REVIEWED
The Bearcat BC950XLT

Build an Inexpensive Vertical Antenna

Read about the Eiffel Tower Wireless Station
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 weather of Megawatt broadcasters and jammers.

Technically, the HF-225 distinguishes itself by having a low phase noise synthesizer, 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 synthesizer actually tunes in steps of 8Hz, which is better than 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
Cover In our review this month John Waite takes a good look at the Bearcat BC-950XLT Mobile Scanning Receiver.

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Ron Ham
Brian Oddy G3FEX

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A WORD IN EDGAWAYS

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 in a 2f. 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 had 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 DTH 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 156.85MHz 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 amendment 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 multivalved 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 G5s 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 G90IOM and G9FLH on h.f. with G9MICM 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, Maidfield Road, Langley, Slough SL3 8AL.

Short Wave Magazine July 1989
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, GBBC5R, 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.

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**GB2NTS, GB2NTU, GB2NTW and GB2NTN**: 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 8QB**.

**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 USAFA stations in and around the Bedford area 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 Group USAFA. 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, Putney, Bedford MK41 9LR. Tel: (0234) 244506.

**GB7ATC**: This station will be on the air from Cardington Airfield to celebrate the 50th Anniversary of 157 Sqn (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 28 MHz bands (VACRAL frequencies). More information can be obtained 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 Staithes X-War 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 3725 and 7055 MHz in the h.f. band and also on 144 MHz. 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.

**GB4VVR**: 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 144 MHz 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.
*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 every station and is held at Cranfield Aerodrome, Bedfordshire. The rally covers the whole spectrum of operating from light aircraft through powered gliders and microlights to airmail 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 Bryngles 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, family entertainment and strawberry fields (weather permitting). There is both free entrance and car parking. Details from: Rolf Little. Tel: (0872) 72554.

**July 16** The Sussex Amateur Radio & Computer Fair will be held at Brighton Racecourse from 10am to 5pm. There will be a shuttle to Brighton seafront 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 programme. Talk-in on S22. Details from: C.A. Mills G0AAO. Tel: (05977) 43101.

**July 23** The Burnham Beeches and Maidenhead & District ARS 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, paddock style Motocross, 4x4 stand GB4MR. Entrance fee is £1 and the car boot area will be £5 per car and driver for the day. Contact: Bob Hear G6BTY 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 11am. Peter G4WCE. Tel: Lymm 5959 or via packet at GB7NPW-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. A bargain stall at the Sunday (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. There is a free-on-duty 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 SEQ 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: Alan on (0832) 593072 or Ron (0934) 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 to 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. Appropriately, there are 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 £6 per car. The event opens at 10am. More details can be obtained from Kevin G7WTH. Tel: (0203) 441590 or David G4DWW. Tel: (0455) 525599.

**August 3** 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 Road, St Albans Road, Derby. All the usual attractions will be there including their Monster Junk Sale. More details from Martin GS8JZL. 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. Cammac on (0204) 24104.

**August 27** The Galashields & District ARS are holding their open day at the Focus Centre, Livingstone Place, Galashields 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) 22666.

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

**August 28** The Huntingdonshire ARS are holding a Junk Sale at The Medway Centre, Coneygaere 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 your junk for £5. The contacts for this rally are: G1YVS on (0487) 830212 or GBLRS on (0480) 56772.

**September 3** The Preston ARS 22nd Annual Mobile Rally will be held at Lancaster University, as in previous years. The rally will be held at 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.
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 200MHz+ 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 Edystone 680X, classic 15-valve receiver, 45MHz 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-9500 Mk 5, 10kHz to 950MHz continuous coverage, 11 months old. Mint condition, boxed, complete with mains p.s.u. £580 plus postage. Tel: Swindon (0793) 629546 weekends only.

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

FOR SALE Tandy PRO-2004 scanner, as new, only 7 months old with discone antenna £250. Tel: (0332) 716865.


FOR SALE AOR AR-2002 scanner receiver, near new, boxed, complete with Discone discone antenna, £400 o.n.o. G. Milne. Tel: (0252) 657464 evenings.

FOR SALE Icom IC-R71E general coverage receiver, between 100kHz and 30MHz with manual, f.m. unit installed, also Icom RC-11 W.R. controller with manual. Will sell for £90 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 f.h.f. price offered. Tel: (0272) 861589.

FOR SALE Black Jaguar BJ-200 Mk 2, good condition in makers box 18 months of use, with leatherette case £100. Included is mobile mount. Mr C. C. Hibbard, 510 Pentrethegn Rd, Caereithin, Swansea SA6 9AG. Tel: (0792) 583522.


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., 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, Thorterton, Devon EX5 5LT.

FOR SALE Win-108 airband monitor and holster, v.g.c., £130 ono. J. Lockwood G3KLL, QTHR. Tel: Walls 596.

FOR SALE Racal RA17 0-30MHz receiver 100kHz to 8kHz bandwidth with £155 buyer collects. G3LUV 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 NiCad £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 Provis. Tel: (0224) 518934.

FOR SALE Sony ICF-2001 D receiver 150kHz-30MHz, a.m./s.s.b./gcw, v.h.f. airband, f.m. broadcast, universal p.s.u. 110/240v a.c. original packing, manuals, wave-guide, unmarked, all as new, under guarantee with purchase receipt £235. P. Rien, 4 Borough View, Torrington, Devon EX38 7NN. Tel: (0865) 233111 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., £585.00, buyer collects. Tel: 061-445 5888 (Manchester).

