LOWE HF-225 COMMUNICATIONS RECEIVER REVIEWED

THIS IS TWO EMMA TOC
The story of P.P. Eckersley

SPECIAL BOOK OFFER
Buy the 9th Edition of Guide to Facsimile Stations by Klingenhuss and save over £2.00
When you are ready to graduate to real listening Look to Lowe

The New HF-225 Receiver

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

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

The HF-225 has a range of low cost options which extend its appeal, such as a keypad for direct frequency entry, which simply plugs into a rear panel jack; an active whip aerial; a rechargeable battery pack for portable use; and an attractive carrying case which protects the receiver whilst allowing full operational use. The new D-225 detector option is really something special. 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: John Wrightson has reviewed the new Lowe HF-225 communications receiver for Short Wave Magazine readers and was favourably impressed with what he found.

Pre-publication Book Offer
John Wrightson

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F. C. Judd G2BCX

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Part 6
Joan Ham

This is Two Emma Toc
Part 2
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SWM Review
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Brian Oddy G3FEX

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A WORD IN EDGEWAYS

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

Moving on to C. Stapleton of Torquay. He likes his Philips D1835, I do too, that's why I sell 'em! His comments are very accurate! I hope the person who recently phoned as to this model reads CS's letter as to his QSLs. Mrs L. A. Reed of Cheltenham has brought up a point in airport/plane security. We have checked this out. CARRY your radio so that those involved in checking such items can do so quickly. OK, so it is that little bit extra to have to hand, but radios packed away in luggage are likely to cause delay and holdups! There are a host of pocket multi-band portables available, we have a choice of over six in stock. Bon voyage everyone!

Nice comments from

Harold G3FLJ, but wouldn't buy the BETWARE?

There is a batch of these radios under the Sangean badge which have a "fault". There is a programming error in the organising software for IC402. On 16, 19, 25 and 31 metres the start frequency is wrongly programmed, hence the clearout price! To date, I have been unable to source who will service these models. With the Tatung MTR7602 we have the full UK Factory Service Department backup for service and parts! Caveat emptor.

John Berridge writes about his Russian radios - four in all! Well, I sell Vega radios in large quantities, and I can say, very honestly, that we find our radios very reliable indeed, with little comebacks and if we did have trouble I can assure you I would show them the door pretty quick! Mind you, John has a point about the turret tuner. To quote from a letter which I received from a Russian - "One must be a brave man to sell the dinosaur of the radio industry, the wavechange switch sounds like a Kalishkov machine gun". Still, they don't come much cheaper. If you require spares John, contact Vega at Zenith House, 69 Lawrence Rd, Tottenham, London. Tel: 01-800 8086.

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

PETER BROWNBRIDGE
JOHNSONS SHORTWAVE RADIO
WORCESTER

Sir
Brian Oddy's "Starting Out" article in the April issue was both interesting and well done, as usual. My interest in calibration has prompted me to write. As the H.F. time-signal transmissions of MSF from Rugby, ceased on the 29 February 1988, experimenters might receive those of RWM from Moscow. These are 4kHz lower in frequency than those given by Mr Oddy. BPM from China are "expected" frequencies, like WWV from USA, but are much weaker.

T. J. WYNN
NEWPORT
GWENT

Sir
With reference to Mr Wright's letter in the March issue of SWM asking for recommendations regarding suitable radios in the £100 to £150 bracket. I have been an avid s.w.l. for 20 years and in that time have owned a number of short wave receivers including a Lowe SRX-30, various Edystone and Grundig models, Vega portables, and so on. However, I believe that my present model, a Sony 7600DS, has the edge over all of them.

I would mention the following points as being important factors to consider when purchasing a set:
1. Portability
2. Sensitivity
3. Digital Readout (Accuracy)
4. Stability
5. SSB

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

R. B. WATSON
GREEN DUNS CROFT
DONCASTER

WHAT'S NEW

DXpedition

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

This event will be taking place from 2300 June 2 to 2300 June 3. The proposed frequencies will be 14.195, 14.305, 14.401 and 14.60MHz. The callsign to look for is P29CEH. A special QSL card will be available. Any s.w.l. who is able to receive the station should send a detailed reception report to the address listed below. PO Box 789, Goroka, EHP, Papua New Guinea

EJ0A DXpedition

A DXpedition to the Aran Islands, IOTA EU06 will take place from June 2 to June 5. A group of US and Irish amateurs will be active on 3.5, 7, 14, 21 and 28MHz s.s.b./c.w. and 144MHz s.s.b., l.m. and packet. The group will use the callsign EJ0A. QSLs via Joe W2ORA or Alan E18EM.
Trans-Atlantic Challenge

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

Operational frequencies & modes: 14MHz station - 144.101 (A1A, c.w.); 144.225 (J3E s.s.b.); 70MHz station - 70.144 (A1A and J3E); 50MHz station - to be announced: HF control station - 14.330 (J3E); 21.330 (J3E); 3.76 (J3E).

Experimental Criteria: To log weather electromagnetic, atmospheric noise and solar radiation patterns to assist in the prediction of Aurora activity so that a study of anomalous v.h.f. radio propagation can be carried out. To monitor amateur radio beacons in the North American continent. To study the following propagation modes and mechanisms: radio propagation by Sporadic-E, communication paths utilising moon bounce and meteor scatter, the effect of various weather patterns on propagation and the effect of long range v.h.f. propagation over water. To study the effect of auroral activity on h.f. propagation by monitoring the 14.15MHz world-wide beacon network, as established by the North California DX Foundation.

The 800 Award

In 1189, Northampton was granted a charter by Richard I. The anniversary of this being celebrated this year, Northampton Radio Club is playing its part in these celebrations by the operation of the station GB800 throughout the year, and by contacting the other Northamptons in the world on the actual anniversary in November.

It has also now been decided to instigate the 800 Award Certificate which can be earned as follows:
- Minimum of 25 points necessary in the UK or 20 points elsewhere, points awarded for contacts in the area of Northampton Borough Council: GB800 = 10 points, G3GBP or GM8LED = 5 points, Northampton Radio Club members = 2 points, other amateurs = 1 point.

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

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

Snippets from Sweden

Dominican Republic: Since February 16, a transmitter on 11.7MHz has been observed relaying programmes from Radio Mil and Radio Clarin weekdays. The transmitter usually signs on between 1030 and 1130 with the Radio Mil Informativa morning news bulletin in progress until the end of the programme, usually at about 1230. This is followed by Radio Clarin’s local service, with Radio Mil’s news programmes from 1630/45 and again from 2130 to approximately 2300. Relays of Radio Clarin’s local service include an evening news programme entitled Clarin Informativo between 2300 and 2400.

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

Iraq: Radio Baghdad in Spanish was heard at 1800-1850 on 9.755MHz, at 2200-2255 on 11.710MHz and 13.880MHz.


The frequency is 15.345MHz.

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

Pakistan: Radio Pakistan is broadcasting to Europe on a new frequency 15.845MHz, replacing 9.76MHz. This concerns Urdu at 1645 and 1800, English at 1718 and French at 1915, 11.57MHz is in parallel. The new Radio Pakistan address is: English Section, World Service, Radio Pakistan, Box 1933, Islamabad, Pakistan.

Radio Sweden English Schedule

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<th>UTC</th>
<th>MHz</th>
<th>Beam</th>
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Asia/Australia:

| 1230 | 21.610 | 13 | 65 |
| 1230 | 17.795 | 16 | 100 |
| 1400 | 21.610 | 13 | 70 |
| 1400 | 17.705 | 16 | 100 |
| 1530 | 17.705 | 16 | 100 |
| 1530 | 1.179 | 254 | omni |
| 2010 | 15.390 | 19 | 100 |
| North America |
| 1530 | 21.610 | 13 | 305 |
| 1530 | 17.680 | 16 | 320 |
| 2000 | 9.665 | 31 | 320 |

D.L.F. European Services

**Weekdays**

236.4m m.w. 1.269MHz

Danish 1930-2000

English 2015-2100

Dutch 2100-2130

Swedish 2130-2200

Norwegian 2200-2230

194.9m m.w. 1.539MHz

French 1930-1945

Czech & Slovak 2000-2030

Polish 2030-2100

French 2100-2130

Polish 2130-2200

Czech & Slovak 2200-2230

Hungarian 2230-2300

Italian 2300-2330

**Sundays**

236.4m m.w. 1.269MHz

English 2015-2100

Dutch 2100-2130

194.9m m.w. 1.539MHz

Czech & Slovak 2000-2030

Polish 2030-2100

French 2100-2130

Polish 2130-2200

Czech & Slovak 2200-2300

Hungarian 2230-2300

Italian 2300-2330

Times are given as local West German times.
LISTEN OUT FOR

GB2NTS, GB2NTU, GB2NTW and GB2NTE: On July 29/30 four stations will be on the air from different National Trust properties, one each in Scotland, Ulster, England and Wales. Hopefully Ireland will make up a fifth country (E1). 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 Commemorative Certificate available. Overseas the cost is £15 or equivalent return postage by Air Mail, UK/Ireland it requires a 19p s.a.e. You need to send QSL cards or log extracts to Scottish Tourist Board (Radio Amateur) Expedition Group, PO Box 59, Hamilton, Scotland ML3 6QB.

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

GB2WW: The station will be on the air from Kirbinton Airfield from 25th June to celebrate the 50th Anniversary of D-Day landings.

GB2WW: This station will be on the air again from Kirbinton Airfield for the Remembrance Service of 375 Bomp Gp USAF. 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 GOEYM. 30 Cotswold Close, Putnoe, Bedford MK41 9LR. Tel: (0324) 244506.


FOR SALE: Trio R-2000 general coverage receiver 150kHz-30MHz fitted with VC10 v.h.f. converter 118-174MHz, excellent condition. Buyer collects, offers £525. Tel: (0582) 686716.

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


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

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

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

FOR SALE: 4 new amplifier valves, unsealed and unused, at £45 each. Ring or write for details to J. Heron, Windsor House, 358 East Reach, Taunton, Somerset. Tel: (0823) 275655.

FOR SALE: Black Jaguar MkII computerised scanning receiver £350, two v.h.f. low, air v.h.f. mid, v.h.f. high, uh.f., 8 months old. Bargain £135 with full frequency guide. Mr. L. Wilkins. Tel: Redhill (0737) 769788.

WANTED: v.h.f.u.h.f., 5 inch colour multi-standard TV, Pal/Secam, a/c/d/c., Pref Secam L, 5.5MHz/0.65MHz sound, might consider, Yoko (mono) F6, or (colour) JVC CX 610 GB. M. B. Evans. Tel: 01-505 6303.

Complete the form in July's 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 an amount of payment of £2.30, to Trading Post, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH18 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 number or your subscription number as proof of purchase of the magazine.

FOR SALE: Trio R2000 receiver. Very good condition, original packaging, manual, etc. MM 2m converter £400.00. Ian Fay, 7 Oakridge Close, Forest Town, Mansfield, Notts NG19 0YE. Tel: Mansfield (0623) 25561.

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


FOR SALE: Sony ICF-2001D immaculate and complete with power supply etc. £190.00. Tel: (0553) 589063 ask for Mike.

FOR SALE: Kenwood R2000 receiver with VC10, v.h.f. converter and Maplin a.t.u. Showroom condition, no mods, also homebrew mast and 144MHz Slim Jim antenna also computer desk. Complete station for £500.00. Tom Colborne, 13 College Close, Long Load, Langport, Somerset. Tel: (0458) 24262.

FOR SALE: Dressler ARA30 active antenna, as new, original packing, half price £60.00. Wanted antenna tuning Art. J. House, 4 Elizabeth Way, Kemilworth, Warwickshire CV8 1QP. Tel: (0926) 54555 (6-8pm).

