



# ICOM

## Count on us!

### IC-R7000, 25-2000 MHz, Commercial quality scanning receiver



ICOM introduces the IC-R7000, advanced technology, continuous coverage communications receiver. With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the

main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz. The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A 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.

### IC-R71E, General coverage receiver.

The ICOM IC-R71E 100KHz to 30MHz general coverage receiver features keyboard frequency entry and infra-red remote controller (optional) with 32 programmable memory channels, SSB, AM, RTTY, CW and optional VFO's scanning, selectable AGC, noise blanker, pass band tuning and a deep notch filter.

With a direct entry keyboard frequencies can be selected by pushing the digit keys in sequence of frequency. The frequency is altered without changing the main tuning control. Options include FM, voice synthesizer, RC-11 infra-red remote controller, CK70 DC adaptor for 12 volt operation, mobile mounting bracket, CW filters and a high stability crystal filter.



**Helpline:** Telephone us free-of-charge on 0800 521145. Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

**Datapost:** Despatch on same day whenever possible.

**Access & Barclaycard:** Telephone orders taken by our mail order dept, instant credit & interest-free H.P.

**Icom (UK) Ltd.**

Dept SW, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.



[21] Sony ICF-SW1S Reviewed



**Cover** If you are going abroad for your summer holidays then you should be thinking of taking a small, portable short wave radio to enable you to keep in touch with what is going on at home. If it also receives v.h.f. f.m. as well as long and medium wave broadcasts so much the better. John Waite looks at Sony's latest offering which ties in well with our free, pull-out feature on holiday listening, 'Waves Away'

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# FIRST WORD

May I thank all those readers who took the time to fill in and return the questionnaire from the April issue. These are now being prepared for processing and analysis, which will take quite a while — so good was the response.

I had a quick look at the forms as they came in and some of the comments and answers confirmed my own thoughts and ideas based on the normal feedback from you through letters and chats at rallies. In this issue you will find one or two changes based on your replies.

The most obvious one is the introduction of "Readers Adverts". The rules governing these will be quite strict to rule out the

pseudo-dealer and the advertising of illegal equipment. You should use the form printed on page 52 but if you do not wish to cut your copy of the magazine you may use a photocopy or plain paper. However, in this case you must send in the Corner Flash from page 52 or quote your Subscriber Number to prove that you have bought a copy of SWM. No Corner Flash or Subscriber Number — no advert! The charge has been fixed at £2.30 inc. VAT for up to 30 words plus your address and payment must accompany your copy. The first adverts should appear in the June 88 issue.

The special "gate-fold" cover was very well received and I have had requests for

extra copies of the covers. We have had a small quantity of each side printed and these will be available from our stands at rallies price 50p per side. Unfortunately they will not be available by post — their size makes it too difficult and expensive to package them.

If you are holidaying abroad this summer then the pull-out section in the centre of this issue will interest you. It will prove to be a handy guide to help you find the English language broadcasts in your holiday area and give you the times and frequencies of the BBC World Service broadcasts to keep you in touch with home.

DICK GANDERTON

## A WORD IN EDGEWAYS

Sir

*As one who has been dabbling in radio for many years I have seen plenty of changes.*

*For instance, all station wavelengths used to be in metres and the frequency given in kilocycles. Nearly all of the old radios were calibrated in metres, and later in kilocycles, which made the calibration far easier, giving the exact frequency of the station.*

*Then some bright spark decided that it should be called kilohertz!*

*I am all for change if it helps progress, but I see no reason for change when it is not. I refer here to the changes of frequencies on the long wave band.*

*Ever since the BBC started broadcasting on the long wave band, around sixty years ago from the old 5XX transmitter at Daventry, the station has been on 1500 metres, 200Kc/s (sorry kHz). The result of moving it to 198kHz has been to put it 2kHz nearer to Motala on 189kHz and it is still 9kHz from DLF Munich on 207kHz.*

*So why has it been changed?*

*It has not altered the fact that some thirty stations use frequencies from 153 to 281kHz — a mere 128kHz, and all are receivable in the UK. There are three on 153, two on 171, four from 177 to 183, three on 198, two on 207, two on 216, two on 236, two on 245, two on 254 and two on 263kHz. Of the six stations in the USSR five share the same frequency with another station outside Russia. No Russian station shares the same frequency with another*

*Russian station as far as I know. There are five l.w. stations pumping out 2000kW.*

*How long will it be before someone realises that the reliable coverage area of a l.w. transmitter is far greater than the m.w. counterpart, and that some could be used for propaganda purposes, perhaps with a power in excess of 2000kW. The result — chaos, the same as the medium wave band where far too many stations are trying to make themselves heard above the rest of the noise that is going on.*

*It is high time that some sort of world-wide organisation was set up to sort out this mess and to ensure that all transmitters are restricted to a power whereby they do not overlap another station on the same frequency.*

GEORGE MILLMORE  
WOOTTON ISLE OF WIGHT

I will use George's letter as a peg to hang some comments about abbreviations and units on. I too was brought up on Kc/s and can well remember the change to hertz and all the comment and trauma that went with it. We all thought that it would never catch on!