FOR SALE Antenna tuner, Vizuho KX-2 Sky Coupler, £93 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, ZC Mktl, RF56, 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., Mktl, etc. K. F Brandon. 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 1892 evenings.

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 and spares, £23. No callers please. P. Burns, 9 Crommook Avenue, Cokemother, Cumbria CA13 9BQ.


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

FOR SALE Dresler ARA-900 active antenna, 50MHz-1300MHz, as new, £90. Tel: (0201) 7425545 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.
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. GWV7T. George Christofi G0JKZ on 01-427 4800.

Braintree & District ARC 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 G0IZV on Braintown 44908.

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

Mid-Warwickshire ARC meet 2nd & 4th Tuesdays, 8pm at 61 Emscote Rd, Warwick. June 27 is Youth In Tune - A young hams view of an old hobby CR0D and July 11 is Visit to Warwick School Satellite Station GGLMU. Mike Newell G1HGD on Kenilworth 513073.

Trowbridge & District ARC have a Social Evening on July 5 and their Annual Family Picnic and "barbe" on the 19th at White Horse Hill, nr Westbury, from 6pm onwards. Meet the TA Club, Bythsea Rd, Ian G0GRI on Bratton 830388.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. June 28/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 G4BAW. David Bailey G1MMV at Flat 7, Thatcham Close, Yeovil, Somerset BA2 3BS.

Hastings Electronics & RC have a Packet Radio Talk on July 19. 3rd Wednesdays, 7.45pm at West Hill Community Centre, Court, Downey Close. Reg Kemp G3YFF 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 at Downs Bar. June 27 is a Committee Meeting at 35 Great Elishams, Banstead, July 3rd Natter Night and the 11th is Pye Westminster - Conversion & Trials. Shooting evening at John Puttock G0BWV on 01-644 9945.

Norfolk ARC meet Wednesdays, 7.30pm in The Norfolk Dumpling, The Livestock Market, Harford, Norwich. June 26 is Practical Antennas G3KB, July 5 is Sizewell "A" Power Stn Len Green of CEG, the 9th is Club Visit to Sizewell "A" Power Stn - Weekend event, the 12th/26th are Informal and the 19th an Inter-Club Quiz with GT Yarmouth ARC & Lowestoft ARC. Craig Joly G0GBD on Norwich 468784.

Bedford & District ARC have Amusing Anecdotes G3FWA on July 4 and “ORP” Masters the Power and Antennas that did it G4MEW on the 18th. Allen's Club, Hurst Grove, 8pm. Glen Loake G0GBL on Bedford 266443.

Fylde ARC 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 old Well 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 5, Room 15, Ground floor; "C" Block, Gilberd School, Brinkley Lane, Highwoods. Mike J. Griggs G4JYN on Layer-de-la-Haye 348169.

Thornbury & District ARC have Amateur TV on July 5 and f.h. activity on the 19th. 1st & 3rd Wednesdays, 7.30pm in the United Reform Church, Chapel St. Tom Cromack G0FGL at Rose Cottage, The Nete, Oldbury-on-Severn, Bristol BS12 1RU.

Stourbridge & District ARC have a Carnival briefing on July 4 and G8J/LG6MKK Test Equipment. Use & Abuse on the 18th. Meetings held twice monthly at the Robin Woods Centre, Beauty Bank. C. Brumm G1WAI on Hagley RD 986607.

Keighley ARC meet Tuesdays, 8pm in the clubroom, rear of Victoria Hall. June 27 is "Wildlife on the Falklands" Slides G0QRO, 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 G0/SH on Bradford 498622.

Birken Hill 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 Clubhouse.

Coventry ARC meet Fridays, 8pm at Baden Powell House, 121 St. Nicholas St., Redditch. June 23/ July 14/21 are Nights on the Air & Weather. July 16/18/30 is a 144MHz Contest and July 7 is Visit to Rolls Royce Heritage Trust (provisional). Jonathan Ward G4HHT on Coventry 610408.

South Dorset RS meet 1st Tuesdays, 7.30pm at the Pennsylvania Castle Hotel, Portland. Geoff Gwilians 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 Royal Enthusiasts Club Premises, off Hayley Lane (by M3 bridge). July 12 is Quiz night. Tim Fitzgerald G4UOE on Camberley 292831.

Bath & District ARC have a club night on July 5 and Visit by Regional Liaison Officer on the 19th. Meet alternate Wednesdays, 8pm at Englishcombe Inn, Englishcombe Rd, Eton. Oakland G4EVG on Combe Down 832156.

Wirral ARC have a d.f. contest on July 5 and an Equipment Sale for members’ funds on the 15th, 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, Womley. June 28 is Weather Satellites G4OAV (from RIJ), July 5/19 are Natter Nights and the 12th is an Open Air Meeting - Baas Hill Common. Roger Frisby G4OAA on Hoddesdon 464796.

Derby & District ARC 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 ARC meet Thursday, 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 a Discussion Night and Preparations for v.h.f Field Day. David Holland on 061-973 1837.

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 ARC now meet Wednesdays, 8pm in the upstairs family room at Brewers Droop Inn, Wolverhampton St. Dave G0EGG on Wolverhampton 734477.

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

Evening on July 14 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd. Nick Lawlor G8AJY 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 Mondats, 7.30pm at Four Crosses, Menai Bridge (St. John’s Ambulance HQ). Tony Rees on Bethesda 600963.

