTP/1) and Spain (TVE1/2).

Tropospheric

A moving weather system caused a weak opening on April 21 when I logged fluctuating negative pictures, with much fading, from France at the lower end of Band III both at home and while portable near Goodwood.

The slightly varying high pressure, combined with a spell of fine and often warm weather from late April to mid-May, produced some interesting results in the v.h.f. and u.h.f. TV bands. I received pictures from France and Belgium, with a chimney-mounted, horizontal dipole feeding my D100 converter and JVC3060 receiver at 1800 on May 2, 1430 on the 3rd and 0900 on the 7th. Several u.h.f. channels suffered from co-channel interference overnight on May 1/2. As dawn approached and the sun was rising on the 5th, the co-channel interference was getting stronger. By careful tuning at 0500 I received a strong colour picture and sound from Anglia TV on Ch. 21. I also received a strong, negative picture, on Ch. E11, from Sissinghurst Castle car-park at 1415 on May 9.

John Woodcock (Basingstoke) received Canal+ (France) at times in Band III. David Glenday watched unidentified test-cards co-channelling on Chs. E27 and E43 with transmissions from Craigkelly and Black Hill at 1000 on May 2, received

SEEN & HEARD

a jazz programme, logo and clock-caption from Denmark (TV2, Hedensted) on Ch. E30 between 2100 and 2319 on the 4th and co-channel interference on the signal from Black Hill, Ch. E43, at 1050 on the 5th. David found a mystery on the 2nd when, at 0955, an unidentified PM5544 test-card appeared on Ch. E30. "It was strong colour and had no identification whatsoever, with top and bottom ident panels blank. I phoned **Garry Smith** (Derby) and he said it was probably radiated by Nederland 3 (Lopik)," said David.

Despite it being very directional, Edwina and Tony are delighted with the performance of their new Antiference 18-element log periodic u.h.f. antenna. This is matched to a Fringe 1229 mast-head amplifier and although the pictures are poor, under the worst conditions, they can now expect daily signals from Welsh S4C. During this reporting period, they also received pictures in Band III from Canal+ on April 15, 18, 19, 21, 24, May 2, 5, 7, 8 and 10.

"I had a XG-8 installed on a rotator recently for reception of the locals (Moel-y-Parc, Winter Hill and The Wrekin) and had earmarked Chs. 40 and 43 as possible channels to watch," wrote **Clive Grey** from Wirral. Clive reports that the atmospheric pressure was rising on May 4 and 5 and by the evening of the 5th, he noticed that pictures from Central TV (presumably Sutton Coldfield) were appearing on Ch. 43, confirmed by The Wrekin's on Ch. 23. He made a mental note of this and during the following afternoon, Clive switched on and saw pictures that were not identical to The Wrekin's. However, a quick turn of the rotator provided Ireland's RTE2 in full colour, with telextext, at a distance of some 240km. "I think this is Cairnhill. RTE1 was less good then, but as the evening wore on, the two Irish stations improved all the time, with the pressure at 1032mb (30.5in)," said Clive who had no problem resolving the teletext pages of Aertel. Although the pressure was down to 1027mb (30.35in) on the 7th and most signals had collapsed, he found CH4 from Divis, confirmed by adverts for Belfast theatres, was better than ever on Ch. 21. Clive quite thought the fun was over, but at 1930 while watching BBC2, from The Wrekin on Ch. 33, the whole picture was swamped by another transmitter broadcasting the news from RTE2. "I often monitor the v.h.f. signal from Dublin on Ch. IJ when the pressure is high, but I'd never seen anything like this before," said Clive. A super observation Clive, it is the unexpected that puts the thrill in DXing.

Satellite Reception

Les Jenkins (Godalming) has installed a Bush SR2000 tuner, fed from a 650mm "dish" antenna and by May 4 had logged RTL, SAT1, 3SAT, TV5 and Worldnet from the satellite Eutelsat 1. "We are able to receive Galavision," said the Mancinis who explained that this is from Mexico and aimed at Spain and is on for 24hrs. My thanks are due to Edwina and Tony who told me that Eurosport is using the Dutch (PTT Telecom) channel, on lease, for the recording of events that are transmitted later in the day and for including the following list of information: 3 SAT - German (ORF and ZDF); Filmnet - English scrambled; SAT-1 -German; RTL Plus -German as the programmes on Ch.E7; TV5 -French; Super -Dutch based English; Eurosport -English at present, due to go German on Eutelsat later this year, remaining English on Astra; TVE-1 -Spanish as per normal land-based; RAI Uno and RAI Due -as per land-based; Teleclub - private Swiss film channel in German, now scrambled; EBC -European Broadcasting Commision, in English but Swiss origin and uses Teleclub channel before they open.

SSTV

In Worthing, **Steve Charles** uses a Lowe HF-125 receiver, Yaesu FRT-7000 a.t.u. and 20m long wire antenna for the reception of SSTV signals. These are decoded with Technical Software's RX4 program on a Sinclair 48K Spectrum computer and fed to an Alphacom 32 printer for hard-copy. Between April 22 and May 7, he copied pictures around 14.230MHz from stations in Austria Fig. 9, France Fig.10, Hungary, Israel, Italy Fig.11, Poland, Spain Fig.12 and Yugoslavia. Don't forget, I am always pleased to hear about your reception of slow scan television pictures and the equipment that you use.

The next three deadlines are:
June 19, July 17 & September 18

LONG MEDIUM & SHORT

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

Once again the holiday season is here and no doubt "getting away from it all" will be foremost in the minds of many DXers, but do remember to take a small portable radio and a pair of headphones with you because exploring the bands from a new location can be both interesting and rewarding. When you return, why not send along your holiday log for publication in this series so that other DXers can share your your experiences?

Long Wave DX

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

The long wave station being built in the Irish Republic is nearing completion and test transmissions will commence in July on 254kHz. The station is a joint venture between RTE and Radio Luxembourg and is due to be fully operational by September using the name "Atlantic 252". When the third stage of the new l.w. band plan is implemented on 1 February '89 it will move to 252kHz.

When Atlantic 272 commences operation co-channel interference may arise in some areas of the UK because the broadcasts in Arabic from Tipaza, Algeria (1500/750kW) on 254kHz are generally well received here during the day. Listening in Aldershot, **Mark Selby** rated them as 33343 at 0840 and **Phil Townsend** noted them as SIO 343 at 1700 in London. This frequency is also used by Lahti, Finland (200kW) and two stations in the USSR, namely Yerevan (150kW) and Kazan (150kW), which are sometimes heard here at night.

In Javea, Spain **Jurgen Thiel** has been experimenting with a 1m square loop which he has attached to a ceiling joist so that it can be easily rotated. It has enabled him to hear for the first time Topolna, Czechoslovakia 272, rated as 44554 at 1100 and Moscow, USSR 263, noted as 22552 at 2130. The directional properties are adequate to separate the 1000kW transmissions from Ouargla, Algeria on 198 from BBC Radio 4, radiated by Burghead (50kW), Droitwich (400kW) and Westerglen (50kW) and to his surprise he found they could be used to log Etimesgut, Turkey on 198 as 23552 at 1530.

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

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

DXers:
A: Leo Barr, Sunderland.
B: Lez Chipperfield, Stourbridge.
C: Simon Hamer, New Radnor.
D: George Millmore, Wootton, I.O.W.
E: Mark Selby, Aldershot.
F: Tim Shirley, Bristol.
G: Jurgen Thiel, Javea, Spain.
H: Phil Townsend, London.
I: Max Wustrau, Bedford.

MW Transatlantic DX

Relatively poor conditions have been noted during the last few weeks and of course the long hours of daylight are not conducive to this aspect of our hobby. The broadcasts from CJYQ in St.Johns, Newfoundland 930 often provide a pointer to conditions and the latest report from **Jim Willett** (Grimsby) indicates that their signal peaked SIO 322 around 0100. Despite the poor conditions, Jim managed to log some interesting signals - all rated as 222.

In Wakefield, **Mark Thompson** put his new JRC NRD 525 receiver to the test during several nights, but he was very disappointed to find the conditions so poor. He logged CJYQ as SIO 233 at 0358 and Radio Globo via Rio, Brazil 1220 as 222 at 0357. During early April Mark added WSSH in Boston, MA 1510 to his growing list of DX and rated their signal as 232 at 0400. **Steve Whitt** (Ipswich) informs me that WSSH has now ceased operation under that callsign.

Instead of incurring the loss of sleep associated with transatlantic DXing, **Ron Pearce** has been employing a time switch controlled receiver and cassette tape recorder to monitor specific DX frequencies in Bungay during the night! After studying the charts in this series he decided to monitor 1.220MHz at 0230 and he was delighted to find that the broadcasts from Radio Globo via Rio, Brazil had been recorded at 0235!

A QSL letter along with two hats, mugs and stickers has been received from CFNB in Fredericton, NB by **Tim Shirley** to confirm his reception of their broadcasts on 550 at 0600 in Bristol during February. (See Station Addresses)

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

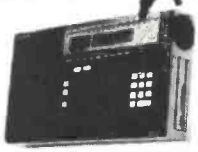
Carr. Free

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 /220-280MHz/ 300-380MHz/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

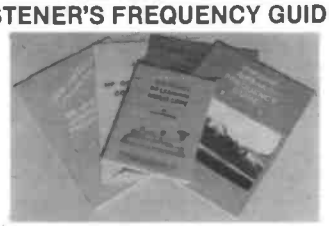
LISTENER ANTENNAS

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)**
AN3 3 way coax switch	**£7.95 (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 HF 225 Short wave	**£395.00**
FRG9600 Scanner 60-950MHz	**£509.00**
IC-R7000 Scanner 25-2000MHz	**£957.00**
ADR 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.** New edition available end of June.