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

FOR SALE: BGP. Tel: (0234) 244506.
**RALLIES**

**SWM in attendance**

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

**May 28:** Plymouth Radio Club are holding their mobile rally at Plymouth School, Church Road, Plymouth. Doors open at 10am and there is a large, free car park, refreshments, raffle, trade stands, demonstrations and talk on S22. Full details from: Joe GR1XX on (0752) 509855.

**May 28:** The rally will be at the Maidstone (YMCA) Sports centre on the A229 at Loose Village, Maidstone, Kent ME16 8EE at 10.30am. For disabled visitors can get in free at 10am. There is also free overnight parking with a snack bar, showers, etc., available. There are children’s videos and a play.Talk on S22 and all the usual trade stands. For more details, contact: GEF2D. Tel: (0622) 507097.

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

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

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

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

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

**June 25:** The 32nd Longleat Amateur Radio Rally will be held as usual in the grounds of Longleat House, Warminster, Wilts. This rally is also well known for offering something for the whole family. More details from: Shaun O’Sullivan G8PGV, 15 Witney Close, Saffron Walden CB18 3DX.

**June 30 - July 2:** The Popular Flying Association Rally is again being held at Cranfield Aerodrome, Bedfordshire. The rally covers the whole spectrum of sport

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

Toothill 8 is Wednesdays, 8pm at Marconi College, Arbour Lane. Roy 7.30pm at Marconi College, Arbour Lane. Eric 7.30pm

Cheshunt & District ARC have Natter Nights on June 7/21 and Open Air meeting - Baas Hill Common on the 14th. Wednesdays, 8pm in the Church Room, Church Lane, Wombles. Roger Frisby G4OAA on Hoddesdon 644795.

Wimbledon & District ARC meet 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arroce Park Rd, Birkenhead, June 21 is a Capacitance G3GEX, Alec Seater G4OUQ on 01-644 6094.

Verulam ARC have an Informal/Activity evening on June 13 and a lecture/RAYNET by G4XUU on the 27th. 2nd & 4th Tuesdays, 7.30pm at RAHF, New Kent Rd, St Albans. George Christofi G0DJX on 01-426 2689.

Bath & District ARC meet Wednesdays, 8pm at Englishcombe Lane. Eric G4GEO on Combe Down 832156.

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at the Railway Enthusiasts Club Premises, off Hawley Lane (by M3 bridge). Tim FitzGerald G4UGE on Camberley 292321.

Chelmsford ARC have a meeting on June 6. 1st Tuesdays, 7.30pm at Marconi College, Arbor Lane. Roy G3PMX on Chelmsford 352221 ext. 3815.

Ipswich RC meet at 8pm in the Red Lion, 284 Bramford Rd. June 8 is Morse test at Ipswich and the 17th is Annual QRP day. Jack Toothill G4FF on Ipswich 464047.

South Dorset RS meet 1st Tuesdays, 7.30pm at the Peninsular Castle Hotel, Portland. Further details from Geoff G4FWL on Weymouth 781164 after 6pm.

South & Chess RS have a committee meeting at 20 West Ave, Ashford on May 30, a Natter Night on June 5, visit to Mercury Comms Satellite Earth Station at Tallack, nr Oxford on the 14th and Inter-Club Quiz (No. 2) S&C v CATS at home on the 16th.

ARGARC have Pyramidaleys G3YEE on May 30 and Natter Nights on June 6/16. 20 Clubroom, rear of Victoria Hall, 8pm. Kathy G1JGH on Bradford 496222.

Bournemouth & District ARC meet on Fridays, 7.30pm in Downs Lawn Tennis Club, Holland Ave, Chesham. Natter Nights, 1st Mondays in Down Road, John Pottock GBBVW on 01-644 9945.

Biggin Hill ARC meet 3rd Tuesdays, 7.30pm at Victory Social Club, Kehchill, Gdns, Hayes, June 20 is G2M1 Souvenirs. Geoff Milne G3UMV on 01-462 2689.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. June 8 is Robots G5JL, the 15th is Aerial Directivity G3YM and the 22nd is Sky Wave Absorption G3YM. David Bailey G4BJ on 7 Thatchem Cl, Yeovil BA21 3BS.

Dunstable Downs RC meet Fridays, Room 3, Chews House, 77 High St South, June 4th, is G8KTW and the 18th is G4/1Q/24hrs.

Coventry ARC meet Fridays, 8pm at Baden Powell House, 121 St Nicholas St, Radford. May 26/June 9 are Nights on air & Morse tuition. June 8 is night on air - out of town. Paul B65U on 01-597 7117.

Kirkby ARC meet Wednesdays, 7.30 at the Kirkby Sports Centre, 15 Valley Rd, Westvale, Kirkby, House, Pellon Lane. 1st Tuesdays are informal Noggin and Natter nights. Paul 7.30pm and Roger Frisby G4OAA on 01-644 9945.

G4FWL is Programme Controller. G3YEE on G4FYO at Weymouth 781164 after 6pm.

Grassroots

Lorna Mower

ACTON, Brentford & Chesswick ARC meet 1st & 3rd Fridays, 7.30pm at Chesswick Town Hall, High Rd. June 20 station Accessories. W.G. Dyer G3GHE at 188 Gunnersbury Ave, Acton, London W3 8LB.

Midland ARC have a Treasure Hunt on June 20. Thursdays are Natter Nights, Wednesdays.

P MORE, 1st Tuesdays are Committee, 2nd Tuesdays and last Mondays BBC Computer Nights. 4th Tuesdays Birmingham RAYNET group. All meetings begin at 7.30pm, apart from Wednesdays at 7pm. Unit 16, 60 Regent Place, in the Jewellery Quarter. Paul O’Connor G1ZYC on 021-443 5157.

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Wimbledon & District ARC meet 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arroce Park Rd, Birkenhead, June 21 is a Capacitance G3GEX, Alec Seater G4OUQ on 01-644 6094.

Verulam ARC have an Informal/Activity evening on June 13 and a lecture/RAYNET by G4XUU on the 27th. 2nd & 4th Tuesdays, 7.30pm at RAHF, New Kent Rd, St Albans. George Christofi G0DJX on 01-426 2689.

Bath & District ARC meet Wednesdays, 8pm at Englishcombe Lane. Eric G4GEO on Combe Down 832156.

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at the Railway Enthusiasts Club Premises, off Hawley Lane (by M3 bridge). Tim FitzGerald G4UGE on Camberley 292321.

Chelmsford ARC have a meeting on June 6. 1st Tuesdays, 7.30pm at Marconi College, Arbor Lane. Roy G3PMX on Chelmsford 352221 ext. 3815.

Ipswich RC meet at 8pm in the Red Lion, 284 Bramford Rd. June 8 is Morse test at Ipswich and the 17th is Annual QRP day. Jack Toothill G4FF on Ipswich 464047.

South Dorset RS meet 1st Tuesdays, 7.30pm at the Peninsular Castle Hotel, Portland. Further details from Geoff G4FWL on G4FYO at Weymouth 781164 after 6pm.

South & Chess RS have a committee meeting at 20 West Ave, Ashford on May 30, a Natter Night on June 5, visit to Mercury Comms Satellite Earth Station at Tallack, nr Oxford on the 14th and Inter-Club Quiz (No. 2) S&C v CATS at home on the 16th.

ARGARC have Pyramidaleys G3YEE on May 30 and Natter Nights on June 6/16. 20 Clubroom, rear of Victoria Hall, 8pm. Kathy G1JGH on Bradford 496222.

Bournemouth & District ARC meet on Fridays, 7.30pm in Downs Lawn Tennis Club, Holland Ave, Chesham. Natter Nights, 1st Mondays in Down Road, John Pottock GBBVW on 01-644 9945.

Biggin Hill ARC meet 3rd Tuesdays, 7.30pm at Victory Social Club, Kehchill, Gdns, Hayes, June 20 is G2M1 Souvenirs. Geoff Milne G3UMV on 01-462 2689.

Yeovil ARC meet Thursdays, 7.30pm at The Recreation Centre, Chilton Grove. June 8 is Robots G5JL, the 15th is Aerial Directivity G3YM and the 22nd is Sky Wave Absorption G3YM. David Bailey G4BJ on 7 Thatchem Cl, Yeovil BA21 3BS.

Dunstable Downs RC meet Fridays, Room 3, Chews House, 77 High St South, June 4th, is G8KTW and the 18th is G4/1Q/24hrs.

Coventry ARC meet Fridays, 8pm at Baden Powell House, 121 St Nicholas St, Radford. May 26/June 9 are Nights on air & Morse tuition. June 8 is night on air - out of town. Paul B65U on 01-597 7117.

Kirkby ARC meet Wednesdays, 7.30 at the Kirkby Sports Centre, 15 Valley Rd, Westvale, Kirkby, House, Pellon Lane. 1st Tuesdays are informal Noggin and Natter nights. Paul 7.30pm and Roger Frisby G4OAA on 01-644 9945.

G4FWL is Programme Controller. G3YEE on G4FYO at Weymouth 781164 after 6pm.
Special Book Offer


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

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

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

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

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

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

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

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

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

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

The R-5000 from Kenwood

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

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

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

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

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

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

In the words of Dr Samuel Johnson when he referred to London:"
"Prepare for death if here at night you roam,"
"And sign your will before you sup from home."
Caveat Emptor.
John Wilson.
G3PCY/5N2AAC

R5000 £875 inc VAT
VC20 £167 inc VAT
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 Electronica 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 importors 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 receiver 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.
Lowe HF-225 HF Receiver

John Wrightson

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

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

Features

The receiver covers the entire h.f. spectrum from 0.3 to 30MHz, with a tuning knob adjustable with 1MHz up/down buttons on the front panel being used for frequency selection. An optional keypad for direct frequency entry plugs into the rear of the set and will set you back an extra £19.50.

Reception modes provided are c.w., u.s.b., l.s.b. and a.m., with internal i.f. filters of 22, 4, 7 and 10kHz being fitted. In normal use an appropriate filter is automatically selected for the mode in use, but a different filter width may be switched into use by pressing the appropriate front panel buttons. The c.w. buffs will be pleased to know that a switchable, audio bandpass filter is fitted, with a 200Hz audio bandwidth centred on a c.w. note of 800Hz. A further, optional, unit (£39.50 extra) may be plugged-in inside the set to give f.m. and synchronous a.m. (a.m.s.) reception (more of this later), a fixed 12kHz width i.f. filter being used for f.m. reception.

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

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

For use in strong signal areas an internal 20dB r.f. attenuator can be switched in from the front panel, and an audio noise blanker acting on the i.f. signal is in circuit at all times to give a degree of noise suppression. The set can be used portable and is fitted with a plug-in mains unit being provided to power the set from the 240V a.c. mains supply.

Tuning

Tuning is performed in 8Hz synthesiser steps on c.w., s.s.b. and synchronous a.m. when fitted, in 50Hz steps on a.m., and in 125Hz steps on f.m. when fitted, giving 1, 6, 9 and 26kHz respectively for a complete rotation of the tuning knob. Two digital v.f.o.s are provided, together with 30 memory channels, each storing any given frequency. A line of five front panel buttons are used in “primary” and “secondary” function modes to switch between v.f.o.s, memory channels, filter widths and so on, a rotary knob selecting the actual reception mode. Two more rotary knobs are used for the On/Off/Volume and Tone controls, the latter providing either f.m. or h.f. audio frequency cut depending on its position. A small speaker is fitted underneath a grille on the top panel of the set, and a front panel socket is provided for either mono or stereo headphones.

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

In Use

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

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

Memories

The memories can be used for a selection of pre-set channels. The frequency of each memory channel may be checked without...
altering the tuned frequency, the tuning knob acting as a "memory channel" knob in this mode. A press of the memory "recall" button then switches over reception to the selected memory frequency. Alternatively, it is possible to step through the memory channels, receiving each frequency in turn. This was quite useful for storing several of the alternative broadcast frequencies used by individual stations, switching between these for the best reception under the prevailing propagation conditions. As it was possible to tune away from each memory after recall, this facility could also be used to change bands, each memory storing the centre frequency of an amateur or broadcast band for example. However, the memory channels store only the frequency, other parameters such as reception mode being omitted.