Mid-Warwickshire ARC meet 2nd & 4th Tuesdays, 8pm at 61 Emscote Rd, Warwick. June 27 is...
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 call-sign “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 system was 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 flat and doubled 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 kHz). Probably because of this the French station gradually moved further away by using longer wavelengths and ended up on 2600metres. 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
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.

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
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 Electronics 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.

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 searching 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.

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.
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 embarrassing 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 180mm. 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 more than adequate. 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.

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 independent 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 relies 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 dissipates.

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?
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 automatically 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 U/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
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 & 453.06MHz - 468.175MHz
- Marine: 156.025MHz - 162.025MHz & 453.05MHz
- 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.

### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>a.c.</td>
<td>alternating current</td>
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<tr>
<td>GMT</td>
<td>Greenwich Mean Time</td>
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<tr>
<td>Hz</td>
<td>hertz</td>
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<tr>
<td>kHz</td>
<td>kilohertz</td>
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<td>km</td>
<td>kilometre</td>
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<td>kW</td>
<td>kilovolt</td>
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<td>m</td>
<td>metre</td>
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<tr>
<td>mm</td>
<td>millimetre</td>
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<tr>
<td>r.f.</td>
<td>radio frequency</td>
</tr>
<tr>
<td>w.o.m.</td>
<td>words per minute</td>
</tr>
<tr>
<td>W/T</td>
<td>wireless telegraphy</td>
</tr>
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</table>

7ths" structure during radiotelephony tests early in 1906. 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.
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MARINE

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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 teletypewriter 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 Pooleys’ 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 EGOK 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 Southampton
EGNM Leeds and Bradford
EGPF Glasgow
EGPH Edinburgh
EGPK Prestwick
EGPO 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 Patrick (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, and, 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 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 at that Peterborough (Conington) the old air/ground frequency of 123.000MHz has been replaced by 129.725MHz; also that the Gatwick Radar frequency of 119.600MHz 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* 49/1969, gives the UNICOM frequency as 130.425 MHz. It is used within a radius of 10 nautical miles up to FL30 at the scene of major emergencies, and is particularly useful in the area around Yeovilton (Fleet Air Arm Museum) where there are some hazards.

**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 airliner crew 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 aerobatic shows 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 taxiing). Remember the rule: “stop 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) Aerobijumble 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 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 wouldn’t 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**

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<thead>
<tr>
<th>a.d.f.</th>
<th>automatic direction finder</th>
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<tr>
<td>a.f.t.n.</td>
<td>aerial fixed telegraph network</td>
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<tr>
<td>APHAZ</td>
<td>aircraft proximity hazard</td>
</tr>
<tr>
<td>a.t.c.</td>
<td>air traffic control</td>
</tr>
<tr>
<td>CAA</td>
<td>Civil Aviation Authority</td>
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<tr>
<td>d.c.</td>
<td>direct current</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organisation</td>
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<tr>
<td>i.l.s.</td>
<td>instrument landing system</td>
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<tr>
<td>mAh</td>
<td>milliamperes hour</td>
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<tr>
<td>MHz</td>
<td>meghertz</td>
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<tr>
<td>NATS</td>
<td>National Air Traffic Service</td>
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<tr>
<td>n.a.b.</td>
<td>non-directional beacon</td>
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<td>nm</td>
<td>nautical mile</td>
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<tr>
<td>p.a.r.</td>
<td>precision approach radar</td>
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<td>RAF</td>
<td>Royal Air Force</td>
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<td>s.i.d.</td>
<td>standard instrument departure</td>
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<td>TACAN</td>
<td>Tactical Air Navigation</td>
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<td>t.a.f.</td>
<td>terminal area forecast</td>
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<td>VOLMET</td>
<td>Volume MeTeorological reports</td>
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<td>V</td>
<td>volt</td>
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**Airband**

Short Wave Magazine July 1989

15
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ACCESS AND BARCLAY CARDS ACCEPTED.
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 transmitters. It seems as well as currently. 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 minutes. Presenters must sound more

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 really 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 to air time too. Their office in Nashville Tennessee said that the response to their initial broadcasts on 15,690kHz, (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.

IRD

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. IRS starts transmitting at 0730UTC on 9.860MHz Sundays, signing off around 1130UTC. Station manager, Aldo Contronoe, 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 guerilla 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 had 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 guerillas 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 a 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 drown 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 s.w. 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 3300kHz 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 fifties.

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, Trincomalee 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 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 Panafriacan 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. 13m) 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 Lithuania, 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-up on 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 announcements make references to local f.m. frequencies of 102.5MHz and Moron Airbase on 96.1MHz, and summer temperatures around 91 degrees Fahrenheit. 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**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>f.m.</td>
<td>frequency modulation</td>
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<tr>
<td>kH</td>
<td>kilohertz</td>
</tr>
<tr>
<td>kW</td>
<td>kilowatt</td>
</tr>
<tr>
<td>l.s.b.</td>
<td>lower sideband</td>
</tr>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>m.w.</td>
<td>medium wave</td>
</tr>
<tr>
<td>s.w.</td>
<td>short wave</td>
</tr>
<tr>
<td>UTC</td>
<td>coordinated universal time (GMT)</td>
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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.

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to give amazing results

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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 located in many different countries - radio waves do not stop at national boundaries! This process is co-ordinated by the International Telecommunications Union which maintain an international frequency register, in effect a huge database of what, where and when. 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 solve 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 interferance 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 Radiocommunications 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 transceivers, 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 Radiocommunications 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 BUA.
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 "145.6N" 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 149-149.5MHz 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 irradiated 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.