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.**

SHORTWAVE LISTENERS CONFIDENTIAL 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. **£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! Large SAE please.

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

SEEN & HEARD

Other MW DX

Having constructed a giant 2m square m.w. loop, Jurgen Thiel found he could only use it during the day as it was just too awkward to use in his listening post. Signal levels from stations in the UK proved to be almost as good as those obtained with his Beverage antenna, which at one time extended to 350m but local objectors forced him to reduce it to 240m. No new stations were logged with the giant loop, so he has now reverted to his 1000mm by 600mm loop which has a 40673 m.o.s.f.e.t. pre-amp. He can usually receive BBC Radio 1 on 1053* clearly during daylight, but sometimes the signals from the UK are inexplicably poor. (*Shared by Burghead (20kW), Droitwich 150kW, Postwick 10kW, Start Point 100kW and lower power relays)

After dark, many of the broadcasts from Spain reach the UK well via sky wave paths. Fifteen of them were logged by **Martyn Williams** in Sunningdale. Surprising as it may seem, **Ted Walden-Vincent** picked up the 10kW broadcasts from SER Radio Bilbao on 990 while using a Walkman Radio in Great Yarmouth! The performance of this little set seems to be quite remarkable, as it will pull in many other European stations too.

The broadcasts from RTE-1 via Mercia, Spain on 855 (125kW) have also been reaching **Dick Moon** in George, S.Africa around 0310UTC! Some of the low power transmissions from Australia were logged by him between 1700 and 1800. They stemmed from 6DL Dalwallinu 531 (10kW); 6WF Perth 720 (50kW); 2BA Bega 810 (10kW); 6GN Geraldton 828 (2kW); 6NA Narrogin 918 (2kW); also 6KY in Perth 1206 (2kW).

MW Local Radio DX

"Local radio DXing has been super with several new stations logged," writes Mark Thompson. He achieved his ambition by logging BBC Radio Cornwall via Redruth 630 (2kW) and Bodmin 654 (0.5kW) at 0600. Much to his surprise he also heard ILR Plymouth Sound via Plumer Barracks 1152 (0.32kW) at 1830. In Morden, **Sheila Hughes** added two new ones to her list, namely ILR Devon Air Radio via Pearce's Hill 666 (0.34kW) and BBC Radio York via Fulford 666 (0.8kW).

Up in Forfar, **Stewart Russell** heard, for the first time, ILR Chiltern Radio via Kempston 792 (0.27kW); Radio Trent via Quarndon 945 (0.2kW) and Invicta Radio via Hoo 1242 (0.32kW), which is the most southerly station he has heard to date. The transmissions from BBC Greater London Radio (GLR) via Brookmans Park 1458 (50kW) have been attracting the attention of **Chris Nykiel** in Leeds, as they seem to peak up about 100 minutes before dusk.

BBC Radio Gloucestershire 603 (0.1kW) and ILR Radio Wyvern via Breinton 954 (0.16kW) were heard for the first time by **Louis Whitfield** in Luton. He rated the broadcasts from the new BBC Wiltshire Sound via Swindon 1368 as 32233 at 1712. Their transmissions via Lacock 1332 and Swindon 1368 have been reaching **Lez Chipperfield** in Stourbridge.

Freq kHz	Station	ILR BBC	Power (kW)	DXer
585	R. Solway	B	2.00	N,O,R
603	Invicta Sound(Coast)	I	0.10	E,I,J,M,O,P,S,T
603	R. Gloucester	B	0.10	B,E,K,M,O,S,T
630	R. Bedfordshire	B	0.20	B,D,I,J,K,M,O,P,T
630	R. Cornwall	B	2.00	E,O
657	R. Clwyd	B	2.00	B,D,E,I,J,O,Q,R,S,T,U*
657	R. Cornwall	B	0.50	O
666	DevonAir	R	10.34	D,E,K,N,S,T
666	R. York	B	0.80	D,I,J,O,S,T
729	BBC Essex	B	0.20	E,I,J,K,M,O,S,T
738	Hereford/Worcester	B	0.037	B,O,T
756	R. Cumbria	B	1.00	L,O,R
756	R. Shropshire	B	0.63	B,E,J,K,O,R,S,T
765	BBC Essex	B	0.50	B,E,I,J,K,M,N,O,P,S,T
774	R. Kent	B	0.70	E,I,J,K,M,P,Q,S,T
774	R. Leeds	B	0.50	O,R
774	Severn Sound	I	0.14	B,O
792	Chiltern R	I	0.27	B*,E,I,J,K,L*,M,O,P,Q,T
792	R. Foyle	B	1.00	O
801	R.Devon	B	2.00	B,E,J,K,T
819	Hereford/Worcester	B	0.037	B,O
828	2CR	I	0.27	E
828	R. WM	B	0.20	B,O
828	R. Aire	I	0.12	O,R
828	Chiltern R	I	0.20	I,J,K,M,O,P,T
837	R. Cumbria	B	1.50	L,O,R
837	R. Furness	B	1.00	L,R
837	R. Leicester	B	0.45	B,D,E,I,J,K,M,O,P,T
855	R. Devon	B	1.00	E
855	R. Lancashire	B	1.50	O,R,T
855	R. Norfolk	B	1.50	C,D,I,K,O,S,T
873	R. Norfolk	B	0.30	D,E,I,J,K,M,O,S,T
936	Brunel R. (GWR)	I	0.18	B,D,E,I,K,M,O,S,T
945	GEM-AM (R. Trent)	I	?	B,K,L*,O,Q,S,T,U*
954	DevonAir R	I	0.32	E,O,T
954	R. Wyvern	I	0.16	B,O,S,T
990	WABC (Beacon R.)	I	0.09	B,O,S,T
990	R. Devon	B	1.00	D,E,J
990	Hallam R	I	0.25	O
999	Red Rose R	I	0.80	A,L*,O,R
999	R. Solent	B	1.00	D,E,I,J,K,M,S,T
999	GEM-AM (R. Trent)	I	0.25	O,S,T
1026	R. Cambridgeshire	B	0.50	D,I,J,K,M,O,P,Q,S,T
1026	Downtown	RI	1.70	R
1026	R. Jersey	B	1.00	E,M,N,O*
1035	R. Kent	B	0.50	D,E,J,K,M,P,S,T
1035	NorthSound R	I	0.78	L
1035	R. Sheffield	B	1.00	O
1107	Moray Firth R	I	1.50	L
1107	R. Northampton	B	0.50	B*,D,E,I,J,K,M,O,S,T
1116	R. Derby	B	1.20	B,D,S,T
1116	R. Guernsey	B	0.50	E,F,K,M,O*,T
1152	BRMB (Xtra-AM)	I	3.00	B
1152	R. Broadland	I	0.83	O,S
1152	R. Clyde	I	3.60	L
1152	LBC	I	23.50	E,I,J,K,M,P,S,T
1152	Metro R. (GNR)	I	1.80	A,R
1152	Piccadilly R	I	1.50	O,R
1152	Plymouth Sound	I	0.32	O*
1161	R. Bedfordshire	B	0.10	H,I,J,D,T
1161	Brunel R. (GWR)	I	0.16	B,E,I,K,M
1161	R. Sussex	B	1.00	D,E,K,M
1161	R. Tay	I	1.40	B*,L,O*
1161	Viking Gold	I	0.35	J,N*,O,R,T
1170	R. Orwell	I	0.28	J,T
1170	Signal R	I	0.20	B,O,R
1170	TFM Radio (GNR)	I	0.32	O,R
1170	Ocean Sound	I	0.12	D,E,K,M
1242	Invicta Sound(Coast)	I	0.32	E,H,I,J,K,M,O,S,T
1251	Saxon R	I	0.76	D,E,H,I,J,K,N*,O,S,T
1260	Brunel R. (GWR)	I	1.60	B,D,E,K
1260	Marcher Sound	I	0.64	N*,O,R
1260	GEM-AM Leicester	I	0.29	D,I,O,S,T
1260	R. York	B	0.50	J,O
1278	Pennine R	I	0.43	E,N,O
1305	R. Hallam	I	0.15	O,T
1305	Red Dragon R	I	0.20	B,E,J,K,T
1323	R. Bristol	B	0.63	O,T
1323	Southern Sound	I	0.50	D,E,J,K,M,N,S,T
1332	Hereward R	I	0.60	C,O,J,K,M,N,S,T
1332	Wiltshire Sound	B	?	B
1359	Essex R	I	0.28	I,J,K,O,S,T
1359	Mercia Snd(Xtra-AM)	I	0.27	B,O,T
1359	Red Dragon R	I	0.20	J
1359	R. Solent	B	0.85	E
1368	R. Lincolnshire	B	2.00	E,J,O,T
1368	R. Sussex	B	0.50	E,K,M,S
1368	Wiltshire Sound	B	?	B,I,S
1431	Essex Radio	I	0.35	D,H,I,J,O,P,S,T
1431	Radio 210	I	0.14	E,J,K,M,T
1449	R. Cambridgeshire	B	0.15	E,H,J,O,Q,S,T
1458	R. Cumbria	B	0.50	O
1458	R. Devon	B	2.00	E
1458	GLR	B	50.00	E,G,I,J,K,M,P,S,T
1458	R. Newcastle	B	2.00	L,O
1458	GMR	B	5.00	O,R
1458	Radio WM	B	5.00	R,T
1476	County Sound Gold	I	0.50	B*,E,H,I,J,K,M,O,S,T
1485	R. Humberside	B	1.00	J,O,T
1485	R. Merseyside	B	1.20	O,R
1485	R. Oxford	B	0.50	B*,I,J,S,T
1485	R. Sussex	B	1.00	D*,E,K,M
1503	R. Stoke-on-Trent	B	1.00	B*,E,J,L*,D,R,T
1521	R. Mercury	I	0.64	D,E,J,K,M,T
1521	R. Nottingham	B	0.50	J,O,S,T
1530	R. Essex	B	0.15	D,E,I,J,R
1530	Pennine R	I	0.74	H,O,R
1530	R. Wyvern	I	0.52	B,T
1548	R. Bristol	B	5.00	E
1548	Capital Gold	I	97.50	E,I,J,K,M,N*,P,S,T
1548	R. City	I	4.40	R
1548	R. Cleveland	B	1.00	O
1548	R. Forth	I	2.20	L
1548	R. Hallam	I	0.74	O,T
1557	R. Lancashire	B	0.25	O,R
1557	Chiltern R.N'hants	I	0.76	H,I,O,T
1557	Ocean Sound	I	0.50	E,J,K,M,O*
1584	R. Nottingham	B	1.00	E,I,J,O,S,T
1584	R. Shropshire	B	0.50	B,O
1584	R. Tay	I	0.21	L
1602	R. Kent	B	0.25	D,E,J,K,M,T