**Synchronous AM**

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

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

**Amateur Bands**

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

Connecting the receiver audio output to a KAM all-mode terminal unit gave excellent results, all manner of interesting stations being demodulated. I found the tone control on the receiver was useful in reducing low audio frequencies when receiving data signals such as packet, but I would have preferred the facility for adding a narrower i.f. filter, such as 600Hz, for digital modes or c.w. This could certainly give better performance in crowded band conditions, but then the low cost of the receiver must be borne in mind.

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

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

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

**Laboratory Tests**

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

**Conclusions**

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

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

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

### SPECIFICATIONS

#### Sensitivity:

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>AM</th>
<th>SSB</th>
<th>FM</th>
</tr>
</thead>
<tbody>
<tr>
<td>60kHz - 2MHz</td>
<td>&lt;1.2µV</td>
<td>&lt;1.0µV</td>
<td>&lt;0.6µV</td>
</tr>
<tr>
<td>2 - 30MHz</td>
<td>&lt;0.9µV @ 1.8MHz</td>
<td>&lt;0.5µV @ 1.8MHz</td>
<td>&lt;0.9µV @ 30MHz</td>
</tr>
</tbody>
</table>

#### Selectivity:

<table>
<thead>
<tr>
<th>IF Filter (kHz)</th>
<th>Bandwidth (kHz)</th>
<th>Shape Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>2.3 (2.27)</td>
<td>1:1.5</td>
</tr>
<tr>
<td>4</td>
<td>5.9 (5.56)</td>
<td>1:1.7</td>
</tr>
<tr>
<td>7</td>
<td>12.9 (7.73)</td>
<td>1:1.5</td>
</tr>
<tr>
<td>10</td>
<td>21.5 (10.53)</td>
<td>1:1.2</td>
</tr>
</tbody>
</table>

#### Dynamic Range:

- **Reciprocal mixing effects** (2.2kHz filter): >80dB @ 0.5kHz from wanted signal (84dB)
- **Intermodulation effects** (2.2kHz filter):
  - 10kHz signal separation
  - 3rd order intercept point > +3dBm
  - Intermod-free dynamic range >85dB @ 50kHz signal separation
  - 3rd order intercept point > +12dBm
  - Intermod-free dynamic range >93dB

#### Spurious responses:

- **Image rejection**:
  - +90MHz >75dB (>75.5dB)
  - +910kHz >90dB
- **Fixed response rejection**:
  - 45MHz >85dB (>85dB)
  - 455kHz >100dB
  - 22.5MHz >75dB

#### Power supply:

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

#### Dimensions:

- 253 x 109 x 204mm

#### Weight:

- 1.9kg (2.8kg with batteries)

Measured values in parenthesis.

### Abbreviations

- a.c.: alternating current
- a.g.c.: automatic gain control
- a.m.: amplitude modulation
- a.m.s.: synchronous a.m.
- c.w.: continuous wave (Morse)
- d.c.: direct current
- dB: decibel
- dBm: decibel referred to 1 milliwatt
- f.m.: frequency modulation
- Hz: hertz
- i.c.: integrated circuit
- i.f.: intermediate frequency
- kg: kilogram
- kHz: kilohertz
- l.c.d.: liquid crystal display
- l.f.: low frequency
- l.s.b.: lower sideband
- mA: millamp
- MHz: megahertz
- mm: millimetre
- r.f.: radio frequency
- s.s.b.: single sideband
- u.s.b.: upper sideband
- V: volt
- v.f.o.: variable frequency oscillator
- µV: microvolt
- Ω: ohm
Here at Raycom the Yaesu FRG-9600 has always been a favourite. We have taken the '9600, fine tuned it, added our own modifications and turned what has always been a good scanner into a unit offering unmatched versatility for its price. The standard model covers 60-905 MHz with AM/FM/SSB, and our Mark 2 mod extends this to 950MHz and has an 'N' connector fitted. Our Mark 5 mod fits an active front end to increase coverage to 100KHz to 950MHz with a display mod to give a correct frequency readout. These mods can also be fitted to your '9600! Phone us for details.

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  - 2S-1000 MHz
  - 2GHz
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- **FRG-9600** (Std) 60-905MHz
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- **FRG-9600 Mk 2 50-950 MHz**
  - £545.00
- **FRG-9600 Mk 5 0-1-950 MHz**
  - £699.00
- Please include £10 post/packing/insurance
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- Your '9600 brought up to Mk 2 £40.00
- Your '9600 brought up to Mk 5 £129.00
- Modification prices include return carriage.

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

<table>
<thead>
<tr>
<th>FREQUENCY CHECKLIST</th>
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<tbody>
<tr>
<td>6 &amp; 10 METRE HAM RADIO</td>
</tr>
<tr>
<td>CIVIL AIRCRAFT</td>
</tr>
<tr>
<td>VHF/UHF HAM RADIO</td>
</tr>
<tr>
<td>PMR LAND MOBILE</td>
</tr>
<tr>
<td>MARINE</td>
</tr>
<tr>
<td>CELLULAR PHONES</td>
</tr>
<tr>
<td>RADIO CONTROL MONITOR</td>
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</table>

- **FRG-9600**
  - £295.00
  - (save £30)

**CHALLENGER BJ200**

**BJ200 Scanner Package**

Challenger BJ200 HF/VHF/UHF Scanning Receiver

- 26-30, 60-88, 115-178, 210-260, 410-520 MHz
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- **£199.00**
  - **£229.00**
  - Plus £10 post/packing

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Congestion in the London terminal manoeuvring area (t.m.a.) seems to be a topical problem. The t.m.a. is a defined area of controlled airspace which covers Heathrow, Gatwick, Stansted and Luton and lies at the confluence of various airways such as A1, A2, A20, B3, B4, G1, R1 and many others. Its height varies from place to place but always starts well above ground level. However, surrounding each airport, there is a smaller special rules or control zone extending from the surface up to the local base of the t.m.a. Presently, aircraft are brought in to the t.m.a. from the airways by London Airways control at the London Air Traffic Control Centre (LATCC) which is sited at West Drayton, immediately north of Heathrow. Flights are then handed off to an approach radar controller at the destination airport and are guided through the t.m.a. (via any holds or "stacks") to descend down to the airport’s own local control zone boundary. Soon after this the Tower controller (in the visual control room at the airport) takes over. Hence each airport within the London t.m.a. is taking aircraft from LATCC and performing its own radar approach control.

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

You Write

Lucky Graham Hewitt (Coventry) has an office overlooking the centre section of Birmingham’s runway 15/33 which he says is “very distracting” - wonder what the boss makes of it! Graham’s first aeronautical interest was as an ops clerk (SAC) at RAF Bruggen, Germany. To answer your question, the VOLMET transmissions originate at some of the sites used as relays by LATCC (see below). I’m not sure where the Birmingham • t.i.s. (automatic terminal information service) is broadcast from, but being on 113.65MHz it’s in the v.o.r. beacon and t.i.s. band (i.e. is below 118MHz) so is being transmitted from a beacon away from the airport.

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

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

Frequency and Operational Information

Looking first at the CAA’s General Aviation Safety Information Leaflet 3/89 the London t.m.a. is being extended at its south-eastern corner near the Detling v.o.r. beacon. If you are a pilot, NOTAM A163 gives the details. This Leaflet also reminds pilots to press the transmit button, pause ever so briefly, and then to speak - in that order! Otherwise, the first word of the transmission gets clipped.

First time correspondent Peter Finn (Milford Haven, Dyfed) sends a list of the LATCC relay stations which should interest Graham Hewitt. They are: Birdlip (Gloucestershire), Cheddington, (Suffolk) Cleethorpes (Humberside), Daventry (Northamptonshire), Daventry (Northamptonshire), Davidstow Moor (Cornwall), Grantham (Lincolnshire), Great Dunfell (Cumbria), Greenwich (Middlesex), Kelsall (Lancashire), Preston (Lancashire), Snaefell (Isle of Man), Swingfield (Kent), Tring (Hertfordshire), Ventnor (Isle of Wight) and Warrington (Cheshire). Peter also has a question: are the Shanklin V.H.F. frequencies relayed, and if so, from where? An example would be the organised tracks transmitted on 133.8MHz.

Information Sources

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

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

Follow-Ups

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

| Photographs: Christine Mihneki |

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

| Godfrey’s flight in a Piper Cherokee Warrior. No crevice is safe from inspection with Godfrey doing the pre-flight checks. |
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ACCESS AND BARCLAY CARDS
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Summer Blues

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

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

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

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

NDXE Is History

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

According to the FCC's letter to Mr Norman, cancelling the NDXE permit, the last communication received from NDXE's legal representative was dated 29 May 1986, and "because of the uncertainty and the status of the construction of the station has actually begun, the application for extension of time is hereby dismissed).

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

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

Atlantic 252

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

Deutschlandfunk Magic!

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

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

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

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

Namibia

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

Radio Luxembourg's s.w. transmitter on 6.060MHz is heard in many parts of the world despite only really being designed for European reception. They also run a rather obscure s.w. service in French towards the Canadian province of Quebec, but because the power on 15,350MHz is only around 10kW, and it is not possible to vary the frequency of the ancient transmitter, this operation is more of a gesture rather than a specific service.

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

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

Vatican Discs

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

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

Veritas Anniversary

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

Consolidation In Boston

At the end of March, the Christian Science Monitor sent termination notices, effective at the end of April, to all but a handful of the 61 full-time employees working at Monitor Radio and the s.w. World Service. Despite having just opened a third s.w. transmitter site, the financial burden of developing the daily television news programme has led the Boston based organisation to considerably trim its radio operations. They have told employees that they intend to announce a smaller number of redefined radio jobs in the very near future. The Washington office of Monitor Radio is expected to close soon, with the rehired employees moving into the TV programme's office space. As from May 1 a new consolidated radio programme commenced. It runs simultaneously via the transmitters in Maine, South Carolina and Saipan. The KYOI station in Saipan is now fed by satellite for the entire period it is on the air, not just part-time as was formerly the case.

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

Storm Hits Radio Australia Site

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

All India Update

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

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

Goodbye Metres?

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

Dr Kim Andrew Elliott, Director of Audience Mail Research at the Voice of America in Washington has been researching into reception figures in the developing world. He reports that recently made receivers in those areas no longer have metres prominently marked on them. One of the largest international broadcasters is the BBC World Service in London. In the evenings here in Europe you can hear some of their relay stations come on the air with references to wavelengths. Andrew Piper is the BBC's planning and development organiser and he explained that the BBC still makes passing references to metres. But what would you say if radio stations dropped references to wavelengths altogether? Drop me a line. We'll pass your comments on to the stations concerned. In fact, come to think of it, it seems surprising that those parts of the world that are still non metric never thought of expressing their wavelength in feet and inches!
ANTENNAS

F. C. Judd G2BCX
Part 6

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

**Broad Band Active Antenna**

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

However, these "active" antennas cannot be used for transmitting.

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

Vertical collinear antennas for v.h.f./u.h.f. use are omni-directional and, depending on the number of half-wave elements (two or more), can provide a useful although not particularly high degree of directivity gain.

The elements are normally "close spaced", as in Fig. 6.3, and driven in phase by means of quarter-wave stubs inserted between each. It is worth mentioning that some commercially made collinears of this type use inductive phasing methods, but if poorly designed these can cause distortion of the vertical radiation pattern and loss of directivity gain; the specification for "gain" is often exaggerated or given in such a way as to be misleading. An accurately calculated or measured vertical radiation pattern, similar to that shown in Fig. 6.4, is a good indication that a vertical collinear has been well designed.