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**Frequency Allocations 146-156MHz**

<table>
<thead>
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<th>Service</th>
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<td>146.000</td>
<td>Emergency Services</td>
</tr>
<tr>
<td>148.000</td>
<td>139.500</td>
</tr>
<tr>
<td>149.000</td>
<td>140.500</td>
</tr>
<tr>
<td>149.900</td>
<td>Navigation Satellites (Space to Earth)</td>
</tr>
<tr>
<td>150.050</td>
<td>Radio Astronomy</td>
</tr>
<tr>
<td>152.000</td>
<td>Emergency Services</td>
</tr>
<tr>
<td>153.000</td>
<td>Radiopaging Systems</td>
</tr>
<tr>
<td>153.500</td>
<td>Government Services</td>
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<td>154.000</td>
<td>Government Services</td>
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<tr>
<td>156.000</td>
<td>Emergency Services</td>
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**Abbreviations**

<table>
<thead>
<tr>
<th>CB</th>
<th>d.c.</th>
<th>DTI</th>
<th>ITU</th>
<th>MHz</th>
<th>n.b.f.m.</th>
<th>RC</th>
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<tr>
<td>Citizens Band</td>
<td>direct current</td>
<td>Department of Trade &amp; Industry</td>
<td>International Telecommunications Union</td>
<td>megahertz</td>
<td>narrow band frequency modulation</td>
<td>remote control</td>
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<tr>
<td>r.f.</td>
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22

Short Wave Magazine July 1989
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 $\lambda/8$ to $\lambda$, 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 $\lambda/2$ apart, and pattern B with the radiators spaced $\lambda$ 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. 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 $\lambda/8$ and with 135° degrees phase difference between the current flowing in each element. If the array is operated horizontally the radiation pattern has the 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 $\lambda/4$ 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 $\lambda/8$ 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 W6JK - author of the book Antennas. Constructional details and dimensions for various W8JK antennas will be found in the ARRL Antenna Book.

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

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ARRL</td>
<td>American Radio Relay League</td>
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<tr>
<td>dBd</td>
<td>gain relative to a half-wave dipole</td>
</tr>
<tr>
<td>h.f.</td>
<td>high frequency</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>ultra-high frequency</td>
</tr>
<tr>
<td>v.h.f.</td>
<td>very high frequency</td>
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<tr>
<td>λ</td>
<td>wavelength</td>
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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.
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SHORT WAVE MAGAZINE JULY 1989
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 negotiates the lamp in the centre of the room.

Note: There is no electrical connection between the lamp and antenna.

How to support your antenna

A cheap TV antenna!

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

Upstairs window 10m
10m
Back of building
Insulator securing antenna to tree
Insulator securing antenna to tree
Old washing line pole

The author's dipole for 3.5 MHz bent to fit

Horizontal omni-directional ceiling antenna

Ceiling antenna where it negotiates the lamp in the centre of the room.

Half-wave lampstand reflector.

An indoor option

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!

Short Wave Magazine July 1989
After a long absence from the hobby, my interest in short wave listening was rekindled by an article on restoring the Eddystone 940 by T.J. Wright in September 88 SWMM. 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 be 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.

### 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 assembly 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.
INTRODUCTION TO DX-TV

Keith Hamer & Garry Smith
Part 19

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):

<table>
<thead>
<tr>
<th>Location</th>
<th>Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>0Hz</td>
</tr>
<tr>
<td>Iran</td>
<td>5kHz</td>
</tr>
<tr>
<td>Dubai</td>
<td>0Hz</td>
</tr>
<tr>
<td>Malaysia</td>
<td>10kHz</td>
</tr>
<tr>
<td>(West)</td>
<td>48.24MHz</td>
</tr>
<tr>
<td>(Sabah)</td>
<td>48.25MHz</td>
</tr>
</tbody>
</table>

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):

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>Vision</th>
<th>Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Te Aroha</td>
<td>0Hz</td>
<td>10kHz</td>
</tr>
<tr>
<td>Hedgehope</td>
<td>0Hz</td>
<td>0Hz</td>
</tr>
<tr>
<td>Kaukau</td>
<td>0Hz</td>
<td>0Hz</td>
</tr>
</tbody>
</table>

Australia Channel AO (Nominal frequency 48.25MHz vision):

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>Vision</th>
<th>Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDCO Toowoomba</td>
<td>0Hz</td>
<td>78kHz</td>
</tr>
<tr>
<td>ABMNO Wagga Wagga</td>
<td>46.240MHz</td>
<td>-10kHz</td>
</tr>
</tbody>
</table>

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
INTRODUCTION TO DX-TV

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 Davies 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 fraught 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 GS family of i.f. modules for positive vision modulation was often met with instability. A basic single-stage inverter 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.

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 49.25MHz. 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.
INTRODUCTION TO DX-TV

Indoors
The antenna could be positioned 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 II.

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 interference 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 7NE. Tel: (0992) 441306.

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!

Abbreviations

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

PRACTICAL WIRELESS JULY 1989 ISSUE

Ten-Tec Paragon Model 585 All-band HF Transceiver Reviewed

A Small Yagi for 50MHz

Transmitter Control for Mobile Operation

On Line to CAIRO - 1

Re-creating John Scott-Taggart’s ST300 Receiver of 1932

They Said We Couldn’t Do It...