What is more to the point, however, is the laxity in writing abbreviations, units and their multipliers. This is particularly true of the multipliers for "kilo" and "mega". The correct way of writing kilohertz is kHz, not Khz, KHZ or KHz. K is reserved for degrees Kelvin (absolute temperature) or 1024 bits of computer memory. The other common error is to write mhz

instead of MHz. So what, you say, everyone knows what is really meant. Do they? How do you know if one million cycles occur every second or one cycle takes nearly 17 seconds to complete? ED.

Sir

*I read with interest David Gommo's letter in "A Word in Edgeways" April 88 SWM and agreed with most points. He suggests that c.w. swamps everything else. If you cannot beat them, why not listen to them? I have been a s.w.l. for some 70 or so years and some time ago I did just that. It is quite easy to learn and modern aids are helpful.*

*It is said that c.w. (Morse) is dying — this may be true — but there is plenty of life around at the moment. A tiny squeak on 28.262 AX2RSY Australian Centenary, a ship entering the Black Sea asking for a pilot, a trip around the beacons using the excellent Beacon Chart given away with the March 88 issue of your sister magazine, Practical Wireless — or perhaps an Ice Report from the Arctic. Excellent books are available from various sources such as Interbooks or the Short Wave Magazine Book Service.*

*I am not competent to comment on the quality of amateur operating standards or indeed would I wish to, they form a very small percentage of my listening. OK — 73 — 88BCNU, etc. is of no particular interest to me. I would, however, be very interested to read any comments from any listener who shares my corner of the Hobby.*

*A passing thought — with the mass arrival of scanners (v.h.f., u.h.f. and up) would not the abbreviation "r.l.", taken from the SWM slogan "For the Radio Listener", be more appropriate than s.w.l.? E. SWAN EASTBOURNE SUSSEX*

This letter touches a sore point with me — Morse (c.w.) is better at sending me to sleep than counting sheep! The mere sound of Morse entering my ears seems to completely turn my brain off, so if anyone has any ideas on how to stay alert while receiving Morse I would appreciate hearing them.

The final paragraph is also interesting. I have received several letters from readers, some quite abrupt, on the subject of the title of the magazine and the description "For the Radio Listener". The first grouse is that as it is *Short Wave Magazine* it should not cover anything outside the short wave bands. This is, in my opinion a nonsense — short wave listener (s.w.l.) has become a term for anyone who "listens" to any form of radio signal no matter what the frequency, mode or subject matter. This brings me to the other major complaint — that as a magazine for "listeners" it should not be covering anything that is not output through a loudspeaker or headphones! Television and any form of data transmission is not considered to be "listening". Again this is nonsense. The term "listener" is used to describe anyone who receives radio transmissions no matter how they have to be presented to be understood. ED.

# WHAT'S NEW

## Peaks & Plains Award

This award is sponsored by Gradus Ltd., in conjunction with the Cheshire Peaks and Plains Tourist Board.

The award is available to all licensed radio amateurs and s.w.l.s on a worked/heard basis. You need to work/hear 10 Cheshire stations PLUS either of the MDRS club stations (G1MWS, G4MWS) OR any one of the special event stations organised by MDRS active throughout 1988.

All contacts must be made after 1 January 1988. The award costs £1.50 (4 IRCs for non G callsigns) with a log extract showing stations worked/heard, date, etc., countersigned by one other licensed amateur to:

R. Thornley G1NUS  
270 Hurdfield Road  
Macclesfield  
Cheshire SK10 2PN

## PEAKS AND PLAINS AWARD

THIS CERTIFIES THAT

**IS90844**

HAS SATISFIED THE REQUIREMENTS, VIA AMATEUR RADIO, TO QUALIFY FOR THIS AWARD

BAND 2mts  
MODE F3E  
AWARD No. 11

ISSUED BY *[Signature]*

**MACCLESFIELD & DISTRICT RADIO SOCIETY**  
1958 - 1988

SPONSORED BY GRADUS LTD. IN CONJUNCTION WITH PEAKS & PLAINS TOURIST BOARD

## Media Network

This programme, broadcast by Radio Netherlands, is a weekly survey of communication developments compiled with the assistance of over 170 monitors spread across the globe.

**April 28:** Digging in the Archives. This edition of Media Network will explore some of the huge radio archives which are gradually being sorted by the Dutch Broadcast Museum in Hilversum. They'll also be including news from the WRTH editorial office in Amsterdam.