The directivity gain more likely to be obtained with vertical collinears having close-spaced elements is as follows: with two elements 1 to 26dB; three elements 3.2 to 3.5dB; four elements 4 to 4.5dB. About 3.5dB can be obtained with two elements and 6dB with four elements, but the spacing between each must be at least 0.42. Each element has to be separately fed and in such a way that the current in each is in the same phase.

**Two-Element Collinear, Extended Spacing**

Full constructional details of this 2m amateur band antenna are to be published in Practical Wireless. It has been developed from an h.f. antenna known as the "double extended Zepp" to form a two-element vertical collinear.
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The 2LO station was set up by Marconi in 1922, and in November the BBC took over its operation. Capt. Eckersley joined them as Chief Engineer at a salary of £800 per year. He rapidly became responsible for some notable innovations, developments and philosophies, laying the foundations on which the BBC edifice of the future was to rise.

As early as 1923, he had a policy of covering the whole of the country with broadcast programmes, and then to offer the choice of a second programme put out simultaneously on the same wavelength, based on the regions. He set up relay stations, linked by Post Office cables, and was responsible for the installation of the high power long wave transmitters at Daventry, against opposition by the Post Office. Capt. Eckersley studied his subject in depth, making observations of the service areas of stations, studying the design of transmitting antennas with his brother Thomas Eckersley FRS, and H.L. Kirke. Britain’s pioneering national system of broadcasting was one of his schemes, as was the Regional scheme, for which he designed the first BBC London Regional transmitter at Brookman’s Park, Potter’s Bar which was in use until 1952. The central control of the designs was a feature of his introductions - all a far cry from the primitive hut at Writtle which was a transmitter, laboratory, studio and research department. He was able to see far into the future of broadcasting and initiated the Union Internationale de Radiodiffusion in 1925 to try to sort out the wavelength chaos and allocate the limited usable frequencies of the time. This organisation preceded the ITU which is in being today.

Bugbear

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

“Please, PLEASE, I implore you, don’t interfere with the pleasure of others. Please, don’t do it!”

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

“I criticise a policy, not individuals” he said.

Much has been made of the choice of the Marconi TV system over that of Baird. Reith had asked him as Chief engineer to assess it bettered badly from trolley-bus interference. It was inaugurated in 1931 by the Lord Mayor. In 1934, 1935 and 1936 there were demonstrations by The Wire Broadcasting Co. through the electricity mains with the cooperation of the Chief Engineer of Liverpool Corporation Electric Supply Co.

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

Capt. Eckersley was in the gallery to hear the question, as his ticket for the Distinguished Strangers’ Gallery is included in his scrapbook. The Wire Broadcasting Co. had a share capital of £1,000 and he was a shareholder, seeing wire broadcasting as an economical use of frequency space. The year was 1939, and war pushed the whole scheme into the backwaters of history. Debate continued in the technical papers due to the concern was voiced about post-war broadcasting, but the increased capacity of manufacturers brought about by the war, and the experimenting with f.m. which was going abroad diverted attention to new possibilities. Wired wireless was no longer viable. The name “Rediffusion” was an inspiration of Capt. Eckersley’s. One idea which came out of this was single sideband (s.s.b.) The Eckersley papers include a patent and detailed specifications dated 17 October 1934, for “Assymetric Sideband Broadcasting”.

Hectic Activity

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

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

Capt. Eckersley was a fluent and frequent writer, putting pen to paper in the form of technical articles, popular pieces for Radio Times and Popular Wireless, explaining in delightfully simple imagery, problems, new developments and how radio and television would be broadcast, and mountains of letters to listeners. He lectured to the Institute of Electrical Engineers, and little radio clubs alike with great enthusiasm and humour. He had the gift of making the obscure and complex, understandable to the merest beginner, and his lectures were accompanied by gales of laughter which regularly rocked his audiences. He loved looking into the future of broadcasting and was the author of several...
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pieces on the subject. In 1925, he wrote for Radio Times an article entitled, “A dream of the future.” In his dream, the BBC had gone. The British Branch of International Broadcasting had replaced it. No school was without a wireless, and the elderly Chief Engineer (himself) took him to a vast concert hall where the first edition of the news was being broadcast as instantaneous moving pictures and sound in stereoscopic reality from New York. Broadcasts by unpopular public figures were often jammed by their opponents using triangulating airships, but this could rapidly be coded out by the engineers. Home sets ranged through what individuals could afford, from stereoscopic sound and picture sets to the “old fashioned people” owning multi-valved sets with loud speakers.

Cherished Dreams

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

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

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

I am most grateful to Myles Eckersley and Joan le Grand for allowing me to see and use material in the family scrapbook, and for Ticket for a Lecture on Wireless Telegraphy given by Capt. Eckersley in November 1922.

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

thinking to me about his father.

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

The Power Behind the Microphone.
P.P. Eckersley.


Sequel

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

ANTENNAS

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

with greater electrical spacing between each half-wave element, as shown in Fig. 6.3(c). The vertical radiation pattern is shown in Fig. 6.4 which is similar to that obtained from vertical collinaires with close-spaced elements. However, because of the effective wider spacing between the 2 half-wave portions of the otherwise 0.64 wavelength elements 1 and 2, the directivity gain is 3.5dBd. The prototype of this antenna, shown in Fig. 6.5, is mounted on a horizontal support. This is to avoid interaction occurring if it is mounted on a metal mast, as was the prototype when initial tests had been completed.

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

References


Fig. 6.5. Prototype of 2-element collinear with extended half-wave element spacing, see text.
PHILIPS D-2999 WORLD RECEIVER

Mike Richards

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

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

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

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

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

If you are away from a mains source then battery power can be used in the form of six D cells or equivalent, which fit into the battery compartment in the base of the D-2999. If you have a local supply of 9-14 volt d.c. available, this can be utilised via the external power socket on the side panel. As with most modern receivers which have clocks and programmable memories a back-up power source is required to keep the clock running and preserve the memory contents when the main power is turned off. The D-2999 uses three AA cells which are required regardless of which power source is used for the receiver. The life of these back-up batteries is very dependant on how much the receiver is used, but Philips quote two months if the receiver is not used at all and about a year under "normal" usage.

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

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

In addition to the power and antenna connections there were a few other facilities worthy of mention. There was a five-pin DIN and phono socket on the rear panel, wired in parallel, carrying the audio output of the D-2999 extracted before the volume control. This was ideal for connection either to an external amplifier, tape recorder or utility station decoding equipment.

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

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

Operation

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

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

Powering-up the D-2999 simply consisted of a single press of one of the chrome buttons which run the full length of the front panel. The only thing I felt was missing was a timer function which can be very handy for recording programmes when you are busy. As the D-2999 contained a clock I would have
thought that this would have been a comparatively easy feature to include. The audio section is provided with plenty of controls to allow the best reception of a wide range of signals. The basic controls comprised volume, treble and bass which were all grouped together for convenience. One rather unusual feature was the inclusion of two speakers, a 75mm unit on the front panel and a larger 175mm unit on the top panel. The 75mm was the main speaker but using one of the chrome buttons on the front panel the 175mm unit can be switched on as well. The beauty of this system was that you could choose the appropriate speaker combination for the type of signal you were receiving.

Having sorted out the audio, it was time to try tuning the station you wanted. Frequency entry using the keypad was very simple. I'm just altered the diagram, which I thought would be convenient, as I was very pleased to see was a nice 30mm rotary tuning knob. Perhaps I'm just old fashioned, but I still find this type of control far easier to use than the UP and DOWN buttons used by many receivers.

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

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

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

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

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

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

Performance

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

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

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

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

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

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

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

Keith Hamer & Garry Smith
Part 18

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

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

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

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

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

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

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

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

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

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

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

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

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

Lightning Scatter

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

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

Aircraft Reflection

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

Another Type of Propagation?

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

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

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

Maximum Skip

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

Mystery Propagation

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

Strange Event

On 6 June 1988, radio amateurs and DX-TV enthusiasts throughout northern Europe witnessed a truly fascinating
trans-Atlantic opening lasting several hours with an m.u.f. (maximum usable frequency) approaching 80MHz. Signals were first discovered around 2200BST and were still evident, albeit weaker, at 0100. Reception on the higher USA TV Channels A4 and A5 produced reasonably clear pictures but vision signals on the lower Band I Channels A2 and A3 were virtually impossible to decipher because several stations were present at once. Signals were remarkably constant for much of the time. Stations which were identified from the audio channel offset frequencies were found to be spread along the east coast of the USA from South Carolina to Newfoundland, located off the Canadian coast! This means that reception distances ranged from 3600km to almost 8800km.

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

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

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

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

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

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

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

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

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

Fig. 7: Unidentified YL presenter seen during an F2 opening on 15 January 1980 on Channel E2. The time of the opening, between 0840 and 0920UTC, suggests that the signal could have originated in a country as far east as Malaysia.

Fig. 8: A caption seen during the same opening. The two lines of text in the centre of the picture resemble Arabic script.
Fig. 1. During these months, it was logged almost daily in the east of the UK where extremely low-level signals could be detected in the absence of a British Channel B2 local to hinder reception. Unfortunately, the authors had to contend with the problem of sound-on-vision interference from the BBC-1 transmitter at Holme Moss on channel B2 - its sound carrier coincided with the E2 vision frequency.

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

Very Weak Signals

Band 1 reception from the African Continent was, on the whole, notably far weaker than that normally encountered from the east or west. Signals were virtually at "noise level" on numerous dates even when using i.f. stages with reduced bandwidth. Of course, such signals were almost undetectable on a normal receiver with wideband i.f. stages.

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

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

Unidentified African Reception

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

In Retrospect

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

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

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

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

Widespread Activity

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

The Future

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

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

Solar Cycle 22 Update

Further examples of F2-layer reception have occurred since the end of 1988 with activity mainly confined to channel E2, the lowest Band 1 channel, with signals from the Middle East and possibly Malaysia. On January 13, pages of Arabic text were noted on Channel E2 prior to the station opening. The signal is thought to have originated in Dubai since the service is known to radiate pages of text before programmes commence.

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

News reaches me of an interesting sounding active antenna offering a frequency coverage of 20-13000MHz. Made by a company called Maildol and called the HS1300B the actual antenna element is enclosed in a tubular shroud with the amplifer housed in a tubular, finned, heat-sink at the base of the unit. The overall size is 800mm long, 60mm in diameter and weighs in at around 400g. Power is supplied to the unit by means of the coaxial connecting cable. Performance is said to be good, with few problems of overloading on strong signals. However, as with all types of active antenna systems, you may have to be careful if you live close to a transmitting station. The price - around £86. Contact: Lee Electronics, 400 Edgeware Road, London W2 for further details. Tel. 01-723 5521. It seems that legal problems are preventing importation of the continuous frequency AR-2515, it bears a remarkable resemblance to the AR-2002 with the addition of an increased frequency range of 5-13000MHz, 2000 memories and an incredible scan speed of 3000 channels.

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

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

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

Antenna Assortment

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

The inductors were Siemens type B78108T Stock no. BT10, and came from Electrovalue, 28 St Jduses road, Englefield Green, Egham, Surrey TW20 2NB. Tel: (0784) 33603. The capacitors were small aluminium types available from several suppliers, but if you want really tiny ones try some of the surface mount types, for example Siemens type Z5U. Each one is 4.2 x 4.2 x 1.5mm. Be warned you will need tweezers, a magnifying glass and torch to use these components - the torch is to help you find them when they shoot out of the tweezers onto the floor.

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

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

However you can improve the performance by rewinding the coil (see Fig. 1). Unscrew the end caps on the loading coil, desolder one end of the coil and unwind, rewind an 18mm length of the wire back onto the former, leaving about 3mm between adjacent turns. Resolder the new end back, and discard the remaining wire. All that is left is to screw the end caps back on the coil. You should now find the antenna works better on most of the UK bands of interest. Adjust the length for the best results on each band.

However I would not advise using this antenna for transmit despite what it says in the instruction leaflet, as the joints on the telescopic sections can cause the v.s.w.r. to vary considerably.