Understanding Circuit Diagrams - 15

Antenna Clinic - 7

ON SALE NOW
Piccadilly 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.

**Piccadilly's Studios**

Visitors enter Piccadilly Radio through a smart reception at the Portland Street entrance of the Plaza – an office complex on 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 Saddleworth 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
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 Saddlerworth 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

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 19 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) 678588. 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.
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 transient 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.

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.

**Wavetrap**

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.
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 interference, 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 heterodyne 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.

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
**AX 700E**

**£575 (PSU extra)**

AT LAST — a scanner from Standard! For longer than I can 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).
Unfortunately, Figs. 1 and 2 referred to in the "Scanning" column of June Short Wave Magazine, fell off the page! They are shown below.

**MODIFICATIONS TO TANDY ANTENNA**
- Unscrew end cap
- Rewind coil

**FISHING ROD COLINEAR**
- Seal end with glue
- Coil wound from 17cm length of wire
- Glue rod to connector

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**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 complaints, 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.

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**HAVING DIFFICULTY GETTING YOUR COPY OF SHORT WAVE MAGAZINE?**

Then place a regular order with your newsagent NOW!
This month, let's take a closer look at how radio signals from the transmitting station are propagated into your receiver: What will it look, in very general terms, at the v.h.f. and u.h.f. bands, when in "standard" terms, such as those used by various amateurs, otherwise "equivalent" to the ionosphere, where certain bands are affected in different ways from the type of world-wide propagation using the ionosphere?

Let's start with the rock-bottom base condition, namely the totally dead earth, i.e., no electricity can come and do its job. This is the ground, which can be tolerated between two stations, A and B, but it will tend to be held back and so follows, to some degree, the earth's curving surface.

However, you won't have been on the band very long before you realise that something else is going on, and you are bound to wonder what is going on, and what is going to come, into play. First, the ground isn't flat, but crossed in hills and valleys; I can look out of my window and see the Red Waller repeater about 5km away and some 400m higher! The earth in that hill will act as a large and intense "carrier" to all the signals going around here if we just push our v.h.f. or u.h.f. signals straight at it. Walking along a canal towpath and under one of the masts of the British Waterways, the S-meter and you will see that the signal all but disappears. In other words, the whole system has been seen through earth or brickwork of any thickness.

As I say, it is a reflection of the ionosphere, but in fact the ionosphere refracts or bends the waves back to earth. (Were it truly refraction, it is hard to see how it went up would come back down again, and everything external to the ionosphere would seem to have made a sudden, and intense, return!) At v.h.f. also, ionisation can result in signals from farther away being received; at low v.h.f., a signal from the equator near a sunspot peak, we may even have F-layer world-wide propagation. Sporadic E patches may give us some 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 path of least loss.

Another ionisation effect is that of the aura. Here the noticeable thing is that all the signals come from a direction north of the one we would expect, and that what is transmitted as a T5 signal reaches the other end as an S5 signal. I have been told that this is explainable easily on c.w., with difficulty on s.s.b., and there is a rare hope of any hope of making sense of the aura. Although it is true, say, to your west, you may find, as you crank the beam from west towards north, the signal changes from 19 to 12, as you go from direct to aurorally deflected signal. It is the data yielded by the logs of a v.h.f. contact which provides the key to unlock the secrets of a radar aura 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 coax shell screen being run through the house as it enters the attic. This has yielded about four signals on Top Band in four months. The 3.5 and 14MHz bands usually term with signals, but alas not a lot is heard on 28MHz. Now, Leo wonders why, when he is working G-N working a G in Newcastle, it should turn out that the US station is much louder than 1.8 and 28MHz. There are, in essence, two answers.

First, the relative signal strength: the higher 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 least as high as a point or more and so is unaffected by absorption in ground-based objects. This wave is less affected by such things as mountains and other obstacles and so is the layer which may be as high as 500km in equatorial regions. It is then bent and reflected and returns to earth, maybe a couple of thousand km or more away. Clearly, between the end of the groundwave - which is largely - and the point of arrival of the sky-wave, there is an distance where the signal is insubstantial. This is called the skip distance. At amateur antennas at the lower frequencies, the radiated angle is almost straight up and down. As you fire an earth-borne wave may appear much closer to home, so the skip distance falls; on 3.5MHz, the ground wave and the skywave return overlap, in which case signals in the area of the overlap will often display serious fading. This is because the skywave is fired upwards and travels 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 noise, it is still noise, and the domestic noise, it is still noise, and the domestic noise, it is still noise, and so you can see we have used the cable to connect an unobscured 900pF a.t.u. will probably give you a peak of two or three S-points as it is tuned up, and above the top you get from the removal of the shielding, the result will be a rather droll UK signal which the receiver will probably have trouble in picking up at all. Practically, you can ask the s.a.t.u. to a few bands and if it is sharp enough, and you want a few bands and it is sharp enough, and you want a signal, you can set the receiver to around 10 and you will find that the wire isn't really steady in level, whether a broadcast or amateur signal is in the right place or not. Now alter the antenna, and repeat the check. You will probably find much more signal input, but a little bit of tuning will be needed by TV timebase and similar noise.