A: Leo Barr, Sunderland
B: Lez Chipperfield, Stourbridge.
C: Francis Hearne, Ilford.
D: Sheila Hughes, Morden.
E: George Millmore, Wootton, I.O.W.
F: Dennis Monger, Falmouth.
G: Chris Nykiel, Leeds.
H: Roy Patrick, Derby.
I: Peter Perkins, Hemel Hempstead.
J: Christian Pritchard, Cambridge.
K: Richard Radford-Reynolds, Guildford.
L: Stewart Russell, Forfar.
M: Mark Selby, Aldershot.
N: Tim Shirley, Bristol.
O: Mark Thompson, Wakefield.
P: Phil Townsend, London.
Q: Ted Walden-Vincent, Great Yarmouth.
R: Neil Wheatley, Lytham St.Anne.
S: Louis Whitfield, Luton.
T: David Wratten, Cambridge.
U: Max Wustrau, Bedford.

Reporting from Newcastle-on-Tyne, **Neil Wheatley** informs me that Great North Radio (GNR) is the name of a new service from ILR Metro Radio via Greenside 1152 (1.8kW) and TFM Radio via Stockton 1170 (0.32kW).

A relatively little known receiver, namely the Sony ICF-7601 was used by **Peter Perkins** to compile his extensive list for the chart. Writing from Wootton, IOW **George Millmore** says he is very impressed with the directional properties of his new Tatung MR-7602 portable, which have enabled him to separate some stations on shared frequencies and add them to his list.

Short Wave DX

From time to time solar flares have resulted in sudden bursts of noise and even complete fade-outs on the h.f. bands, but such events are to be expected as we continue to climb the steep slope leading to the peak of the present sunspot cycle. During most days however, many broadcasts from all over the world have been well received here.

Generally excellent conditions have been noted in the 25MHz (11m) band and the nine broadcasters taking advantage of them have now been joined by the Voice of the UAE in Abu Dhabi. Their broadcasts on 25.900 (Ar 0800-1600) were rated as 55544 at 1529 by **Paul Hawkins** in Cinderford.

The daily broadcasts to Europe from Radio RSA in Johannesburg, S.Africa 25.790 (Ger 0900-0956; Eng 1400-1556) are well received here, often peaking the 55555 noted at 1445 by **Chris Shorten** in Norwich! In contrast, the 6kW transmissions from Radio For Peace International, Costa Rica 25.945 (Sp, Eng to E.USA, Europe 1520-2315) are often weak. In Wallsend, **David Edwardson** rated them as 24432 at 1940 and the latest report from **Alan Roberts** in Quebec, Canada quoted 24443 at 1515.

SEEN & HEARD

Freq MHz	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2015	F
2.485	ABC Katherine	Australia	2106	I
3.200	TWR	Swaziland	0455	L
3.210	R.Mozambique	Mozambique	1900	R
3.215	R.Orange	S.Africa	1825	C
3.250	R.Luz Y Vida	Honduras	0300	J
3.255	BBC via Maseru	Lesotho	1832	C
3.270	SWABC 1, Namibia	S.W.Africa	1930	H
3.320	R.Orion	S.Africa	0100	R
3.330	R.Kigali	Rwanda	1920	H
3.365	GBC Radio 2	Ghana	1925	J,N,R
3.400	Reykjavik	Iceland	1915	J
3.905	AIR Delhi	India	1805	J,L
3.915	BBC Kranji	Singapore	1930	D,H,K,L,R
3.945	RRI Tanjungkarang	Indonesia	2045	F
3.955	BBC Daventry	England	2100	E,J,P,Q
3.965	RFI Paris	France	2235	D,H,M,Q,S
3.970	R.Buca	Cameroon	0455	R
3.970	RFE Munich	W.Germany	2202	Q
3.980	VOA Munich	W.Germany	1950	H,M
3.985	R.Beijing, China	via SRI Berne	2110	D,K,Q,Q
3.985	SRI Berne	Switzerland	2010	J,P,S
3.995	DW Cologne (Julich)	W.Germany	2221	J,M,Q,S
4.080	R.Ulan Bator	Mongolia	2300	R
4.220	PBS Xinjiang	China	2334	B
4.500	Xinjiang	China	2334	B
4.719	RRI	Indonesia	2230	C
4.735	Xinjiang	China	2334	B
4.755	Caracol Neiva	Columbia	0434	B,G,J,L,R
4.760	ELWA Monrovia	Liberia	1950	H
4.765	R.Moscow	via Cuba	0433	L
4.770	FRCN Kaduna	Nigeria	0500	R
4.780	RTD	Djibouti	1915	R
4.785	R.Baku	USSR	1915	H,R
4.790	R.Atlantida	Peru	0350	G,J
4.790	TWR Manzini	Swaziland	1840	C
4.795	R.Moscow	USSR	2100	A,D,E,H,K
4.795	R.Moscow, Ulan Ude	USSR	0327	L
4.800	LNBS Lesotho	Maseru	0700	C
4.810	R.Yerevan	USSR	1950	H,J
4.815	R.diff TV Burkina	Duagadougou	1910	B,H
4.820	R.Botswana	Botswana	1846	C
4.820	La Voz Evangelica	Honduras	0300	L,R
4.825	R.Ashkhabad	USSR	2225	S
4.830	Africa No.1	Gabon	1900	A,D,H,J,K,L, N,O,S
4.830	R.Tachira	Venezuela	0315	G,J,L

Freq MHz	Station	Country	UTC	DXer
4.832	R.Reloj	Costa Rica	0331	L
4.835	R.TV Acaua, Teresina	Belgium	2231	S
4.835	RTM Bamako	Mali	2010	B,H,J,K
4.845	RTM Kuala Lumpur	Malaysia	2320	C,F
4.845	ORTM Nouakchott	Mauritania	1930	B,H,J,K,L
4.850	Prov.Uige	Angola	0002	B
4.850	R.Yaounde	Cameroon	1950	H,J,K,L
4.850	R.Capital, Caracus	Venezuela	0300	J,L,R
4.855	R.Sana Yemem	Yemen	2100	E
4.865	V of Cinaruco	Colombia	0406	B,G,J,L
4.870	R.Cotonou	Benin	1840	H,J,R
4.880	SABC Radio 5	S.Africa	1945	H,J
4.885	Voice of Kenya	Kenya	1920	H,J,L,N,R
4.890	RFI Paris	via Gabon	0415	G
4.895	Voz del Rio Arauca	Colombia	0300	J
4.895	R.Moscow, Kalinin	USSR	0229	M
4.905	R.Araguaia	Brazil	2300	R
4.905	R.Nat.N'djamena	Chad	1840	H,J,L
4.910	R.Zambia, Lusaka	Zambia	1817	H,J
4.915	R.Ghana, Accra	Ghana	1920	H
4.915	Voice of Kenya	Kenya	1920	H
4.920	R.Quito	Ecuador	0420	B,G
4.925	R.Nacional, Bata	Eq.Guinea	2100	H
4.925	R.Mozambique,Maputo	Mozambique	0555	C
4.935	Voice of Kenya	Kenya	1835	B,H,J,K,O
4.965	SWABC Windhoek	S.W.Africa	1825	L
4.965	R.Zambia, Lusaka	Zambia	1940	H
4.970	R.Rumbos, Caracas	Venezuela	0430	R
4.975	R.Uganda, Kampala	Uganda	1915	H,L,R
4.977	R.La Hora, Cuzco	Peru	0330	L
4.980	Ecos del Torbes	Venezuela	0300	R
4.990	AIR New Delhi	India	0002	C
4.990	FRCN Lagos	Nigeria	0507	L
5.005	R.Nacional, Bata	Eq.Guinea	1915	H,K,L
5.015	R.Moscow Vladivostok	USSR	1945	H
5.020	ORTN Niamey	Niger	1915	H
5.025	R.Rebelde, Habana	Cuba	0339	L
5.025	R.Uganda, Kampala	Uganda	2030	H
5.030	R.Impacto	Costa Rica	0550	L
5.035	R.Bangui	C.Africa	2115	H
5.045	R.Cultura do Para	Brazil	0335	F
5.045	R.Togo, Lome	Togo	1915	B,H
5.050	R.Tanzania	Tanzania	1839	F,L
5.055	Faro del Caribe	Costa Rica	0523	L
5.057	R.Tirana Gjirokaster	Albania	2035	D,H,K,L
5.065	R.Candip, Bunia	Zaire	1915	H
5.095	R.Sutatenza, Bogata	Colombia	0351	G,L