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

Discones

Paul Hawkins of Gloucestershire asks if any one has experimented by adding extra vertical elements to the top section of an AR-2515 to the Icom/Diamond super wideband model. In particular he wonders about adding a Sandpiper mobile antenna in order to improve the performance. Well Paul, I touched on this in the April 1986 column. At the time I had been experimenting with discones and was a little disappointed with the results that I had been obtaining. I found that you could add elements to the top of the discone in order to improve the low frequency performance of the antenna but that this caused unpredictable dips in the gain at other frequencies. I tried adding an antenna similar to the Sandpiper design and found that it did improve performance down to the 60-145 and 433MHz but worsened it by as much as 10dB over the band 60-100MHz and to a lesser extent at 120-130MHz and 250-280MHz. This is because of the varying phase relationships of signals being received by each active part of the antenna. If the signals add in-phase the signal is enhanced, if they add in anti-phase the signal is degraded. Not does the resonant frequency of the extra element play a part in this, so too does the method of construction as stray capacitance and inductance can create spurious resonances at frequencies other than those intended by the designer. Only by very careful design optimisation can the interaction between elements be minimised - a little beyond the capabilities most of us, unless...
you know someone who has access to the appropriate research facilities of course.

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

A Good Read

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

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

The book is called Mobile Radio Telephones in the UK and is written by Dr R.C.V. Macano. Published in 1986 by Glentop Press Ltd, Bath Place, High street, Barnet EN5 5XE. ISBN 1 85181162 6.

Computer Control

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

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

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

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

Until next month - Good listening.

14EST

Lakenheath (LK3) TACAN on the 066 degrees radial it is passed at FL180 on the descent so spotting from here will be disappointing unless binoculars are used and the sky is clear. The geographical location is Hoveton, to the north-east of Norwich. From Liberty, the published procedure is to track 245 degrees and descend to 3700ft (altitude, i.e. on QNH) at 17 d.m.e. and then 1300ft altitude at 7 d.m.e. which is also the Aardvark reporting point.

Also in April I asked you about my ICAN altimeter and G.L. Davies (Thames Ditton, Surrey) has come up with some answers. Many thanks. The altitude shown by this early instrument is only correct when calibrated against a standard atmosphere. Corrections are applied by using a dedicated circular slide rule calculator. The altimeter assumes that sea level pressure is 1013.2mb (the same setting used now to obtain flight levels on modern instruments); the decrease of pressure being 1mb per 30ft. The ICAN law

assumes a sea level temperature of 15°C and a lapse rate of 1.98 degrees centigrade per 1000ft up to 36000ft where the temperature will thus be minus 56.5°C. The pointer is adjusted by the knob for a known height (e.g. on the ground) and subsequent readings must be compensated by the slide rule since the outside air will differ from the temperature assumed by the standard atmosphere. One problem with early instruments is the radioactive Radium 226 contained in luminous paint applied prior to about 1950. From then on, Tritium paint, a much safer alternative, was used; this glows orange under ultra-violet lighting. The historic ICAN type altimeter can be obtained from Parkhouse Aviation with prices from around £5. Contact Barry Parkhouse for current availability and price on (0276) 33067.

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

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

**Down-Converters**

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

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

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

**Stability**

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

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

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

It is a simple matter to generate a crystal controlled injection signal of 20MHz or below, since a quartz crystal can be resonated at its fundamental frequency in the parallel mode, but complications arise when a higher injection frequency is required. Although a relatively low frequency crystal oscillator could be followed by one or more frequency multiplier stages, it would be necessary to ensure that only the final injection frequency could reach the mixer, otherwise unwanted mixing products would arise. This could be achieved by using adequate screening and filtering.
by ensuring that the final injection signal has to pass through a high "Q" resonant filter, known as a hi-Q break before it enters the mixer. This technique is frequently adopted in s.h.f. and v.h.f. (super high frequency) microwave converters.

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

The block diagram of a typical crystal controlled v.h.f. down-converter is depicted in Fig. 2. In this particular design all incoming signals within the 144 to 146 MHz (2m) amateur band are converted to frequencies within the 28 to 30 MHz (10m) amateur band, since the 10m band is within the tuning range of many s.w. and m.w. communications receivers. When an incoming signal on 144.000 MHz is heterodyned by the 116.000 MHz output from the quartz crystal controlled overtone oscillator, a difference signal on 28.000 MHz is produced (144.000 - 116.000 = 28.000 MHz). Similarly a signal on 145.525 MHz will be converted to 28.525 MHz (145.525 - 116.00 = 29.525 MHz).

Many v.h.f. converters of this type employ a single field effect transistor (f.e.t.) such as the 2N5459 in the r.f. stage, but a better performance can be obtained by using two junction f.e.t.'s in a cascode circuit. Another popular device is the dual-gate m.o.s.-f.e.t. (40073), which can provide considerable gain and a good low noise performance even at u.h.f. They also perform well as mixers and require little power from the local oscillator. In order to facilitate the matching between the converter output and the main receiver, some converter designs include an emitter follower stage after the mixer.

Up-Converters

So far, little mention has been made of up-converters. One application, which would suit the owner of a 144 MHz amateur band receiver, would be to up-convert the short wave bands to the v.h.f. region. This can best be achieved by employing a crystal controlled type of converter since it will ensure adequate stability, but a number of quartz crystals will be required because the short wave spectrum will have to be converted to the 144 to 148 MHz (2m) band in segments 2 MHz wide. The r.f. and mixer stages could be tuned by using ganged variable capacitors in conjunction with a bank of short wave coils selected by a wave change switch, but a series of selectable band-pass filters would simplify matters. It would then be possible to use the scanning facility fitted to some v.h.f. receivers to effectively search a chosen 2 MHz wide segment of the s.w. region. Some multimode v.h.f. receivers have no provision for receiving amplitude modulated (a.m.) transmissions, so the short wave a.m. broadcast signals would have to be demodulated in either the lower sideband (l.s.b.) or upper sideband (u.s.b.) mode.

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

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

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**Abbreviations**

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<tr>
<th>f.e.t.</th>
<th>field effect transistor</th>
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<td>kHz</td>
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It isn’t really necessary to spend a fortune on your rig and antennas if you want to get into DXing, for which of course is one of the reasons for the phenomenal success of the G-QRP Club. While the “QRP” refers to operating low power (and quite a few stations have managed to work in excess of 200 countries using under five watts of RF power), for many, it is a natural addition to the proposition to find the G-QRP Club members, using the same antenna set-up, and using simple receivers to go with the simple transmitter and simple antenna. In any case, they welcome s.w.l.-only members.

When Justin Cooper, his old white beard, was your columnist, he was the fellow who designed the famous white dipole station, using the same antenna setup. Down came the beam, to whirl around Cooper’s home town. 

Interestingly, the DXpedition artist, Ron Wright ZL1AMO is, at the time of writing, operating from Willis Island as FV2LS, to ZL1AMQ. This call only appears when one of the staff on the island happens to be a radio amateur, but since the tour of duty is for another year you can take your time over this one. Try around 14.165MHz, but note that he himself listens around 14.160MHz. For cw, you can try around 14.010MHz.

I also hear the ZS4HJ has a mind to visit 9U1 in about eight weeks from the time I write - say, mid-June - and already has a licence.

The Bands

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

This is an urbanity of human nature - few of us like getting up! Even if you do, maybe other members of VK could get awoken by the noise from your loudspeaker; in which case a pair of headphones, of the hi-fi type which look like safety earmuffs are the goods; a slight modification if there are of the stereo type by taking the wire to the “ring” off and fitting it to a window or “lip” connection, leaving the “sleeve” connection as is. The earmuff design keeps sound in quite effectively (and the domestic QRM out), and if you get into the habit of using the lowest possible volume anyway you will save your ears into the bargain.

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

Letters

A. G. Duck (Birkenhead) is a new starter at the tender age of 83; he has a Matsui receiver. Shortly after getting it, he had an occasion to call a friend, who noticed the small volume and gave it a whirl - a local amateur who was able to leave a list of the local call-signs. Initial trials were made with the set’s own antenna, but since then a loop has been built and tried in the kitchen; the next move is to get it into a QRP contest.

In case, he has altered the old, old problem, when he mentions the eternal gabbling of others or worse putting them wrong way round: for the record, the routine is to say GW3KFE this is G3WVM standing by, or just GW3KFE from G3JSMW. The aim of putting your own call-sign last is so that anyone listening from a faraway place may be sure he knows which end of the QSO is which.

The letter from D. Peat (Mansfield) has much of interest; David comments that it is nice to be able to keep your log on a computer but as he says, you must have backup paper copies. For example, on 3.5MHz there was HG4P, on 7MHz FSPHL (St. Pierre et Miquelon) for a bit of rare DX Europe again, on 14MHz there were 4X6PZ/2M, 6W1AAD, AA1K, BY1PK, G3JSM, HJ1AH, JR1CSA, JY0HC, K8FGK, N2E1OM/MM, N2QG, NB8A, OYSJT, PP1LAE, RFFO, W40X. On 21MHz it was 4DOP, HV3J5, KE3O, K8WJ, WPR2 and the usual crop of Europeans. The gear comprises Phillips D2999 and some 30 metres of wire. N-S and coupled by way of an a.t.u.

Nice to hear again from R. Watters (St. Austell) who notes how he tried the "new bands" and was quite surprised at the number of stations he logged; on 14MHz simply N4A0S, OA461, HJ1LSQ, HL1ASS 9MCW2; on 21MHz ON8LS/ SN8; on 7MHz JASO/U, JAC1CPX, on 28MHz VET75S, W9L/T0 and K42DMI (both YLs); which left the following unlogged 18MHz, KC5UT, NA4L, W1ODY, W2AH working OK1KAJ, 9H4W, plus on 24MHz J3TAJ, KATHU, N4MVP, and VE7CN. Not a bad crop of s.s.b. stations on a band supposedly c.w.-only!

D. H. Travis (Guisley) has continued his listening and mentions VKZL/W6/W7 heard on the HF-125, while the Tustung TMR 7602 managed a joint "tip" on 3.5 MHz, on his unit (mobile) on March 15, Otherwise, alas, it was all UAUB, UC, YUs and other "lolas".

Leslie Sargent (Runcorn) seems to be a little lost on the location to be ascribed to a given prefix. The real one may be George E. D. see his notes in DX Magazine, for another "set-up" on 3.5 MHz on a Geoff Watts’ Prefix List from 62 Belmonte Road, Morpeth. This prefix has been heard on a copy of Geoff Watts’ Prefix List. The whole business is a puzzle.

As for this fluid now, from Stuart Wilson (St Andrews, Fife). Now he has his EC 10 and a couple of end fed wires up and running. He demonstrates that there is still life left in the old touch with some 533 prefixes baked in, his collection being from all around the globe.

White Rose Contest

After nine years of devoted work, D. A. Whitaker (Harrogate) has decided to step down from the arduous job of running the White Rose Club SWL Contest, although he assures us that the Club will continue to organise this popular s.w.l. event. The 1989 event showed a large drop in support for Top Band - or maybe conditions were not so hot on that band! Be that as it may, a thurible de Bae left on the land won the "phone section" for a second time with some 43758 points whereas in 1988 the Whitaker was second, nearly making a win for the home side and Mike Ribton was third. On the c.w. side, Don Piccirillo was not just the only UK entrant, but also the winner. In his signing off notes, David Whitaker noted that Arthur Miller, Norman Henbrey and Jean-Jacques Yerganian from ON have supported this event with the highest number of contacts this year since it started. I can imagine well that such support is very heartening indeed for those who put so much time and effort into setting up and running this or indeed any other such event for our pleasure. Thansk!
Readers Letters

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

First letter comes from Brian Cole of Southport. Brian has a slightly unusual setup which includes a Yaesu FT-290 v.h.f. transceiver for h.f. monitoring. The trick to achieving v.h.f. coverage with a v.h.f. rig is to use an up-conveter. This is a device which takes the signal up v.h.f., in this case 144MHz to 146MHz. In order to cover from 1MHz to 23MHz the h.f. band is divided up and remember it doesn't have to be in a straight line.