Occasionally this rearrangement has taken place unexpectedly, I would suggest moving 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 least as high as a point or more and so is unaffected by absorption in ground-based objects. This wave is less affected by such things as mountains and other obstacles and so is the layer which may be as high as 500km in equatorial regions. It is then bent and reflected and returns to earth, maybe a couple of thousand km or more away. Clearly, between the end of the groundwave - which is largely - and the point of arrival of the sky-wave, there is an distance where the signal is insubstantial. This is called the skip distance. At amateur antennas at the lower frequencies, the radiated angle is almost straight up and down. As you fire an earth-borne wave may appear much closer to home, so the skip distance falls; on 3.5MHz, the ground wave and the skywave return overlap, in which case signals in the area of the overlap will often display serious fading. This is because the skywave is fired upwards and travels 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.

WAB Awards

Although this is to a considerable degree a transmitting activity, there are categories for the s.w.l. and of course, as well known the whole propagation results in some surplus funds which are channelled to such good causes as the Radio Amateur Invalid and Blind Club. Details from Brian Morris, G4KSO, 22 Surndel Avenue, Sandhills Estate, Headington, Oxford OX3 8ED.

THE BANDS

D. Walsmsley is primarily a c.w. man, though he admits to occasionally putting on a suitably apocalyptic look and snapping up a trifle here and there on s.s.b. The latter included ZC4KM and ZS6BGI with the key stuff included a load of DX countries in all Continents, and spread over all bands from 1.8 to 30MHz, EABAB was noted on every band between 3.5 and 24MHz, being missing only on the 1.8 and 28MHz bands.

Now to Ted Trowell, who is also normally a user of all the bands between 3.5 and 28MHz, 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 GMRV antenna, which is hauled down for maintenance at regular intervals.

D. L. Mclean notes how 28MHz would open up on the short path between 0700-1200Z to VK-ZL-JA-Asia, while the earth's period to the letter.

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Rally Calendar
Now that our daughter Ruth has reached an age where it is comparatively 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 the 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
- September 3 - Telford
- October 27/28 - Leicester
- November 4/5 - Llandudno

In addition to meeting readers and hearing your views on the magazine, 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 stumps, so I may have to make a small charge of, say, 10p per copy at the rally to cover my cost.

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 14.056MHz using the callsign VA3AKR and seemed to be an automatic station.

Sure enough, the station 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 abbreviation RBBS usually appears quite prominently after the name of the callign. If you have the time to monitor these bulletin boards can be quite a useful source of 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 setup 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 the required 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 you up with an AEA FK-232 interface, which enables the computer terminal to emit RTTY signals. 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 over some eleven years of monitoring. The receivers currently in use are a Racal RA-111TE and a Trio TS-950S Transceiver. Rob has the choice of three antennas, depending on the band and conditions. These are an 8.7m arnry, 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 in the same supply of comments from two readers, Dave Brown and John Kelday. Both Dave and John use the TU-1000 from Maplin Electronics with great success. This terminal unit can handle the normal 170Hz, 425Hz and 850Hz shifts as well as providing a variable shift from one to 1000Hz. The cost is in the region of £50 and it is ideal for the frequency-conversion, 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 Verstarm from BartG. This unit also has an RS-232 output, but is slightly limited as it can only handle 110Hz and 425Hz shifts. The Verstarm 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-220 receiver which he is 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'm concerned, of course, with compiling and updating an international publication of this type is a fairly onerous task and when combined with the relatively small demand the price is bound to be high.

Now to the details, the information supplied in two volumes the first giving an alphabetical list of ships' names while the other gives, alphabetically, the ship's call sign. A separate publication is titled ITU List VIIA - A List of Call Signs and Numerical Identifiers 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 does it cost? 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 £2 Sw. French which is approximately £18.20, 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 and I will pass the details on to you.

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

1. **15.8975MHz, 1400-1500UTC, Mon-Sat, English**
2. **15.8975MHz, 1510-1600UTC, Sunday, English**
3. **17.525MHz, 0600-0700UTC & 1130-1215UTC, Mon-Sat, English**
4. **17.525MHz, 1310-1400UTC, Monday, English**
5. **Daily, English**
6. **18.385MHz, 0710-0810UTC & 0850-0900UTC, Mon-Sat, English**

**Frequency List**
Several readers have sent in logs for the 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 current month, 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
computers, etc. for utility listening.

The first log for this month was sent in by Chris Swann of Wargrave. I'm sure Elaine will like 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 that would like to put a note to. The first station is on 4.215MHz, RTTY, 50 baud, 425Hz shift and seems to send endless RYs. The second uses 7.68MHz RTTY, 50 baud, 429Hz 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 of the Solar panel projects. The only exception being 19.115MHz 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 disappoiting news from Gordon is the vast amount of illegal operation which is occurring 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. Thanx 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:

0.053MHz FAX 90/576 RTO 2045UTC Moscow Metro
3.0495MHz FAX 120/576 DHJSB 2047UTC German Navy
9.14MHz RTTY 50/7 1827UTC TASS English news
9.8255MHz FAX 120/576 KVM70 0846UTC Honolulu Metro
10.408MHz RTTY 50/7 9V6F3 1735UTC ANSA Singapore
12.658MHz CW 7/7 JNA 2025UTC Tokyo Radio
12.99015MHz RTTY 50/N URO 1457UTC Leningrad, Russian text.
15.508MHz RTTY 50/5 SOP2G 1800UTC PAP Warsaw
17.623MHz RTTY 50/5 ZAA6 0919UTC KUQA Kuwait
18.3635MHz RTTY 50/7 3PL 1720UTC Kinshasa Air

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

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 some help and advice on my own experience and 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 Iridium 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.