**May 5:** Dayton Developments. If host Jonathan Marks makes it back to Holland in time, you'll have a report on the Dayton Ham Convention in Ohio USA. Over 30000 amateur radio operators are expected to attend and this year will see special sessions for s.w. broadcast listeners. Also included will be Arthur Cushen's Pacific News.

**May 12:** Media News Roundup. This edition will include news from the African continent from Richard Ginbey.

**May 19:** Media News Roundup. This edition includes clandestine radio news from John Campbell.

**May 26:** Antwerp Antics. This programme will include a report on the 1988 EDXC conference which takes place May 20-23 in Antwerp, Belgium. Media News from Victor Goonetilleke is also scheduled.

## Radio Sweden SSB

Radio Sweden transmit broadcasts from their short wave s.s.b. relay of Swedish home service programmes. These will continue only until July 1 when the transmitter will be closed down. The times of transmission are (for the moment):

- 0200-0230UTC on 17.840MHz (a)
- 0230-0300UTC on 17.840MHz (b)
- 0500-0700UTC on 17.770MHz
- 0700-0900UTC on 17.770MHz (c)
- 0900-1100UTC on 21.555MHz
- 1100-1600UTC on 21.555MHz
- 1600-1800UTC on 15.435MHz
- 1800-2030UTC on 15.420MHz
- 2330-2400UTC on 17.840MHz (a)

(a) Radio Sverige, the Swedish service of Radio Sweden.

(b) English service.

(c) Saturdays and Sundays only.

## 934MHz CB

The Parliamentary Under Secretary of State for Trade & Industry made the following statement about the future of 934MHz CB.

"The Government in common with other administrations in Europe is to consider the introduction of a Short Range Radio (SRR) system in the band 933-935MHz. One of the existing users of this band is the 934MHz CB allocation. Approximately 3000 users have these sets out of a total of over 115000 CB licencees.

Once STT becomes widely used, it is inevitable that the CB service will suffer an increasing level of interference and it is important that potential users of the band are aware of this, and that the many potential

users of any new SRR service are adequately protected.

I have decided therefore that the Performance Specification MPT1321 to which 934MHz CB transceivers are manufacturer certified should be withdrawn from 30 December 1988. This will provide warning to traders and potential users alike that no new sets should be made or imported from this date.

It is of course only fair that existing users of the CB band get a good life from their sets. I can assure users that their existing equipment may continue to be used for its foreseeable useful life."

When further details are available about what will happen to the users on the band, etc., we will let you know.

## BRARS Special Award

British Rail in conjunction with the British Rail Amateur Radio Society have organised a special award to celebrate 21 years of Inter City.

The award will run from the start of the new timetable, May 16, and finish on commencement of the winter timetable in October. It is open to both overseas and British radio amateurs.

The certificate can be gained by a licensed amateur or short wave listener producing a signed log sheet confirming contact with, or in the case of short wave listeners, having heard both stations in contact with 21 different amateur stations whose postal address includes any of the towns listed in the index to the pocket sized InterCity Guide to Services.

The following conditions must be adhered to: At least one of the contacts must be with a member of British Rail Amateur Radio Society, or the club station LMR. No cross band contacts allowed. Contacts by repeater or satellite not allowed. Overseas short wave listeners need only hear the G contact. The log sheet must be set out - date - time - band - station worked/heard, and signed by the operator.

QSL confirmation is not required. The closing date for receipt of log sheets is postmarked no later than 10.12.88.

Logs to be forwarded to:  
Award Manager BRARS  
85 Surrey Street  
Glossop  
Derbys SK13 9AJ

## Ham Aid Mondial

A group of Wiltshire Radio Amateurs are setting up Ham Aid Mondial during the Bank Holiday weekend May 28/29. This is to raise money for the Disasters Emergency Committee and to provide funds to purchase a cardiac resuscitation unit (LIFEPAK 5) for Marlborough Ambulances.

## Alderney is Active

On May 22, the Guernsey Amateur Radio Society will be active on 1.8 and 3.5MHz around the normal WAB s.s.b. frequencies from the Island of Alderney. They will be using the callsign GU4NYT/P.

It is hoped that the transmitting station will operate on all amateur bands below 430MHz. They intend to operate on all permitted modes in these bands. They have three special event calls for the event, GB75HAM, GB4HAM and GB1HAM. The station will be located between Marlborough and Pewsey near Martinsell Hill.

The group will be active for the first three hours of the WAB contest, but will then have to leave to catch the plane to Guernsey.

It is also possible that there will be activity from "rare" parishes in Guernsey during the afternoon of May 22.

# WHAT'S NEW

## RAFARS Golden Jubilee

The Royal Air Force Amateur Radio Society was 50 years old on 1 April 1988. They were about on the air with GB50RAF, which will be used now for all kinds of events until 31 March 1989.