DXers:
A: Leo Barr, Sunderland.
B: David Edwardson, Wallsend.
C: P.R.Guruprasad, Botswana.
D: Sheila Hughes, Morden.
E: Cyril Kellam, Sheffield.
F: Dick Moon, George, South Africa.
G: John Nash, Brighton.
H: Fred Pallant, Storrington.
I: John Parry, Northwich.
J: Christian Pritchard, Cambridge.
K: Richard Radford-Reynolds, Guildford.
L: Kenneth Reece, Prenton.
M: Mark Selby, Aldershot.
N: Alan Smith, Northampton.
O: Mal Tedds, Nottingham.
P: Ted Walden-Vincent, Gt.Yarmouth.
Q: Neil Wheatley, Newcastle-upon-Tyne.
R: Jim Willett, Grimsby.
S: Max Wustrau, Bedford.

DXers:
A: Simon Hamer, New Radnor.
B: Ron Pearce, Bungay.
C: Tim Shirley, Bristol.
D: Mark Thompson, Wakefield.
E: Jim Willett, Grimsby.

Dick Moon reports that the 11m broadcasts to Africa are reaching their target well! He rated RTB Belgium 21.645 as 44444 at 1105; Radio DW Cologne, W.Germany 25.740 as 44433 at 1235; BBC via Daventry, UK 25.750 as 33333 at 1245; RFI Paris, France 25.820 as 33333 at 1210. In Botswana, **P.R.Guruprasad** logged Radio Norway Int., Oslo 25.730 as 35433 at 1455. As expected, the reception of these transmissions in the UK, along with those from Radio Denmark, Copenhagen 25.850 and BRT Brussels, Belgium 26.050 is generally poor.

From time to time the **21MHz (13m)** broadcasts to the S.Pacific area from Radio Australia via Shepparton 21.740 (Eng 2200-0730) have been audible in the UK. At best, **Kenneth Reece** rated their signal in Prenton as 35333 at 0556. They have also been reaching Botswana, where P.R.Guruprasad rated them as 44444 at 0620.

Some of the broadcasts to other areas have also been logged in the UK: Radio Prague, Czechoslovakia 21.705 (Eng, Cz to SE.Asia 0730-0930) noted as 44454 at 0800 by **Christian Pritchard** in Cambridge; Vatican Radio, Rome 21.485 (Fr, Eng, Port to Africa 1100-1220) 45554 at 1120 by **John Parry** in Northwich; RBI via Nauen, W.Germany 21.540 (Ger, Hi, Eng to SE.Asia 1130-1500) 34433 at 1155 by **Darran Taplin** in Tunbridge Wells; BBC via Limassol. Cyprus 21.470 (Eng to E.Africa 0500-1615) heard at 1200 by Tim Shirley; Radio Moscow via Yerevan, USSR 21.450 (Eng to N.Africa 0500-1600) 45445 at 1243 by **Max Wustrau** in Bedford; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap to Middle East 1500-1700), noted as "very clear" at 1510 by Ted Walden-Vincent; BRT Brussels, Belgium 21.810 (Eng, Fr to Africa 1530-1700) SIO 333 at 1530 by **Cyril Kellam** in Sheffield; RTB via Wavre, Belgium 21.460 (Ger to Africa 1600-1645), noted as "poor" during their interval signal on a Marimba at 1545 by **John Coulter** in Winchester; WCSN Scotts Corner, Maine 21.640 (Eng, Fr, Ger to W.Africa 1600-1755) SIO 555 at 1725 by **Alan Smith** in Northampton; Radio Nederlands via Bonaire, Ned.Antilles 21.685 (Eng, Fr, Du to W.Africa 1830-2125) 55555 at 2106 by **Richard Radford-Reynolds** in Guildford.

A number of broadcasters beam their programmes in a variety of languages towards Europe during the day. They include UAE Radio Dubai 21.605 (Ar, Eng 0615-1645) rated as 54444 at 1040 by Chris Shorten; WHRI South Bend, USA 21.840 (Eng 1500-1700) SIO 333 at 1520 by **Philip Rambaut** in Macclesfield; Radio RSA Johannesburg, S.Africa 21.590 (Eng 1400-1556) SIO 444 at 1538 by **Mal Tedds** in Nottingham; WYFR via Okeechobee, Florida 21.615 (Eng, Ger, It 1600-1845) SIO 455 at 1620 by **Kenneth Buck** in Edinburgh; Radio HCJB Quito, Ecuador 21.470 (Cz, Ger, Eng, Sw, Norw, Dan, Fr, Sp 1800-2230) 35444 at 1905 by **David Wratten** in Cambridge.

The **17MHz (16m)** broadcasts from Radio New Zealand, Wellington have been reaching the UK during some mornings. Their programmes in English are beamed to listeners in the Pacific area between 2345-0145 and 0330-0730 on 17.705. During the weekend the gap from 0145-0330 is also used. Listening one morning at 0400, Christian Pritchard rated their signal as 33323, but more often it is poor or non-existent.

Radio Australia use this band to reach listeners in S.Asia via Carnarvon, W.Australia on 17.715 (Eng 0100-0915) and in the C.Pacific area via Shepparton, SE.Australia on 17.795 (Eng 2200-0800). Both transmissions have been audible in the UK, David Edwardson rated 17.715 as 24432 at 0610 and Alan Smith noted 17.795 as SIO 333 at 0550.

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
1010	WINS	New York, NY	0030	E
1210	WCAU	Philadelphia, PA	0100	E
1220	WGAR	Cleveland, OH	0125	E
1500	WTOP	Washington, D.	C0205	E
		Canada		
590	VOCM	St.John's, NF	0130	E
680	CIYQ	Grandfalls, NF	0115	E
750	CKGB	Timmins, ON	0140	E
820	CHAM	Hamilton, ON	0100	C,E
930	CJYQ	St.John's, NF	0115	A,D,E
1070	CBA	Moncton, NB	0200	E
		C.America & Caribbean		
820	XEBA	Guadalajara	0320	E
1570	Atlantic Beacon	Turks & Caicos Ils	0200	E
1610	Caribbean Beacon	Anguilla	0200	E
		South America		
1220	R.Globo	Rio, Brazil	0205	B,D,E

Some of the many broadcasts to other areas were noted in the latest logs: Radio Japan via Yamata, Japan 17.810 (Jap, Eng to SE.Asia 0400-0900) 24232 at 0535 by Kenneth Reece; KYOI Saipan, N.Mariana Islands 17.780 (Eng to E.Asia 0200-0800) 44444 at 0600 by Christian Pritchard; AIR via Delhi, India 17.705 (Eng, Hi to E.India 0830-0940) SIO 333 at 0830 by Alan Smith; WSHB Cyprus Creek, USA 17.855 (Eng to Australia) 44433 at 0840 by Sheila Hughes; Radio HCJB Quito, Ecuador 17.890 (Eng to USA 1200-1600) SIO 111 at 1240 by Philip Rambaut; Voice of Greece, Athens 17.565 (Gr, Eng to USA 1200-1250) 33233 at 1247 by **Garry Judd** in Hayes; RTM Tangier, Morocco 15.595 (Fr,

DEWSBURY ELECTRONICS

G4CLX

IF IT'S KENWOOD IT MUST BE DEWSBURY

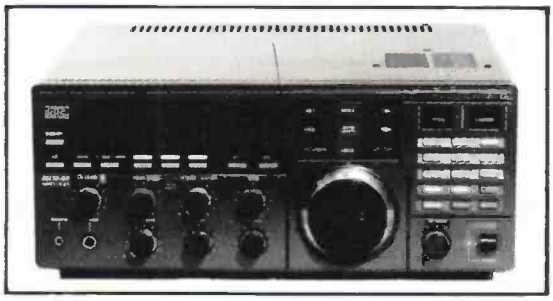
A FULL RANGE ALWAYS IN STOCK

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 – TEN TEC – ICOM – YAESU – WAVECOM BENCHERS
VIBROPLEX – MICROWAVE MODULES – JRC

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228 Fax: (0384) 371228
Telex: 336712 SHELTN G

VISA

Access

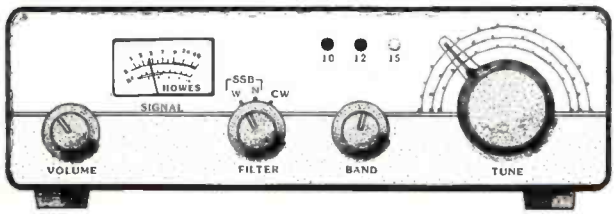
Instant finance available subject to status. Written details on request.