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

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 I've also been to visit 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 G3JOR 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 1800MHz (sidewands on 159.875 and 190.125MHz). The satellite has recently been boosted again. I shall see if orbital elements can be obtained for this Cosmos. Pat recommends that we all listen on 160.000MHz (sidewands on 159.875 and 190.125MHz) when it is over its home. The new refurbishing crew will be returning to MIR in late August, headed by Vladimir Dzjambecov 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.

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 hear 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:

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Kennedy Space Centre
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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 a 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 0906UTC. 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 was very interested to know whether anyone knows of any official announcements about the operation of this 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 colliding 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 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 Metts switch off when they enter eclipse but currently you can hear the slow-scan Meteor infra-red signals. Rev. James Brown, an experienced satellite expert, tells me that he did once modify his frametube to display such pictures.

Shower clouds add a characteristic signal 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 1688MHz. 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.

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 evening travelling north and the early hours of the morning travelling southwards.

NOAA 3 is currently back in normal operation having had more problems. On April 19 it 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 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 1902UTC 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 NOAA's use 136.77 and 137.77MHz. It is possible that some of the earlier NOAA's 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.

Geostationary Satellites
Meteosat 3 continues to transmit wexfax 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 receiving 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. These pictures from NOAAs 9 and 10 - truly an excellent data provider. The GOES-W spacecraft imagery bulb failed, as anticipated.

While GOES-E was providing a strong signal I took many recordings and Figs 2 and 3 are such pictures. They show the visible-light pictures of the south-west and north-west quarters. 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 wexfam 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 outside to receive Meteosat digital data.

The digital pictures are quite spectacular and cover slightly different areas compared to the ones transmitted in wexfam format. If any readers are already using the digital data perhaps they could send in some information and perhaps a picture or two?
"Today in West Germany around 27 million radios were tuned 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 contrast 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 in Berlin. 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 Wurzburg 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 Polesden Lacey, near Dorking in Surrey. During the afternoon those wispy clouds were building up and a cold wind was developing. I checked my experience, they are a bad weather indicator so keep an open ear for them readers, but please remember, that when these halos are seen, the moon or the sun is only acting as a light source, what is causing the phenomenon is within our atmosphere.

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 barograph chart in Fig. 2, prepared with the graphics section of the Mini-Office program on my Amstrad PCW8612, 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, Continental signals from 87.5 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 whilst we watch 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 2330 on May 6.

The next three deadlines are: June 19, July 17 & September 18"
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Short Wave Magazine July 1989
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 (SPEM) and logos from Spain’s TVE. While a Sporadic-E disturbance was in progress on the 8th Simon saw Zgilt 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 (SVT 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 regions (Bremanger, Kongsberg and Melhus), Poland (TVP1), Sweden (SVT Kanal-1) and programmes, sometimes in colour, from Hungary (MTV1), Portugal (RTP1) 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-channeling on Chs. E27 and E43 with transmissions from Craigell and Black Hill at 1000 on May 2, received
Once again the holiday season is here and no doubt "nothing 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 experiences?

### Long Wave DX

**Note:** I.w. & m.w. frequencies in kHz; s.w. in kHz; 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 i.w. band plan is implemented on 1 February, its power will rise to 25kW.

When Atlantic 272 commences operation co-channel interference may arise in some areas of the UK because the broadcasts in Arabic from Tipaza, Algeria (1500/750kHz) on 254kHz are generally well received here during the day. As a precaution, Aldershot, Mark Selby rates them as 3334 at 0840 and Phil Townsend noted them as SIO 343 at 1700 in London. This frequency is also used by Lahti, Finland (200kHz) and two stations in the USSR, namely Yerevan (150kHz) and Kazan (150kHz), 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 joint so that it can be easily rotated. It has enabled him to hear for the first time Topolina, Czechoslovakia 272, rated as 44554 at 1100 and Moscow, USSR 263, noted as 22652 at 2130. The directional properties are adequate to separate the 1000kHz transmissions from Ouargla, Algeria on 158 from BBC Radio 4, radiated by Burghhead (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.

### 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, SATV, 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 - Dutch English; Eurosport are at present, due to go German on Eutelsat later this year, remaining English. List on list as well as 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 Commission, in English but Swiss origin and uses Teleclub channel before they open.

### SSTV

In Worthing, Steve Charles uses a Lowe HF-125 receiver, Yaesu CRT-7000 A.U. and 20m long wire antenna for the reception of SSTV signals. These are decoded with Technical Software's RX program on a Sinclair 48K Spectrum computer and fed to an Alphacam 20 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, Italy, Fig.11, Poland, Spain, Fig.12 and Portugal. Don't forget, I am always pleased to hear about your reception of slow scan television pictures and the equipment that you use.

### 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 CQYQ in St John's, Newfoundland and C300 often provide a pointer to conditions and the latest report from Jim Willett (Grimsby) indicated that their signal had peaked SIO 322 around 0100. Despite the poor conditions, Jim managed to log some interesting signals - all rated as 222.

In Weekfield, 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 CQYQ as SIO 233 at 0356 and Radio Globo via Rio, Brazil 1222 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 222 at 0400. Steve Whitt (ipswich) informs me that WSSH has now ceased operation under that callsign.

Instead of experiencing 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 Bangay during the night. After studying the receiver display, he decided to monitor 1.220MHz at 0230 and he was delighted that he could log the broadcasts from Radio Globo via Rio, Brazil which had been recorded at 0235.