Second point to watch is that you have a good single earth for all your equipment. Multiple earths can cause serious problems (as you can see in the middle of the page). If you want anything further I suggest you look up the article by Richard Wilmut in the March '88 issue of SWM.

Kevin Bates, Derby asks what happened to the promised review of the Klingenfus publication Radio Teletype Code Manual. The book has been reprinted and is available from the SWM book service.

Third Shift What?...

For this month's technical feature I thought I would take a look at the third shift alphabets and what they mean.

It's true! I've seen all third shift alphabets mentioned in the SWM listings and at that point you probably turned the page quickly! Despite the rather obscure nature of the third shift it is actually quite simple as I will attempt to explain.

Let's start with the normal RTTY alphabet which is known as the International Telegraph Alphabet No2 (ITA2). This alphabet defines all the characters that are available and the 5 unit code assigned to those characters. If you are a mathematician you can work out that a 3 code has only 32 possible combinations, i.e., not enough to cover the alphabet, numbers and punctuation. The solution is to give each of the two 3 codes two meanings, one each. The solution is quite simple and involves two of the available codes being nominated as shift characters. These are then used to switch between the two possible meanings for the subsequently received characters. Incidentally the two sets of codes are known as letters and figures.

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

One rather interesting point with some of these transmissions is that the foreign alphabet character and the latin equivalent use the same code so some of the translation process is automatic. Examples of this are third shift Cyrillic and German though with Cyrillic you will have to enable the 'Klingenfus' publication Radio Teletype Code Manual which is available from the SWM book service. The decoding process involves three stages:

1. Obtain a hard copy printout of the relevant charts sent at 0135UTC.
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Although the process is quite time consuming it can be very rewarding particularly if you enjoy puzzles!

If you would like to try your hand at this, APN Moscow on 10.465MHz sends messages using the Cyrillic alphabet. Do you have any modes you would like to try and explain? If so, please drop me a line and I will do my best.

Schedules

This month's feature will be an overview of the Schedules.

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SEEN & HEARD

3.6MHz FAX 60/288 ROO70 Rostov-on-Don Meteo
4.25MHz s.w. PCH20 1619 Pechora Radio in
4.442MHz RTTY 50/R RC7G2 2220 Kiev Meteo
5.535MHz RTTY 50/N 2142 RDM78 Thunders in the USSR which helped prepare this list.
7.058MHz ARQ 100/170 IAR 1630 Rome Radio

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

INFO IN ORBIT
Pat Gowen G3IOR

As the end of the mission for U3, U4 and USMMIR approached, the orbiting command post had almost completed their main scientific, medical, engineering and ecological research programmes. The task was then given to van den Bergh to ask the TsUP command station over the 143.625MHz v.h.f. communication channel "...what do we now do?"

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

This has since been evidenced by the manner the receivedhearings and contacts on 145.500MHz S21 f.m. Simplex. Among them was Jeff CBEW who was working near Pontypool in Gwent. Jeff reports that he had just put up his new GP144W two step collinear antenna and was going strong on v.h.f. activities when on 145.500MHz he heard an S9+ signal calling "CO CO QQ, this is U4MIR "The voice was very clear, with a slight accent but very good English," said Jeff. He continues: "Being a new listener I logged the report and thought no more of it until later talking about it to my father, who informed me who it was. I have since been telescoping for the signal ever since, never to be heard again at that frequency."

In early April, Boris Stepanov UW2IR went to MI with his Oskar radio and on 145.500MHz he heard a call from Vakhtorev who was calling USMMIR. When the call was returned, the two operators got to know each other and started regular contact which has continued ever since.

Boris reports that since the early days of USMMIR's activities, he has been well known and is indeed a well respected operator in his country.

I have been calling USMMIR regularly on 145.500MHz and have been fortunate enough to communicate with several operators over the last couple of months. Many have been regulars and others new to the v.h.f. scene. The most recent communications have been with Saleut 7 which is currently orbiting in a 500km altitude orbit.

The satellite is a Cosmos 954 which was launched in 1972 as an optical beacon to aid in the development of the space program. It was later repurposed as a tool for the Soviet military, with its primary function being to monitor the American military satellites. It was deorbited in 1981 and is now considered a space debris.

Although it is no longer operational, USMMIR has continued to communicate with Saleut 7 as it orbits the Earth. The radio signals sent from Saleut 7 are picked up by various ground stations around the world, allowing researchers to monitor its orbit and collect data on its position and movement.

The next event planned for the STS-35 Columbia shuttle mission is the launch of a communications satellite, which will be used to relay data and images from space to Earth. This is the second such satellite to be launched by NASA, with the first being launched in 1965.

The satellite was manufactured by Hughes Aircraft and is known as the COMSTAR C-1. It is a geostationary communications satellite that was placed into orbit in 1965. The satellite was used to provide communications services to various parts of the world, including the United States, Europe, and South America.

Despite being over 50 years old, the satellite continues to operate and is still in use today. It is considered a valuable asset to the communications industry and is currently owned by a private company.

The satellite was launched from Cape Canaveral Air Force Station in Florida on March 22, 1965. It was placed into a geostationary orbit, which is an orbit that is stable and remains stationary over a specific point on Earth. This allows the satellite to provide continuous communication services to the ground below.

The satellite is powered by solar panels that are located on the sides of the satellite. These panels convert sunlight into electricity, which is used to power the satellite's systems. The satellite also has a backup power source in the form of batteries, which can be used in case the solar panels are unable to provide power.

The satellite is equipped with a variety of communication systems, including those for television, telephone, and data transmission. It is considered to be one of the most successful satellites ever launched, and its legacy continues to be felt today.
Remember to send your reports to
Lawrence Harris, 5 Burnham Park Road,
Peverell, Plymouth, Devon PL3 5QB.

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2303UTC on 23 December 1988. Lawrence apologises for the low
contrast, which is entirely due to the photography of the direct off-screen
result. Future pictures will be stored on his new tape recorder in stereo so
that simultaneous recordings of both the reference clock signal and the
METEOR signals may be later played back together into his computer, thus
permitting contrast enhancement and
clear definition.

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

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

The high points shown on Fig. 6, which is a Goes picture from NOAA
11 taken on 13 February 1989. The
NOAA administration are manoeuvring the Goes satellites although Goes-E is still "seen" from the
UK. Thus, the re-transmitted
pictures are covering different areas.

Lawrence reports that Meteor 2/16
came back on 137.400MHz on April
11, and should now be active for a
continuing period. Meteor 3/2 was
still commanded off at the same date.
And The Dallas Remote Imaging
Group report that Meteor 2/17, which
was on 137.400MHz, is now to be
found operating on 137.400MHz. It is
sending Infra Red APT at night at 20
lines per minute instead of the more
usual 100 lines per minute rate.

Finally

This will be the last column in Short
Wave Magazine by G3IOR, who will
still continue with the "Amateur
Satellites" column in Practical
Wire each month. May thanks to all who have helped to fill
the pages with such interesting news,
and to those who have read and
enjoyed it. I feel sure both will
continue. The bad news is that I shall
miss the column, but the good news
is that you will have a new columnist
who is already well known to you all,
and who is a real expert on weather
satellites. I shall miss you all, but will
continue to send the odd snippet of
information to Lawrence Harris, who
I know will carry on the tradition of
this section of interest in a most
excellent way. I know it is in good
hands. Please send your future
information and pictures to Lawrence
Harris, 5 Burnham Park Road,
Peverell, Plymouth, Devon PL3 5QB.
Remember the nostalgic days when v.h.f. was the order of the day with the “Home”, “Light” and “Third” on the dial with plenty of empty channels for any adventuring DXers to explore. High hopes were that it could be successfully employed without overloading,” wrote Simon Hamer (New Radnor). Referring to 1989, he remembered “Even on a pocket radio, the FM band is crowded in Radnor Valley.”

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

**Aurora**

Radio and astronomical enthusiasts are still talking about the massive auroras seen during the late evening of March 13 and, despite bright moonlight, much of its colouration was seen from southern England. “A fantastic aurora, with beautiful visual effects to the north-east, resembling a hill fire,” said Simon Hamer. Like many other DXers, Simon heard distorted programmes from stations in Belgium, Denmark, Germany, Holland, Ireland, Norway, Scotland and Sweden as their signals were scattered by the auroral ionisation caused by radiations from the giant sunspot group which appeared on the 7th. Although aurora is rarely seen in southern parts I had the good fortune to witness a similar event back in August 1972 when a large and very active group appeared on the 1st and as it crossed the sun’s central meridian on the 5th, Fig. 1, its complex radiations caused a memorable aurora large enough to be seen from northern France, Italy and even as far away as New York.

**Reports**

Conditions were right for a tropospheric opening at the end of March when I heard at least a dozen and a few Dutch DXers, including me, on 87.5 and 102MHz from home, with the R216, at 1100 on the 30th. The weather was warm and sunny and the atmospheric pressure was 70.2 in (1019mb) at Reading. By the end of March, however, the auroral influences were reduced and the usual “warbles” of co-channel interference heard previously were heard again. The sky was very misty and I’m sure I received them because of freak atmospheric conditions. By the morning of the 8th, I noted that the “warbles” had gone or were faint and in the week that followed I had no reports of interference.

“The atmospheric pressure was 30.1 in (1018mb) around 1100 and when I returned home at Launceston, it had fallen slightly,” wrote George Garden on April 1. He then described the event and heard that he had heard the distant DX site on the top of Cairn O’ Mount. “A weather front had cleared the fog and drizzle, so much so that it soaked the car windscreen with large size raindrops.” However, using his v.h.f. radio George identified signals being transmitted by BBC Radios Cleveland from Bilsdale in Yorkshire, Cumbria, Newcastle from Pontop Pike and York in “very strong stereo.” In addition he heard another from Hallam from Congleton serving the Doncaster area. “I heard Tees from Bilsdale which he does not normally hear at this site,” commented Mr. Garden.

On March 28, Russ Redo (Ringmer) was on holiday at Maidenhead, near Torquay and between 1820 and 1900 he checked Band II with his Sangean ATS-60A receiver and telescopic antenna.

logged BBC Radios Bristol, GLR, Solent, 3 Sussex areas and Radio One plus IRLs Capital, LBC, Mercury, 2 Ocean Sound areas, Red Dragon, Southeast Sound and Radio 210. Russ also picked up local stations from south Devon and many from France. “The sky was very misty and I’m sure I received them because of freak atmospheric conditions. By the morning of the 8th, I noted that the “warbles” had gone or were faint and in the week that followed I had no reports of interference.”

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Short Wave Magazine June 1989
saw a subtitled film and commercials from Finland on Ch. E3 (56.25MHz). He also saw Hill Street Blues with Swedish subtitles, in colour, from Sweden's SVT-1 on Ch. E2.

Although the pictures were distorted, Simon Hamer (New Radnor) identified Iceland's (RUV) logo on Ch. E3, a weather map from Norway on Ch. E4 (56.25MHz) and clock ident from Sweden (SVT-1) on Chs. E2/3/4 and the USSR on Ch. R1. This aurora extended its influence into Band III where Simon found equally deformed signals from Denmark (DR), East and West Germany (ARD and DFF), Ireland (RTE), Norway (NRK), Sweden and the USSR.

**Band I F2**

At Meerut, Lt. Col. Rana Roy received those "multiple smearable and fluttering" pictures and distorted sound, via the F2 region of the ionosphere, during the evenings of February 2-5, 7, 8, 10, 14, 15, 17, March 6 and 8. Although he managed to identify the contents of a few programmes from unidentifiable stations like Fig. 3, seen on Ch. E2, he can confirm that signals from Malaysian TV, Fig. 4, were present on Ch. E2 because, at 2105 on February 4 and during the opening on the 15th, their ident "3" appeared. Rana also found Thailand at 2030 on the 5th.