C.M. HOWES COMMUNICATIONS

VISA Access

Mail order to: EYDON, DAVENTRY NORTHANTS NN11 6PT
Tel: 0327 60178

NEW RECEIVER
—Catch the DX on 10, 12 & 15 Metres!



concept receiver featuring DXR10, DCS2 and CSL4 Kits

Now that the sun's activity is high, propagation on the highest frequency shortwave bands is becoming excellent, with many DX stations, and much intercontinental working.

A brand new **HOWES** receiver, the **DXR10** has been developed to give the home constructor the opportunity to get in on the action. This is a three band receiver covering 10, 12 and 15 Metres. The prototype I have been using certainly pulls in the stations in a most impressive manner!

Like our very popular **DcRx** single band receivers, the **DXR10** is designed to be easy to build and within the scope of the beginner, whilst offering an amazingly good level of performance for a simple set. Technical features include a double balanced mixer, bandpass input filtering (which requires no tuning or set up adjustment), active AF filter, and plenty of audio output to drive a loudspeaker or headphones. Suitable for holiday, portable and home station use.

The price is still to be fixed at time of writing this advance information, but it should be **under £30 for the kit.** Ring or write for the exact figure, they should be in stock by the time this advert appears in print.

Some other HOWES KITS:–

ASL5 Dual Bandwidth Filter – worthwhile extra filtering and selectivity for virtually any receiver. Simply connects in line with external 'speaker or headphones.
Kit: £14.90 **Assembled PCB: £22.50**

CSL4 Dual Bandwidth Filter – the same excellent filtering as the ASL5, but designed for internal fitment with our receiver kits. Really sharp selectivity for CW or SSB.
Kit: £9.90 **Assembled PCB: £15.90**

CTU30 Antenna Matching Unit – an ATU for use on all **HF bands and 6M** for receiving or transmitting at up to 30W RF. High quality performance at a sensible price.
Kit: £27.90 **Assembled PCB: £33.90**

DCS2 Relative Signal Strength Indicator – or "S meter" in common parlance! Special **HOWES** custom made meter (see picture), with a two chip driver circuit for use with all our receiver kits. Adds a touch of "class"!
Kit: £7.90 **Assembled PCB + meter: £11.90**

There are over thirty different kits in our range. We have **receivers from £14.80,** and **QRP transmitters from £13.80.** HOWES KITS interlink, so that you can start with, say, a simple receiver and if you wish, expand it into a full transceiver at a later date. Most kits are suitable for the inexperienced constructor, as well as the "old hand"!

If you would like more information on any item, or a copy of our catalogue showing our whole range of kits, simply drop us a line enclosing an SAE. Technical advice and sales are normally available by 'phone during office hours.

All **HOWES KITS** come with full, clear instructions, good quality PCB (drilled, tinned and screen printed with the parts locations), and all board mounted components. Delivery is normally within 7 days.

PLEASE ADD £1.00 P&P to your total order value.

73 from Dave G4KQH, Technical Manager.

dressler
COMMUNICATIONS LTD.

191 FRANCIS ROAD
LEYTON · E10 6NQ · LONDON
TELEX 8953609 LEXTON G
PHONE 01-558 0854 01-556 1415
FAX 01-558 1298

SONY

SONY ICF 2001D £299
76-108 MHz
116-136 AIRBAND
153kHz-29.995MHz
FM - AM - SSB 32 MEMORIES
INC PSU, CARRY STRAP & EARPHONE
Complete ICF2001D system including all above, plus AN1 ..... £349

Sony AIR7 ..... £229
Sony Pro 80-150-kHz, 115MHz-224MHz, AM–FM–SSB £299
Sony AN1 Active Antenna. £55
Sony AN3 Airband Antenna. £53

SONY ICF 7600DS NEW £159
76-108MHz
FM/AM/SSB
76-108MHz
153kHz-29.995MHz
Complete with case, mains power supply, earphone and frequency list.

KENWOOD

TS680 HF + 6m inc Mike.	£895
R5000	£799
R5000 + ARA 30.	£899
VC20 converter.	£160
Bearcat UBC 200 XLT.	£249
Black Jaguar Mk III.	£199

DRESSLER ACTIVE ANTENNAS

ARA 900
ACTIVE ANTENNA
50MHz to 1300MHz
Gain 17dB Typical

NEW

TECHNICAL SPECIFICATIONS FOR ARA 900

Gain	17dB Typical (14-17dB)
Frequency Range	50-1300MHz
Noise Figure	1dB at 50-180MHz 1.5dB below 300MHz 2.0dB below 350MHz 2.7dB below 400MHz 3.0dB below 500MHz 3.8dB below 650MHz 4-6dB below 1300MHz

'N'-TYPE-£149.00
PL259 · £139.00
Intercept Point 3rd Order: +18dbm at Input
Post £3.00 or Securicor £7.00 extra

ARA 30 ACTIVE ANTENNA
50 kHz . . . 40 MHz WITH LIMITED PERFORMANCE UP TO 100MHz

Professional electronic circuitry with very wide dynamic range. Meets professional demands both in electronics and mechanical ruggedness. 1.2m long glass fibre rod. Circuit is built into waterproof 2.5mm thick aluminium tube. Ideal for commercial and swl-receiving systems. £129. See review in Practical Wireless August 1985 issue p.35. Both antennas come complete with 7 metres of cable, interface, power supply and brackets.

£129

OPEN MON – SAT 9AM – 5.30PM
INTEREST FREE HP FACILITIES AVAILABLE ON MANY ITEMS
PROMPT MAIL ORDER

Prices correct at time of going to press. Please phone for latest quote.

ICOM

ICOM R71
General Coverage Receiver
£855

FIRST CLASS SHORT WAVE RECEIVER. BUY THIS FOR £855 AND RECEIVE AN ARA 30 FREE. WORTH £129.
Also R7000 complete with ARA 900 £999.

YAESU

FRG 9600 60/905.	£475
FRG 9600 M 60/950.	£500
FRG 8800.	£585
FRV 8800 VHF converter.	£100
All other YAESU in stock	
AOR 2002.	£475
AOR 3000.	£TBA

SPECIAL OFFER – This month only

Icom 781 £4500 including a FREE MOTOROLA CARPHONE!
Yes – for this month only we are offering totally free a hands-free carphone PLUS free fitting (at our London depot) and we will even pay the £50 connection charge!! Call now for further details of this very special offer.