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

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

**DXers:**
- E: Lee Bar, Sunderland.
- F: Lez Chipperfield, Droitwich.
- H: George Milmore, Wootton, I.O.W.

**Note:** E: Mark Selby, Aldershot.
- F: Tim Shirley, Bristol.
- G: Jurgen Thiel, Javea, Spain.
- H: Max Wustrow, Bedford.

German (ORF and ZDF); Filmnet - English scrambled; SAT-1 - German; RTL Plus - German as the programmes on Ch. E7, TV5 - French; Super-Dutch - Dutch English; Eurosport are at present, due to go German on Eutelsat later this year, remaining English.
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Having constructed a giant 2m square m.w. loop, Jurgen Thiel found he could not receive at all. In his case it was just too awkward to use in his listening post. Signal levels from stations in UK proved to be almost as good as those obtained with his Beverage antenna, which at one time extended to 350m but local jammers forced him to reduce it to 240m. No new stations were logged with the giant loop, so he has now reverted to his 1000m by 600m loop which has a 40673 m.o.s.f.t pre-amp. He can usually receive BBC Radio 1 on 1053 clearly during daylight, but sometimes broadcast from RTÉ 1 via Mercia, Spain on 855 (125kW) have also been reaching Dick Moon in Gloucestershire. Australia around 0310UTC! Some of the low-power transmissions from Australia were logged by him between 1700 and 1800. They stemmed from CAL Dalwallinu 533 (10kW); 6WF Perth 720 (50kW); 2BA Bega 810 (10kW); 6GN Geraldton 828 (2kW) and 3BA Nagambie 918 (2kW); also 6KY in Perth 1205 (2kW).

**MW Local Radio DX**

"Local radio DXking has been super with several new stations logged," writes Mark Thompson. He achieved his ambition by logging BBC Radio Cornwall "Red Rock 666 (0.34kW) 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 BBC Radio Weymouth via布列塔尼 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 Swanley 1368 as 32233 at 1712. Their transmissions via Lacock 1332 and Swanley 1368 have been joined by Lez Chipperfield in Stourbridge.

Reporting from Newcastle-on-Tyne, Neil Wheatley informed me that the Great North Radio (GNR) is the name of a new service from IRFL Metro Radio via Greenside 1152 (1.8kW) and TFM Radio via Blackpool 1170 (3.2kW). A relatively little known receiver, namely the Sony IC-F7601 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 hf bands, but such events may no longer be expected as we continue to climb the steep slope leading to the peak of the present sunspot cycle. During most flux metre however, many broadcasts are heard 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 (As 1440-1600) were rated as 55544 at 1529 by Paul Heins in Cinderford. The daily broadcasts to Europe from Radio RSA in Johannesburg, S. Africa 25.790 (0.05kW); England 1400-1556 are well received here, often peaking the 55555 noted at 1445 by Gary Smith in Norwich! In contrast, the 6kW transmissions from Radio For Peace International, Costa Rica 25.945 (Sp, Eng to USA, Europe 1520-2315) are often weak.

In Wallisand, David Edwardson rated them as 24432 at 1940 and the latest report from Alan Roberts in Quebec, Canada quoted 24443 at 1515.
Dick Moon reports that the 11m broadcast to Africa is reaching their target well! He rated RTB Belgium 21.645 as 44444 at 11:00; Radio DW (Gold), noted 21.700, (Ger), Port in Europe (Eng 0100-0915) and in England as beamered 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 33332, but more often it is poor and does not exist.

Radio Australia use this band to reach listeners in S.Africa via Carnarvon, W.Australia on 17.715 (Eng 0100-0105) and in the Pacific area via Shepparton, SE.Australia on 17.795 (Eng 2200-0800). Both transmissions have been audible in the UK, David Edwards rated 17.715 as 24432 at 0610 and Alan Smith noted 17.795 as SIO 333 at 0550.

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) 24223 at 0536 by Kenneth Reece; KYO 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, Hindi to South Asia).
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73 from Dave G4KQH, Technical Manager.
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**Note:** Entries marked * were logged during darkness. All other entries were logged during daylight.

**DXers:**
- A: Leo Barr, Sunderland
- B: Leo Chippendale, Stourbridge
- C: P.R. Guri-upada, Mombasa, Botswana
- D: Theophylle, Douala, Douala, Mba, of Man
- E: Sheila Hughes, Morden
- F: Neil Wheatley, Lynn
- G: Dick Moon, South Africa
- H: Chris Hordi, Leeds
- I: Stewart Russell, Forfar
- J: Mark Selby, Aldershot
- K: Tom Shirley, Bristol
- L: Lorneshiel, Javea, Spain
- M: Phil Townsend, London
- N: Fred Walker, Newcastle
- O: Garry Judd, Fiji
- P: John William, Huntingdon
- Q: John Williams, Exeter
- R: Rlan Wood, Buckie
- S: Mark Thomas, Norwich

At 0600 David Edwardson noted his broadcast to the C.Pacific area via Shepparton 15.160 (Eng 2100-0700) as 3444.3. Their transmissions were logged as Caravento E.Africa 15.300, Eng (Ch 0100-0900) were noted as 33333. At 0600 December 1989 by Kenneth Recco and to S.Africa 15.415 (Eng 1200-1100) as 14432 and 0930 by Richard Radford-Youngs. Some of the broadcasts to other areas were logged during the day Radio Japan via Yamata 15.270 (Eng, Japan to Australia 0500-1000), noted as SEEN & HEARD at 0300 to 0700 by Cyril Kellam, Voice of Malaysia, Kuala Lumpur 15.290.
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