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

**Band I Sporadic-E**

John Woodcock (Basingstoke) logged very strong pictures from one of the Spanish stations at 0845 on the March 23. "There was a slow fade on the signals but on the peaks the pictures were very good indeed. I am amazed that such pictures are possible on loft antennas," said John. In Great Sutton, Bob Brooks logged Spain (TVI) at 1415 on March 20 and Italian (RAI) Breakfast programmes on Chs. L4 and b around 0800 on the 23rd. "There is still some activity around Chs. R1/6/2 and E4," wrote Edwin and Tony Mancini (Belper). They saw test-cards from Czechoslovakia (CST1) and Poland (TVP1) on March 24, Holland (PTT NED1) and Sweden (SVT/K1) on the 26th and Holland and Poland respectively on the 27th and 31st.

Their log for April includes various pictures with sound from the USSR on the 8th and test cards from the Norwegian regional Bremanger on the 9th, Holland, Sweden and Italy on the 11th and Finland (YLE/TV1), Holland and Sweden on the 12th.

Around 2055 on March 19, David Glenday logged test-cards scribbled "Norge Steigen" and "Norge Hjemmes" on Chs. E2 and 3 respectively. Some twenty minutes later a music programme, in colour, and another with Scandinavian subtitles appeared on Ch. E2. Between 2000 and 2135, David watched the news (Aktuelle) from Sweden, a programme in colour from Finland and an unidentified production on Chs. E2/3/4 respectively. Simon Hamer logged RAI (Italy) on Ch. L6 at 1300 on March 25.

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

**Tropospheric**

Rana Roy observed tropospheric openings, mainly between 0700 and 0830 and some evenings on February 2-5, 7, 8, 10, 14, 15, 17, March 6 and 8. Most of the signals received by Rana were in Band III and came from Indian and/ or Pakistani TV. Among these were pictures from Agra and Jalandhar on Ch. E9, Bhatinda Ch. E12, Fig. 5 (Punjabi News), Kasauli Ch. E6 and Lahore Ch. E5, Fig. 6 (news). The programmes consisted of Breakfast TV in the mornings and in the evenings, news, plays, reviews and songs. "Pictures were fairly clear most of the time and in colour," said Rana.
The weather was mild and the atmospheric pressure was starting to fall and around 2100 on March 29 co-channel interference was beginning to appear in the u.h.f. band. By 0800 on the following morning, the interference, most likely French, on several spots in Band III These were exceptionally strong and were heard not only in Arbroath, at midday with my Pionux TVR5D and its rod antenna while parked on the South Downs near Arding. At 1800 on the 31st, I received French pictures in Band III and a mild interference could be seen on some u.h.f. stations.

During the afternoon of April 1 George Gorden (Edinburgh) drove to a site on the cliffs near Arbroath, placed a log-periodic antenna on top of his car and fed the signals via the appropriate group A, B, C or D amplifier to set. "This is a promising site when conditions are good," said George, having logged BBC New Zealand in March and waves in main black and white. Border CH4 from Selkirk in fair colour on Ch. 65 and a fading erratic signal from Tyne Tees TV on Ch. 81 from Pontefract.

Band III and u.h.f. DX poured into Simon Hamer's receiver throughout the evening of March 29 when he logged pictures from MASTBV (Holland), Belgium (BRT1/2, RTBF1 and Tele2), Chechoslovakia (CST1) on R. 1807 (with flag and national anthem, France) (TDF) on most channels in both bands, Denmark (TVB), Austria and Hedenstedt), East and West Germany (DF1 and ARD/NORD1/3, WDR1 and WEST3), Holland (NED1/2/3), Luxembourg (RTL, PLUS French and German), Norway (NRK) and Sweden (SVT). On April 9, he found Ireland's RTE1 on 1910 E29 and Network 2 on Chs. E33 and 43. "I've received a QSL letter from TV2/Denmark and they were surprised that several UK TVDXers were seeing their station...They are based in Odense (birthplace of Hans Christian Anderson) and housed in an old covered cattle market," said Simon.

Lebens Jenkins (Godalming) spent that weekend in Deal and from his caravan, using a beam grid wideband antenna, Fig. 7, received good pictures from Lille (AF2, FR3 and TF1) and weak but watchable signals from Holland (NED2). Bob Brooks received Band Ill pictures from France (Canal+) and Ireland (RTE) at 2200 on March 29 and again between 1000 and 1050 on the 31st. While a weather system was moving overnight on March 17/18, I noted slight (on-grid) interference on some u.h.f. signals and negative pictures on Ch. 65. Later on the 18th, I checked Band III for DX at several locations but conditions were back to normal. The antenna was received by Edwin and Tony on April 1, 8, 9 and 12 and they also sent photographs of the coloured test-signal that they had received, via satellite, from Agusta Earth Station, Fig. 8, Germany (BRT1 & 3), Figs. 9 and 10, and national (NLD1) Fig. 11 and Teleclub Fig. 12. SSTV

During the weekend of April 1 and 2, Fred Peace (Driffield) looked at his first SSTV contest and was delighted with the results. "The quality of the pictures was the best I have ever received," said Fred. In addition to logging a new one for him, YO3SIS on 21MHz, he copied pictures from stations in Bulgaria, Chechoslovakia, Denmark, Finland, France, East and West Germany, Holland, Hungary, Italy, Poland, Spain, Sweden and Yugoslavia on 14MHz and Yugoslavia on 21MHz.

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

DX Report
Note: L.W. & M.W. frequencies in KHz; s.w. in MHz; Time in UTC.

Long Wave DX
Since Morocco moved their broadcasts in Arabic via Azazl from 209 to 207kHz earlier this year, a new long wave transmitter has been installed near Jordan in Amman, which radiates their Arabic service on 207kHz From Macclesfield, Philip Rambaut mentioned that he has been hearing a broadcast in Arabic on 209kHz that is a heterodyne signal, not evident on that frequency. It is possible that the new transmitter in Jordan resulted in co-channel interference and so one has moved to 209kHz, so far no reports clarify the situation.

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

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

MW Transatlantic DX
In Wakefield, Mark Thompson found conditions rather strange during the month, with no signal of any signals from the US or Canada.

CJQY However, broadcasts from the Atlantic Beacon, Turks and Caicos Islands 1750 and the Caribbean Beacon, Anguilla 1610 were often heard at 333 around 0500. Towards the end of the month transmissions from R. Globo in Rio, Brazil 1220 could be heard between 0210 and 0500. This seems to be a reversal of conditions this time last year.

Broadcasts from CJQY in St Johns, NF 930 were heard at 0500 by Tim Shirley in Bristol and he managed to log several other Canadian stations during the early hours. A few broadcasts from the USA were also noted, mainly from the New York area. Tim uses a loop or choice of outdoor wire antenna plus u.h.f. with either a Trio 660, a Realistic DX 400, Sony ICF 2001D or ICF 7600DS.

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

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

Other MW DX
The broadcasts in Arabic from Al Hassee, Syria on 919kHz were noted for the first time by Neil Wheatley in Newcastle-upon-Tyne. After Lubijana, Yugoslavia on 918 (600kW) had closed down, Neil heard music at 2358, followed by an announcement in Arabic at 0000, which was the same as that used on the s.w. bands by R. Damascus, Syria. This was followed by a reading from the Koran and at 0118 they played the Syrian National Anthem before closing down. This station has not been reported before and is subject to confirmation by QSL. In Sluis, Alex Mackow picked up two BBC broadcasts via Orfordness, UK: BBC 648, the multilingual service on 648kHz (50kW) at 1811 and their European language service on 1296kHz (500kW) with programmes in Polish at 1826.

MW Local Radio DX
The skywave signals from the high power transmitters used by BBC GLR 1458 (50kW) and ILR Capital Gold 1464(50kW) were received in Italy around 2230 by Alex Mackow. Many low power local radio transmitters in the UK were also logged during his visit.

Broadcasts from BBC Wiltshire Sound via Lacock 1332 have reached listeners well outside their intended service area, but there are problems prevailing interference on the Swindon transmission 1336. George Millmore noted good reception on 1332, but he experienced co-channel interference by R. 1338 from the BBC R. Sussex transmitter at Duxhurst, near Reigate (5000W). Reports indicate that there are problems with their transmissions.

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

Having completed a Sooper Loop, Martin Williams in Sunningdale says, "It is wonderful - I wish I had built one a long time ago!" Encouraged by these results, Martin now intends to build the much larger hexagonal spiral loop which John Ratcliffe detailed in the April issue. Edward Emery (Stoke-on-Trent) built the "Hexagon Loop Antenna" and was pleased with the new names for their m.w. services. Francis Haime (Ilford) has been trying to keep a check on them: Beacon R. introduced a m.w. service called WABC (Wolverhampton and Black
Nine broadcasters are now taking advantage of the excellent conditions in the 25 MHz (11m) band: RTB, Brussels; R. Norway International (RNI), Oslo; Cologne; BBC London; R. RSA, Johannesburg; R. France International (RFI), Paris; R. Denmark, Copenhagen; and R. For Peace International, Costa Rica; also BRT External Service, Brussels.

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

RFI use transmitters at Fredrikshavn (350kW), Kviteseid (500kW) and Sveio (500kW) to cover their schedule on 25.730 (Norw to Australia, Middle East 0600-0645; to Japan 1000-1045; to England 1400-1445; to W.Africa, S.America 1110-1145; to E.Africa, Middle East 1400-1445; to Africa 1445-1545 and 1800-1845). Dick Moon rated them in George, South Africa as 34433 at 1500. Their broadcasts also reach Quebec, but Alan Roberts’ ratings this time as only 15321. In many areas of the UK their signal is poor, but in the north east, Leo Barr rated it as 35440 at 1545.

So far, no reports have arrived here from abroad on the broadcasts from R. DW 25.740, although John Ratcliffe says he picked up a transmission in German while checking the band. Their signals were logged in UK DXers, Listening in Guildford, Richard Radford-Redeolns rated them as 35433 at 1200.

The RFI have extended their broadcasts via Daventry 25.750 (Eng to E.Africa, Africa) from 1100 until 1745. As expected, their signals are potent in Africa and they have also been heard in Australia by John Ratcliffe. They also reach Quebec between 1230 and 1745; Alan Roberts rated them as 25330. Most UK listeners have observed a pronounced echo effect.

The broadcasts from R. RSA 25.790 (Ger 0900-0956 and Eng 1400-1556) to the UK, S.Ireland, W.Africa, W.Europe are being very well received here, the 544 noted at 1430 by Cyril Kellam in Sheffield is typical. RFI beams its broadcasts to Africa via Irt榖us (medium 25.820 Fr 0800-1600) and they are reaching their target well. They are also reaching Quebec at 35322.

Despite the target areas involved, all of the broadcasts from R. Denmark are in Danish, 25.850 is beamed to Japan 0510-1100; Indonesia and SE Asia 1200-1300; Europe and Africa 1200-1440; Australia 1400-1500; Middle East 1500-1600). Dick Moon logged them at 1200 as 34333 and Alan Roberts as 15221 at 1440.

Mark Hattam has heard their 3KW transmission from R. Pakistan on 25.945 in Spanish (1400-1700 Mon-
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Short Wave Magazine June 1989
The report from Dick Moon indicates that the broadcasts to Africa from BRT on 26.050 (Du, Eng, Fr 0900-1100) reach their target as 34343 at 0910. Reception in the UK varies, but Phoebe Crooks noted 0515.

The 21MHz (13m) broadcasts to Europe noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.

The 23MHz (17m) broadcasts to Africa noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.

The 24MHz (16m) broadcasts to Europe noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.

The 26MHz (12m) broadcasts to Africa noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.

The 27MHz (10m) broadcasts to Europe noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.