SEEN & HEARD

Freq kHz	Station	Country	Power (kW)	DXer
531	Ain Beida	Algeria	600	P*
540	BRT-2 Wavre	Belgium	150/50	F,J,M,N,P*,Q*
540	Solt	Hungary	2000	B*
549	DLF Beyreuth	Germany (W)	200	B*,N,P*
567	RTE-1 Tullamore	S.Ireland	500	B,E,F,H,J,N*,P*,Q*
567	West Berlin	Germany (W)	100	Q*
567	Damas-Adra	Syria	300	K*
576	Stuttgart	Germany (W)	300	B*,J,N,P*,Q
576	Radio Metro	S.Africa (Rep)	100	C*
585	FIP Paris	France	8	F,J,P*
585	RNE-1 Madrid	Spain	200	B*,N,P*,Q*
594	HRF Frankfurt	Germany (W)	400	B*,D*,N,P*,Q*,S*
603	Lyon	France	300	Q*
603	Koenigswusterhausen	Germany (E)	20	S*
603	BBC-R4 Newcastle	UK	2	H,O
604	Capital Radio	?	?	C*
612	RTE-2 Athlone	S.Ireland	100	B*,E,H,P*,Q*
612	Lerida	Spain	10	Q*
621	RTBF-1 Wavre	Belgium	300	B*,F,J,M,Q*
621	VOA Selebi-Phikwe	Botswana	50	C*
630	Lusaka	Zambia	500	C*
639	La Coruna	Spain	100	Q*
648	R.Lotus, Maraisburg	S.Africa (Rep)	2	C*
657	R.Xhosa, Komga	S.Africa (Rep)	100	C*
657	RCE-2 Madrid	Spain	20	Q*
657	BBC-Wales Wrexham	UK	2	P*
666	Bodenseesender	Germany (W)	300/180	B*,K,P,Q*
666	Lisboa	Portugal	135	Q*
675	Marseille	France	600	B*,Q*,S*
675	Hilversum-3 Lopic	Holland	120	E,F,J,M,N,Q*
684	RNE-1 Sevilla	Spain	250	P*,Q*,S*
684	Beograd	Yugoslavia	2000	P*,Q*
693	BBC-R2 Droitwich	UK	150	L
702	Magic 702, Ga-Rankuwa	S.Africa (Rep)	100	C*
702	Zamora	Spain	5	Q*
711	Rennes 1	France	300	F,J
711	Heidelberg	Germany (W)	5	S*
720	BBC-R4 Lisnagarvey	N.Ireland	10	B
720	BBC-R4 Londonderry	N.Ireland	0.25	O
720	BBC-R4 Lots Rd London	UK	0.5	F,H*,J
729	Oviedo	Spain	50	B*,Q*
738	Paris	France	4	F
738	Poznan	Poland	300	P*
738	RNE-1 Barcelona	Spain	250	N,Q*
747	Hilversum-2 Flevo	Holland	400	B*,E,F,J,M,P,Q*
756	Brunswick	Germany (W)	800/200	F,L,P*,Q*
765	Sottens	Switzerland	500	B*,Q*
774	BBC-R4 Enniskillen	N.Ireland	1	O
774	RNE-1 San Sebastian	Spain	60	Q*
783	Burg	Germany (E)	1000	A*,B*,P,Q*
792	Sevilla	Spain	20	Q*
801	BRF via Munich	Germany (W)	420	B*,P*,Q*
810	SER Madrid	Spain	20	Q*
810	BBC-Scot.	WesterglenUK	100	B*,N,P*,Q*
828	Barcelona	Spain	20	O
837	Las Palmas	Gran Canaria	10	Q*
846	Rome	Italy	540	B*,N*,Q*
855	RAIS Berlin	Germany (W)	100	P*
855	R.Bucharest	Roumania	750	L
855	Murcia	Spain	125	G*,Q*
864	Santah	Egypt	500	G*
864	Paris	France	300	B*
873	AFN Frankfurt	Germany (W)	150	A*,B*,D*,E,H*,K*,N*,Q*,S*
882	BBC-Wales Washford	UK	70	J,N,P*,S*
891	Algiers	Algeria	600/300	D*,O*,P*,Q
891	R.Lesotho, Maseru	Lesotho	100	C*
900	Milan	Italy	600	B*,K*,N*,P*,Q*S*
918	R.Intercont. Madrid	Spain	20	F
927	BRT-1 Wolvertem	Belgium	300	F,J,O*
936	Radio Bremen	Germany (W)	100	P*,Q*,S*
954	R.Swaziland	Swaziland	50	C*
963	Pori	Finland	600	O*,P*,Q*,S*
972	R.Botswana, Gabarone	Botswana	50	C
972	NDR/WDR Hamburg	Germany (W)	300	B*,E*,N*,P*,Q*,S*
981	Algiers	Algeria	600/300	N,O*,P*,Q*,S*
990	RIAS Berlin	Germany (W)	300	K
990	SER R.Bilbao	Spain	10	N*,Q*,S*
999	Hoyerswerda	Germany (E)	20	S*
999	R.Popular, Madrid	Spain	20	B*
1008	Hilversum-5 Flevo	Holland	400	E*,F,J,M,Q*
1008	Aleksinsac/Beograd	Yugoslavia	400/200	Q*
1017	Wolfsheim	Germany (W)	600	B*,F,P*,Q*,S*
1026	Graz-Dobl	Austria	100	Q*
1035	Prog.3 Lisbon	Portugal	120	Q*
1035	Tallinn	USSR	500	S*
1044	DDR-1 Burg	Germany (E)	250	P*,Q*,S*
1053	BBC-R1 Droitwich	Uk	150	L
1062	Kalundborg	Denmark	250	P*,Q*
1071	Brest	France	20	F,J
1071	Lille	France	40	P*
1071	R.Zambia, Kitwe	Zambia	100	C*
1080	Katowice	Poland	1500	P*
1098	Velke Kostolany	Czechoslovakia	400	P*
1098	R.Bop, Ga-Rankuwa	S.Africa (Rep)	100	C*
1107	AFN via Munich	Germany (W)	40	E*,Q*
1116	Bari	Italy	150	N*
1125	La Louviere	Belgium	20	F,Q*
1134	Zagreb	Yugoslavia	300	P*,Q*
1143	AFN via Stuttgart	Germany (W)	10	E*,Q*,S*
1143	Kaliningrad	USSR	150	E*,H*,P*,Q*
1161	Strasbourg	France	200	Q*
1170	Bernburg	Germany (E)	20	S*
1170	TWR Manzini	Swaziland	50	C*
1179	Solvesborg	Sweden	600	B*,E,F,Q*,S*
1188	Kuurne	Belgium	5	F
1197	VOA via Munich	Germany (W)	300	E
1197	BBC-R3 Bournemouth	UK	0.5	F
1206	Wroclaw	Poland	200	D*,Q*
1215	BBC-R3 Moorside Edge	UK	100	J,S*
1215	Tartu	USSR	50	P*
1224	Vidin	Bulgaria	500	S*
1233	Liege	Belgium	5	F
1233	Prague	Czechoslovakia	400	P*,Q*
1242	Marseille	France	150	I*
1251	Siofok	Hungary	135	L
1260	SER San Sebastian	Spain	20	Q*
1269	Neuminster	Germany (W)	600	B*,P*,S*
1278	Strasbourg	France	300	Q*
1278	RTE-2 Dublin/Cork	S.Ireland	10	B,O,P*,Q*
1287	Litomysl/Liblice	Czechoslovakia	300/200	E*,P*,Q*,R*,S*
1305	Marche	Belgium	10/5	Q*
1314	Kvitsoy	Norway	1200	B*,P*,Q*,S*
1323	R.Moscow via Leipzig	Germany (E)	150	D*,P*,S*
1341	BBC-Ulst.Lisnagarvey	N.Ireland	100	B,F,H*,P*,S*
1350	Nancy/Nice	France	100	B*,F,P*,Q*,S*
1359	RBI Berlin	Germany (E)	250/100	E,H*,Q*,S*
1368	Manx Radio, Foxdale	IOM	20	B*,H*,O
1386	Kaliningrad	USSR	500	E*,F,P*,Q*,S*
1395	R.Tirana via Lushnje	Albania	1000	B*,E*,H*,S*
1404	Brest	France	20	F,P*
1422	Heusweiler	Germany (W)	600	B*
1422	Saarbrucken	Germany (W)	1200/600	P*,Q*,S*
1431	Dresden	Germany (E)	250	Q*,S*
1440	Marnach	Luxembourg	1200	B*,F,I*,P,Q*,S*
1467	TWR Monte Carlo	Monaco	1000/400	B*,E*
1476	Wien-Bisamberg	Austria	600	P*,Q*,S*
1494	Leningrad	USSR	500	A*,S*
1503	Stargard	Poland	300	E*,Q*,S*
1512	BRT Wolvertem	Belgium	600	D*,E*,F,H*,Q
1521	Kosice	Czechoslovakia	600	P*,Q*
1530	Vatican Radio, Rome	Italy	150/450	E*,Q*,S*
1539	DLF Mainflingen	Germany (W)	700	B*,F,P*,Q*,S*
1566	Samen	Switzerland	300	Q*
1575	RBI via Burg	Germany (E)	250	P*,Q*,S*
1593	Langenberg	Germany (W)	400/800	B*,P*,Q*,S*

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

DXers:

A: Leo Barr, Sunderland.
B: Lez Chipperfield, Stourbridge.
C: P.R.Guruprasad, Molepolole, Botswana.
O: Simon Holland, Douglas, Isle of Man.
E: Sheila Hughes, Morden.
F: George Millmore, Wootton I.O.W.
G: Oick Moon, George, South Africa.
H: Chris Nykiel, Leeds.
I: Stewart Russell, Forfar.
J: Mark Selby, Aldershot.
K: Tim Shirley, Bristol.
L: Jurgen Thiel, Javea, Spain.
M: Phil Townsend, London.
N: Ted Walden-Vincent, Great Yarmouth.
O: Neil Wheatley, Lytham St.Anne.
P: Louis Whitfield, Luton.
Q: Martyn Williams, Sunningdale.
R: Julian Wood, Buckie

Eng 1400-1700) SIO 444 at 1500 by **Terry Roy** in Gateshead; Radio Nederlands via Talata Velon, Madagascar 15.575 (Eng, Duto S.Asia 1430-1625) 25443 at 1520 by Richard Radford-Reynolds.

Some broadcasts to Europe were mentioned too: Radio Bangladesh, Dacca 17.710 (Eng 1230-1300) rated as 22232 at 1250 by P.R. Guruprasad; UAE Radio Dubai 17.865 (Ar, Eng 1030-1645) SIO 433 at 1605 by Kenneth Buck; Radio RSA Johannesburg, S.Africa 17.795 (Eng 1800-1856) SIO 333 at 1800 by **Alf Gray** in Birmingham; RCI via Sackville, Canada 17.875 (Hung, Cz, Uk, Russ, Eng, Fr 1800-2030) noted as "very clear" at 2000 by Ted Walden-Vincent; Radio Damascus, Syria 17.710 (Eng 2005-2105) 44444 at 2005 by **Mike Smith** in Cambridge; Radio HCJB Quito, Ecuador 17.790 (Eng 2130-2200) 43444 at 2130 by **Leo Barr** in Sunderland; VOFC Taipei, Taiwan 17.845 (Eng 2200-2245) 54555 at 2200 by Chris Shorten.

The **15MHz (19m)** broadcasts from Radio New Zealand, Wellington 15.150 (Eng 2345-0145; 0330-0730 also 0145-0330 Sat/Sun only) have been attracting the attention of many DXers in the UK. Listening at 0403, Kenneth Reece rated their signal as 23332. Several of the broadcasts from Radio Australia have also been reaching the UK. Their transmission to the S.Pacific area via Shepparton 15.240 (Eng 2100-0730) was logged at 2215 as 42233 by Mark Selby and at 0652 as 44334 by Garry Judd. The signature tune which precedes their broadcast in Chinese to C.Asia via Darwin 15.170 (2200-0000) was heard at 2155 by Richard Radford-Reynolds. At 0600 David Edwardson noted their broadcast to the C.Pacific area via Shepparton 15.160 (Eng 2100-0700) as 34443. Their transmissions via Carnarvon to E.Asia 15.395 (Eng, Chin 0100-0900) were rated as 33333 at 0700 by Kenneth Reece and to S.Asia 15.415 (Eng 0900-1100) as 14432 at 0930 by Richard Radford-Reynolds.