The 28MHz (9m) broadcasts to Africa noted steered from U.A.E., D, 0615-0815 (Fr, Ar, Eng, 0515-0615) 33433 at 1030 by Ken Whayman in Bexleyheath; R. Liberty via Gloria 21.745 (Russ 0600-1600) 33333 at 1039 by Neil Whayman.
Philip Rambaut logged their broadcast to central Asia via Darwin 15.170 (Chi 2200-0000) as 222.

George Hewlett says their transmission to the central Pacific area via Shepparton 15.200 (Eng 2000-0730) probably provides the best reception during the early morning. Mark Thompson logged it as a remarkable SIO 444 at 0545. George noted that 15.160 may also be heard, but his signal is weaker than 15.420 and suffers from co-channel interference. Their broadcasts via Carnarvon to E.Africa 15.450 (Eng, Chi 0900-1000) were logged as 22222 at 0800 by Kenneth Reece and S.Africa 15.415 (Eng 0900-1100) were logged as 24522 at 1000 by David Edwardson. George says 15.415 may be heard opening at 0900 at SIO 433, but it gets severe interference by 1000 and reception is thereafter unusable.

The broadcasts from R. New Zealand, Wellington to Australia and Papua New Guinea were also being received in the UK early during the morning. In New Radnor, Simon Hamer picked up a transmission at 0500.

Broadcasts to outside Europe were logged. During the day: BBC via Lisbon 15.420 (Eng, E Africa 0900-0900) as 24223 at 0565 by Kenneth Reece; R. Japan via Yamata 15.270 (Eng, Jap to Australia 0600-1000) as 230 by David Middlemiss in Eymouth; R. Liberty via Lampertheim 15.445 (Russ to C.Africa, Middle East 0500-1300) as 14444 at 0600 by Gary Judit in Hayes; R. Pakistan, Islamabad 15.605 (Ar, Ur to Middle East 1200-1545) as 43333 at 1300 by John Cocks; R. Yugoslavia, Belgrade 15.325 (Eng to USA 1300-1330) as 55555 at 1310 by John Nash; R. Portugal, Madeira 15.270 (Chi, Tel to Asia 2000-2100) as 224 by David Watten.

R. Bucharest, Romania 15.365 (Eng, Port to Africa 1730-1820) was logged as 55455 at 1739 by Ian Curran and Stockton-on-Tees; R. Netherlands via Talata Volon 15.175 (Eng to E.Africa 1830-1925) as 44444 at 1630 by Richard Redford-Reynolds; BBC via Kranji 15.140 (Eng to SE Asia, Australia 1900-2300) as 433 at 1945 by Alan Smith; R. Nacional de Espana 15.415 (Eng, Fr to Africa 1900-2100) as 43444 at 1949 by Leo Barr; KUSW, Salt Lake City 15.650 (Eng to EUSA 1600-2000) as 43333 at 2100 by Mike Smith; R. Nac. Chile, Santiago 15.140 (Sp to S.America 0300-0400) as 55455 at 2100 by Ferdy de Martin in Cortildal; VOA via Greenwich 13.560 (Eng to W.Africa 1600-2000) as 44444 at 2159 by Mal Tedds; WCSN, Scotta Corner 15.435 (Eng to W.Africa 2200-0000) as 43333 at 2200 by Ken Whymaran; R. HCJ, Quito 15.155 (Eng to USA 0000-0300) as 55333 at 0300 by Sheila Hughes. Their broadcasts to Europe were also noted: ISBS Rikisurvaripic, Iceland 15.770 (Ec 1216-1245), heard by Simon Holland in Douglas, Isle of Man; UAE R. Dubai 15.435 (Ar, Eng 0615-1646) as 222 at 1601 by Julian Wood; Voice of Vietnam, Hanoi 15.010 (Eng, Rus, Viet, Fr, Sp 1600-2100) as 433 at 1900 by Terry Roy in Gateshead; LJB, Tripoli 15.415 (Ar 1103-2030) as 45554 at 1925 by John Penny; RNB Brasilia, Brazil 15.265 (Eng, Gre 1800-1900) as 32222 at 1930 by David Minter in Portland; Voice of Israel, Jerusalem 15.096 (Russ, Eng, Fr 0530-2000) heard at 2029 by Ron Pearson in Bungay; R. Korea, Seoul 15.575 (Ar, It, Port, Eng, Ger 1645-2300) as 43444 at 2010 by Alan Curran; R. Portugal, Madeira 15.460 (Eng, E Africa 0900-0900) as 55333 at 0930 by Sheila Hughes.

DSLs:
- A: Leo Barr, Sunderland.
- B: Ian Baxter, Blackburn.
- C: John Cocks, Australia.
- D: Alan Curran, Stockton-on-Tees.
- E: Ffryd De Martin, Cortildal, Switzerland.
- F: Colin Delffe, Corsham.

QSL from Radio Tirana sent in by Neil Wiles

<table>
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<th>Freq</th>
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<td>2017</td>
<td>R. B.M.M, P.F.U.</td>
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<tr>
<td>15.265</td>
<td>ORTM</td>
<td>Moscow</td>
<td>1980</td>
<td>L.P.M.T.</td>
</tr>
<tr>
<td>15.460</td>
<td>ORTM</td>
<td>Moscow, Ashkhabad</td>
<td>1980</td>
<td>A.S, L.P.M.T.</td>
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<tr>
<td>15.510</td>
<td>ORTM</td>
<td>Moscow</td>
<td>1980</td>
<td>A.S, L.P.M.T.</td>
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H: David Edwardson, Wallseid.
I: Bill Griffiths, London.
J: Sheila Hughes, Morden.
K: Cyril Kallam, Sheffield.
L: John Nash, Brighton.
M: Fred Pullum, Stortington.
N: Christopher Pritchard, Cambridge.
O: Richard Redford-Reynolds, Guildford.

DK: Kenneth Reece, Preston.
E: Mark Selby, Aldershot.
F: Tim Shirley, Bristol.
G: Mal Tedds, Nottingham.
H: Mark Thompson, Wakefield.
I: Neil Wilelsey, Newcastle upon-Tyne.
J: Max Wustrau, Bedford.

QSL from Radio Tirana sent in by Neil Wiles

Voice of America

Mauritania

2017

B.M.M, P.F.U.

Camaroon

2000

B.L.L, N.P.U.

Moscow

1980

L.P.M.T.

Moscow, Ashkhabad

1980

A.S, L.P.M.T.

Moscow

1980

A.S, L.P.M.T.

Moscow

1980

A.S, L.P.M.T.

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With the exception of the 13MHz (22m) were: SRI via Otsuka 13.685 (It, Eng, Fr, Gt, To Australia, Pacific area 0745-1000) 15444 at 1400 by Sheila Hughes; Peace and Progress via CJU, Czechoslovakia 17.120 (Ch, Fr, SE, SE Asia 1300-1400) 444 at 1410 by Kenneth Buck; R. Prague, Czechoslovakia 11.200 (Fr, Ar, Fr to S. Asia, Middle East 1400-2005) 434 at 1536 by Ian Bond; AWR Atar, Gujarat 13.720 (Ta, Mt, Te, Hito S. Asia 0600-0800) 434 at 2130 by Philip Barnhurst.

A number of broadcasters are using the large part of the band during the day. They include R. Jordan, Amman 13.685 (Eng0500-1240) 344 at 1205 by Kenneth Buck; R. New Delhi, India 13.730 (Fr, Eng, Sp 0700-1700) 45444 at 1100 by Roy Patrick; WIB, Scotts Corner 13.760 (Eng, Fr 1400-1555) 54444 at 1400 by John Nash; LBSS Rikusarupov, Iceland 17.330 (It, 1850-1900) 54533 at 1858 by Henri Hember; also WRO New Orleans 13.720 (Eng 2100-0000) 23322 at 2310 by Mike Smith.

R. Australia have also been reaching the UK in the 11MHz (25m) band during the early morning. George Hewlett reports that their transmission to Europe and the South Pacific area via Shipperton 11.970 (Eng, Fr, It, Sp 0600-0900) 2200 via the station was rated as 34433 at 0849 by David Edwardson.

Other broadcasts mentioned were the 330 kHz (10m) 54444 at 1315 (Eng to W. Africa 0600-0700) 33333 at 0630 by Kenneth Reece; AWG Agana, Guam 9.670 (Eng, Sp 0900-1100) 23442 at 0940 by John Evans; SBC Singapore 11.940 (Eng to SE Asia 2200-1605) 33222 at 1030 by Christian Pitchard; SRI via SSB by Ihab Taplin; R. DW via Wachtal 13.790 (Hs, Eng to Africa 1800-1920) 434 at 1930 by Roy Patrick; WIB, Scotts Corner 13.760 (Eng, Fr 1400-1555) 54444 at 1400 by John Nash; LBSS Rikusarupov, Iceland 17.330 (It, 1850-1900) 54533 at 1858 by Henri Hember; also WRO New Orleans 13.720 (Eng 2100-0000) 23322 at 2310 by Mike Smith.

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W. L. Orr W5SAI & B. D. Cowan W2LX
Theory, design, construction, adjustment and operation of quad, Quads plus Yagi, Gain figures.
109 pages. £5.60
were three rates automatically set by the microprocessor according to how fast you turn the tuning knob. To give you an idea how well set this was, I didn't realise it was doing it until I read the manual!

The three rates were 1, 2 and 10 kHz per step on short wave and 10, 20 and 100 kHz on v.h.f. I think the secret to success in this case is the use of the 20kHz intermediate step. My only criticism of this aspect of the performance was the short beep which occurred when tuning quickly or switching between presets. It sounded as though the synthesiser was momentarily losing lock, but was not a serious problem.

Moving on to some more serious short wave listening I connected up my wide-band nest of dipoles, which proved easy thanks to the solderless connectors supplied.

Starting with the short wave broadcast bands, I logged a variety of stations including the usual Radio Moscow and Voice of America. I was impressed with the versatility of the audio controls and I found, with a little bit of attention, I could obtain the best of any broadcasts available.

Another feature not yet mentioned was the ability to automatically scan a broadcast band. This is started quite easily by selecting the required band and then pressing the SCAN button. I found this quite valuable for checking the selection of the band as you could adjust the signal level required to stop the scan by use of the LOC/DIST button or the manual r.f. gain control.

Now it was time to look at the performance with amateur signals. I started with the 3.5MHz band where there are always some local calls to catch. Resolution of amateur s.s.b. signals with the b.f.o. proved to be very easy and I could separate several American s.s.b. transmissions on 14MHz along with an assortment of European and Middle East stations. I discovered that the audio performance could be improved by using the old technique of setting the volume control to maximum and controlling the output with the manual r.f. gain control.

The next mode to try was RTTY which involved connecting the LINE OUT to the audio input of my terminal unit and firing-up my BBC B computer. I started with a few amateur transmissions on 14MHz and 21MHz and found that the fine control offered by the b.f.o. was just right for decoding these narrow band transmissions. I then explored the world of commercial RTTY and was able to resolve a wide variety, including TASS news broadcasts with no problems.

The final utility station test was to connect-up my ICS FAX-1 and try a few weather FAX charts. My first station was Rome Meteo on 13.6MHz and I received some very good charts. FAX is quite testing for this type of receiver as you need excellent stability to produce good results without constant retuning. I'm pleased to say that the D-2999 passed with flying colours.

All these tests with the utility modes meant that the D-2999 was operating very close to my computer and printer and I'm glad to say I suffered no interference problems.

**Summary**

I must admit I enjoyed using the D-2999, the microprocessor logic was very well set-up and the physical size was just right. I think Philips must have put a lot of thought into the engineering. The performance on all modes was very good with the sensitivity being exceptional for a receiver of this type. In view of its good all round performance on all modes I would recommend the D-2999 to anyone in this market.

The Philips D-2999 is available from any Philips stockist priced around £299.99. Thanks are due to Philips UK for the loan of the review model.
With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz.

The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall frequencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected frequency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attenuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.
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