Some of the broadcasts to other areas were logged during the day: Radio Japan via Yamata 15.270 (Eng, Jap to Australia 0500-1000), noted as SIO 433 at 0700 by Cyril Kellam; Voice of Malaysia, Kuala Lumpur 15.295

SEEN & HEARD

(Eng, Mal to S.E.Asia 0555-1025) 32432 at 0725 by David Wratten; Radio Bucharest, Romania 15.335 (Eng, Ro to SE.Asia 0645-0810) 54444 at 0730 by **David Minter** in Portland; TWR via Bonaire, Ned.Antilles 15.354 (Eng to USA 1115-1400) 32222 at 1115 by Sheila Hughes; Radio Finland via Pori 15.400 (Fin, Eng, Sw to USA 1200-1500) 44444 at 1304 by Darran Taplin; Radio Veritas Asia, Philippines 15.465 SIO 454 at 1500 by Neil Wheatley; Voice of Turkey, Ankara 15.160 (Tur, Ar to N.Africa 1000-1700) 53433 at 1550 by P.R.Guruprasad.

Later, Radio RSA Johannesburg, S.Africa 15.365 (Fr to W.Africa 1800-2000) was logged as 54444 at 1800 by Chris Shorten; Radio Prague, Czechoslovakia 15.110 (Eng, Cz, Ar to E.Africa 1430-1825) SIO 423 at 1804 by Mal Tedds; Radio Sophia, Bulgaria 15.310 (Eng, Port, Fr to W.Africa 1530-2130), heard at 1900 by **John Sadler** in Bishops Stortford; VOA via Monrovia, Liberia 15.600 (Eng to Africa 1600-2200) 44554 at 2055 by John Parry; Radio Nacional Chile, Santiago 15.140 (Sp to S.America 1030-0400) 34333 at 2200 by **Roy Patrick** in Derby; BBC via Ascension Island 15.400 (Eng to Africa 1500-2300) 44344 at 2250 by Max Wustrau.

Broadcasts to Europe include UAE Radio Dubai 15.435 (Ar, Eng 0615-1645), heard at 1602 by **Julian Wood** in Buckie; RAE Buenos Aires, Argentina 15.345 (Ar, Ger, Fr, It, Sp 1700-2300) 44434 at 1723 by Christian Pritchard; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Fr, Sp 1600-2130) noted as "very good" at 1810 by John Coulter; Radio Kuwait, Sulaibiyah 15.505 (Ar 0700-2300) SIO 444 at 1956 by Kenneth Buck; Voice of Israel, Jerusalem 15.640 (Eng) 44333 at 2016 by Leo Barr; Radio Korea, Seoul, S.Korea 15.575 (Ar, It, Eng, Sp, Pol, Ger 1645-2300) 44444 at 2030 by Mike Smith; VOA via Greenville, USA 15.410 (Eng to W.Africa 1600-2200), noted as "fairly clear" at 2045 by Ted Walden-Vincent; Radio HCJB Quito, Ecuador 15.270 (Fr, Ger, Eng 2030-2200) SIO 433 at 2135 by Alan Smith; WCSN Scotts Corner, Maine 15.390 (Eng 2000-2200) SIO 444 at 2140 by Philip Rambaut.

Broadcasters using the **13MHz (22m)** band include Radio Jordan, Amman 13.655 (Eng 0630-1415), rated as 34333 at 0915 by Sheila Hughes and also heard at 1403 by Ron Pearce; SRI via Sottens, Switzerland 13.635 (Eng, Fr, Ger, It to E.Asia 1045-1300) SIO 433 at 1100 by Alf Gray; Radio Austria Int. Vienna 13.730 (Ger, Fr, Eng, Sp to Europe 0700-1700) 55555 at 1430 by David Wratten; AWR Agat, Guam 13.720 - station ident in English heard at 2058 by Mike Smith; Radio Nederlands, Flevo 13.700 (Eng to W.Africa 2030-2125) 45534 at 2030 by Richard Radford-Reynolds; WHRI South Bend, USA 13.760 (Eng to Europe 1700-0000) SIO 343 at 1921 by Kenneth Buck; WRNO New Orleans, USA 13.720 (Eng to Europe 2100-0000) 32333 at 2248 by Leo Barr; WSHB Cypress Creek, USA 13.760 (Eng, Sp 0000-1600) 34443 at 0549 by Kenneth Reece.

Some of the **11MHz (25m)** broadcasts to Europe stem from WYFR via Okeechobee, Florida 11.580 (Ger, Eng, It, Fr 0400-0700) 33433 at 0527 by Kenneth Reece; Radio Australia via Shepparton 11.910 (Eng 0400-0630) 44454 at 0602 by David Edwardson; Vatican Radio, Rome 11.715 (It 0620-0700) 43333 at 0635 by Garry Judd; BRT via Wavre, Belgium 11.695 (Du 0700-0725) SIO 444 at 0700 by Cyril Kellam; Voice of Greece, Athens 11.645 (Gr, Eng 1200-1550) SIO 454 at 1530 by Kenneth Buck; Radio Pakistan, Islamabad 11.570 (Ur, Eng, Fr 1645-2015) 55555 at 1730 by Chris Shorten; Radio Kuwait, Sulaibiyah 11.665 (Eng 1800-2100) 45343 at 1803 by Mark Selby; Radio Bangladesh, Dacca 11.510 (Eng, Beng 1815-2000) 34433 at 1821 by Darran Taplin; Radio Nacional de Espana 11.790 (Fr, Eng 1800-2200) heard at 2000 by John Sadler; AIR via Aligarh, India 11.620 (Eng 1845-2230) 44333 at 2045 by David Wratten.

Broadcasts to other areas include Radio Australia via Shepparton 11.720 (Eng to C.Pacific 0830-0930) 43333 at 0835 by Sheila Hughes; TWR Agana, Guam 11.805 (Eng to Australia 0930-1100) 33433 at 0930 by Christian Pritchard; Radio Prague, Czechoslovakia 11.685 (Eng, Cz to S.Asia 1430-1625) heard at 1606 by John Coulter; AWR Agat Guam 11.980 (Eng to S.Asia 1600-1700) SIO 222 by Alan Smith; Radio RSA Johannesburg, S.Africa 11.900 (Port to Africa 1800-1856) 54444 at 1800 by Richard Radford-Reynolds; AIR via Delhi 11.935 (Eng to E.Africa 1800-2000) 43333 at 1835 by P.R.Guruprasad; SRI via Schwarzenburg, Switzerland 11.955 (Ar, Eng, Ger, Fr to Africa 1715-2000) SIO 444 at 1854 by Mal Tedds; Radio Globo Rio, Brazil 11.805 (Port to S.E.Brazil 0900-0300) SIO 222 at 2116 by Philip Rambaut; Voice of the UAE, Abu Dhabi 11.965 (Eng, Ar to USA 2200-0200) 33323 at 2230 by Leo Barr; VOIA via Greenville, USA 11.580 (Eng to S.America 0000-0230) 54344 at 0018 by Max Wustrau.

A number of broadcasters in distant locations use the **9MHz (31m)** band to reach listeners in Europe. They include WSHB Cyprus Creek, USA 9.455 (Eng 0200-1200) rated as 34333 at 0531 by Kenneth Reece; WCSN Scotts Corner, Maine 9.870 (Eng 0600-0800) 55555 at 0628 by Garry Judd; Radio Australia via Shepparton 9.655 (Eng 0700-1030), heard at 0730 by **John Nash** in Brighton; Radio HCJB Quito, Ecuador 9.610 (Ger, Fr, Eng 0600-0830) SIO 444 at 0800 by Terry Roy; Radio Pyongyang, N.Korea 9.325 (Eng, Fr, Russ, Kor, Sp, Ger 1300-2150) 34333 at 1700 by David Wratten; AIR via Delhi, India 9.910 (Eng 2000-2230) SIO 243 at 2053 by Mal Tedds; VOFC Taipei, Taiwan 9.955 (Eng, Sp 2200-0000) - 34333 at 2200 by Sheila Hughes.

Other broadcasts intended for Europe stem from VOA via Kavala, Greece 9.740 (Eng 0400-0600) heard at 0545 by **Francis Hearne** in Ilford; UAE Radio Dubai 9.640 (Ar, Eng 1415-2100) rated as 33423 at 1634 by Darran Taplin; BSKSA Riyadh, Saudi Arabia 9.870 (Ar 1700-2130) 33343 at 1700 by Christian Pritchard; Radio Jordan, Amman 9.560 (Eng 1420-2200) 54444 at 1715 by Chris Shorten; Voice of Ethiopia, Addis Ababa 9.660 (Eng 1830-1900) SIO 333 at 1830 by Cyril Kellam; VOIRI Tehran, Iran 9.022 (Russ, Tur, Ger, Fr, Eng, Sp, Ar 1530-2230), heard at 1941 by Ron Pearce; Voice of Turkey, Ankara 9.825 (Ger, Fr, Eng 2000-2250), heard at 2000 by Julian Wood; Radio Sophia, Bulgaria 9.700 (Eng, Ger, It, Fr 1930-2225) 53344 at 2032 by Mark Selby; Radio Baghdad, Iraq 9.770 (Fr, Ger, Eng 1900-2225) noted as "very clear" at 2057 by Ted Walden-Vincent; Radio Cairo, Egypt 9.850 (Ar 1500-2350) 33333 at 2113 by Max Wustrau.

With careful listening a number of broadcasts from distant places may also be heard in the congested **7MHz (41m)** band. They include Radio Tanzania, Dar-es-Salaam 7.165 (Swa, Eng to Tanzania 0500-0900) rated as 45444 at 0655 by P.R.Guruprasad; WYFR via Okeechobee, Florida 7.355 (Russ, Ger, Eng, Sp to Europe 0400-0800) 54444 at 0800 by David Minter; WHRI South Bend, USA 7.355 (Eng to E.USA, Europe 0800-1100) SIO 533 at 0835 by Alan Smith; Radio Beijing, China 7.375 (Russ, Cz, Pol to E.Europe 1500-2055) SIO 333 at 1640 by Philip Rambaut; Radio Australia via Shepparton 7.215 (Eng to S.Pacific 1500-2030) 44333 at 1703 by Garry Judd; also via Carnarvon 7.205 (Eng to S.Asia, Europe 1430-2030) SIO 323 at 1800 by Terry Roy; Radio Beijing, China 7.820 (Ro, Yu, Cz to E.Europe 1900-2125) 34553 at 2005 by John Parry; AIR via Delhi, India 7.412 (Hi, Eng to Europe 1845-2230) SIO 333 at 2047 by Mal Tedds; Radio Korea, Seoul, S.Korea 7.550 (Ger, Eng, Fr, Sp, Port to E.Africa 1945-2345) 24333 at 2030 by David Wratten.

Radio Australia also use the **6MHz (49m)** band to reach listeners in Europe. Their broadcasts via Carnarvon 6.035 (Eng 1530-2030) were rated as 33233 at 1712 by Leo Barr. It seems that they also reach Botswana quite well, as P.R.Guruprased noted 252343 in his log at 1537.

Leo Barr: Matsui MR4099 + internal antenna.
Kenneth Buck: Home-built superhet + random wire.
David Edwardson: Trio R600 + trap dipole 22m long.
Paul Hawkins: Trio R1000 + Howes active dipole.
Sheila Hughes: Panasonic DR48 + 15m inverted L.
Garry Judd: Saisho SW2000 + built-in whip.
Cyril Kellam: Sony ICF 7600DS + AN-1 or 5m vertical wire.
David Minter: Sangean 872 portable.
John Nash: Kenwood R5000 + random wire.
Fred Pallant: Trio R2000 + random wire in loft.
Roy Patrick: Lowe HF 125 + 20m wire.
Ron Pearce: Home-built 2 valver.
Peter Perkins: Sony ICF 7601 + internal ferrite rod.
Christian Pritchard: Kenwood R5000
Richard Radford-Reynolds: Sangean ATS-803A + 15m vertical wire.
Philip Rambaut: Int.Marine Radio R.700M + random wire.
Kenneth Reece: Kenwood R5000 + delta loop.
Terry Roy: Philips D-1835.
John Sadler: DX-100L + SW loop.
Mark Selby: Panasonic RFB-40 + 60m random wire.
Tim Shirley: Trio R600 + random wire.
Alan Smith: Matsui MR4099.
Darran Taplin: Eddystone 680X + 25m random wire.
Mal Tedds: Matsui MR4099 + 25m random wire.
Mark Thompson: JRC NRD525 + 1m loop or 20m random wire.
Ted Walden-Vincent: Toshiba RT-VS3 Walkman Radio.
Jim Willett: Trio 9R-59DS + V dipole.
Julian Wood: Kenwood R1000 + random wire.
David Wratten: Trio R2000 + 30m random wire.
Max Wustrau: Datong PC-1 convertor + FDK-750 2m transceiver.

Abbrv	Language	Abbrv	Language
Ar	Arabic	Ro	Romanian
Beng	Bengali	Russ	Russian
Chin	Chinese	Sp	Spanish
Cz	Czechoslovakian	Sw	Swedish
Dan	Danish	Swa	Swahili
Du	Dutch	Tur	Turkish
Eng	English	Uk	Ukrainian
Fin	Finnish	Ur	Urdu
Fr	French	Viet	Vietnamese
Ger	German	Yu	Yugoslavian
Gr	Greek		
Hi	Hindi		
Hung	Hungarian		
It	Italian		
Jap	Japanese		
Kor	Korean		
Mal	Malay		
Norw	Norwegian		
Pol	Polish		
Port	Portuguese		

The next three deadlines are:
June 19, July 17 & September 18

INDEX TO ADVERTISERS

Aerial Techniques 45
Air Supply 57
ARE Communications 15
BBC 26
Birkett J 15
Bredhurst Electronics 45
Cirkit 19
Colomor Electronics 57
Component Centre 42
Datong Electronics 20
Dewsbury Electronics 53
Dressler Communications 54
Elliott Electronics 19
ERA 50
Flightdeck 57
Garex Electronics 46
HS Publications 46
Hamgear 57
Howes, C M 54
Icom (UK) ..... Cover iii
ICS Electronics 42
Interbooks 15
J. & P. Electronics 19
Javiation 19
Klingenfuss 42
Lake Electronics 57
Lee Electronics 37
Lowe Electronics ..... Cover ii, 8,9
Nevada Communications 26
Photo Acoustics 25
Practical Wireless Magazine 32
Raycom Communications Systems 13,26
Ryedale Satellite Systems 46
Rylands F G 57
S. E. M. 57
South Midlands Communications ..... Cover iiii
Spacetech 42
S. S. C. 57
Stephens James 50
Technical Software 45
Ward Reg & Co 20
Waters & Stanton 49

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**

HIGH POWER WIRELESS EQUIPMENT
Articles from *Practical Electricity* 1910-11
Edited by Henry Walter Young
A reprint of interesting practical articles from the early days of radio. *99 pages.* **£6.85**

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**

SHORT WAVE 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**

WORLD RADIO TV HANDBOOK 1989
Country-by-country listings of long, medium and short wave broadcast and TV stations. Receiver test reports. English language broadcasts. The s.w.l.'s "bible". *576 pages.* **£17.95**

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
Reprinted 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**

SEMICONDUCTOR DATA BOOK
A.M.Ball
Characteristics of some 10000 transistors, f.e.t.s, u.j.t.s, diodes, rectifiers, triacs and s.c.r.s. *175 pages.* **£9.95**

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 **£20.00**

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**

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 Iambic, 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.
£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**

SUBSCRIPTIONS

Fil in the Order form below and post it to: PW Publishing Ltd., FREEPOST, Subscriptions Dept., Enefco House, The Quay, Poole, Dorset BH15 1PP (no stamp required). Credit Card Orders taken on (0202) 678558.
Overseas subscriptions outside Europe are now despatched by Accelerated Surface Post for faster delivery.
If you already have a subscription you can still take advantage of our offer, but you must quote your subscription number.

Please indicate the type of subscription required:

SHORT WAVE MAGAZINE 1 YEAR
❑ £17.00 (UK)
❑ £19.00 (Overseas)

PRACTICAL WIRELESS 1YEAR
❑ £15.50 (UK)
❑ £18.00 (Europe)
❑ £19.00 (Overseas)

PRACTICAL WIRELESS 3 YEAR
❑ £40.00 (UK)

SPECIAL JOINT SUBSCRIPTION 1 YEAR ONLY
❑ £28.00 (UK)
❑ £32.00 (Overseas)

Prices current at June 1989
To commence with issue dated.....

To: PW Publishing Ltd., FREEPOST, Subscriptions Dept., Enefco House, The Quay, Poole, Dorset BH15 1PP

Name.....

Address.....

.....

.....

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

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

Card No.

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

Signature.....

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.

HF performance you can have a real field day with.

With Yaesu's FT-757GX/II, you can enjoy full-featured HF performance just about anywhere.

On vacation. During field day. On the road. Or in your shack.

Because the FT-757GX/II packs all its HF performance into one highly compact, action-ready case. A case so small, it even fits under airplane seats.

Of course, you've probably noticed a similarity to its predecessor, the FT-757GX. That's purely intentional. And now its performance is even better.

With new features like memory storage of operating mode. Slow/fast tuning selection. Automatic step-change according to mode. IF notch-filter. 10 memories. And VFO to VFO scan.

Plus you get an iambic electronic keyer. Woodpecker noise blanker. 600-Hz CW filter. AM and FM modes. AF speech processor. And 25-kHz marker generator. All at no extra cost.

Three microprocessors. Dual VFOs. Single-button VFO/memory swap. Receive coverage from 500 kHz to 30 MHz. Transmit coverage from 10 to 160 metres, including WARC bands. All-mode coverage (LSB, USB, CW, AM and FM). 100-watt RF output.

QSK operation. Massive heatsink and duct-flow cooling system for continuous RTTY operation for up to 30 minutes.

Computer Aided Transceiver (CAT) System for computer control via optional interface.

Of course, the FT-757GX/II offers the kind of options you'd expect from Yaesu, too. Including standard and heavy-duty power supplies, automatic antenna tuner, hand and desk microphones.

So no matter where you work the DX, take along Yaesu's FT-757GX/II. The full-featured HF rig you'll have a real field day with.

YAESU

UK Sole Distributor *South Midlands Communications Ltd S.M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants SO5 3BY Tel (0703) 255111*

Prices and specifications subject to change without notice.