They have created a Golden Jubilee Award too. It is open to all s.w.l.s and amateurs for contacts made between, or reports confirmed between, members of the RAFARS (1.4.88-31.3.89). The basic award will be issued for the first 50 points scored and endorsements will be available if 100, 150, 200 or 250 points are scored. Points can be scored for completed contacts (or confirmed listener reports) as follows:

For contacts on frequencies below 70MHz:  
i: 2 points for each contact on s.s.b. with a RAFARS member in the same country as that of the claimant.

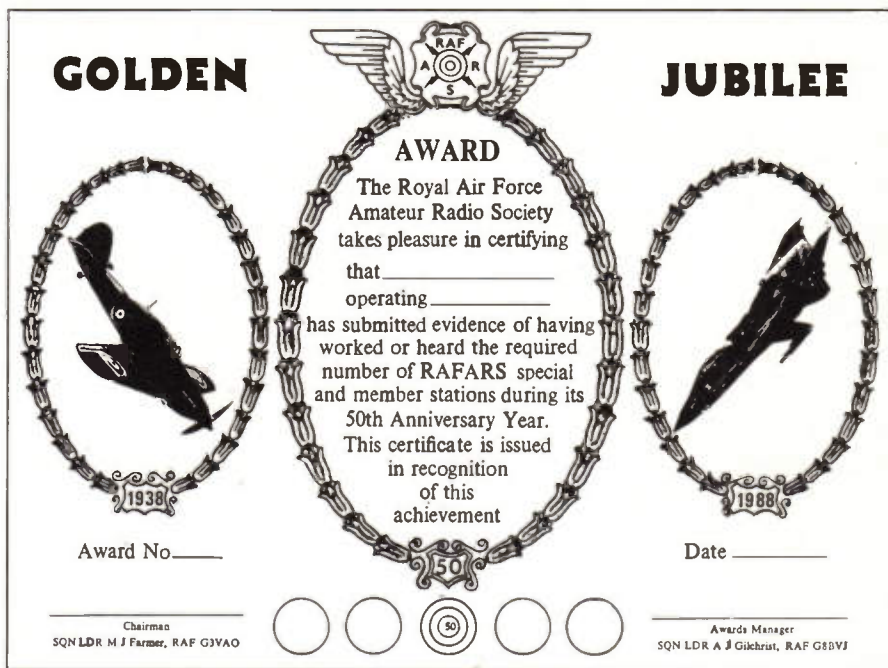
ii: 3 points for each contact using a mode other than s.s.b. (e.g. a.m., c.w., f.m., RTTY, SSTV, etc.) with a RAFARS member in the same country as that of the claimant and for each contact on s.s.b. with a RAFARS member in a different country from that of the claimant.

iii: 4 points for each contact using a mode other than s.s.b. (e.g. a.m., c.w., f.m., RTTY, SSTV, etc.) with a RAFARS member in a different country from that of the claimant.

iv: 5 points for each contact using any mode with either special event stations using a callsign GB7RAF or GB7RFC, RAF club stations or other special event stations designated by RAFARS as counting for the award.

Contacts on frequencies on and above 70MHz shall be scored in the same way as for h.f. contacts except that all points scored shall be double those scored for a corresponding h.f. contact.

Only one contact with each RAFARS



member may be counted, regardless of callsign used. In the case of the special event callsigns only one contact with each special event station may be counted. When the special event callsign is used by different groups, e.g. RAF St Athan and RAF Halton both use GB4RAF, both stations count for points.

Claims should be submitted in chronological order showing the following information (Special logsheets are available from the contest manager).

Date, Start and finish times of the contact (UTC), Callsign of station worked, Frequency band used, Mode used, Signal reports sent and received, RAFARS number

of station worked, Points claimed for the contact.

All claims must be in by 31 July 1989. No QSL cards are required but logs must be signed by a licensed amateur stating they have checked the entry.

The cost of the basic award including P&P is £1 for UK addresses or £1.50 for airmail postage. For claims and full details of the award, contact:

Sqn Ldr A. J. Gilchrist RAF G8BVJ  
6 Mansion Hill  
Halton  
Aylesbury  
Bucks HP22 5NL

## The World of Amateur Radio Exhibition

The World of Amateur Radio exhibition will take place in the URC Church Hall, Rock Street, Thornbury on May 21 from 10am to 4pm.

The purpose of the exhibition is to present to the general public the fascinating world of amateur radio. Aspects of radio to be seen at the exhibition will include:

### Short wave listening.

A complete working s.w.l. station, equipped with both high performance and economy communications receivers.

### Computers.

This section will illustrate the use that is made of home computers in radio communications.

### Amateur Television.

Television pictures using the BBC/IBA 625 standard will be shown, these pictures will be transmitted on u.h.f. 430MHz.

### Microwaves.

The part of the exhibition showing the mechanical and plumbing skills of amateur radio enthusiasts.

## AMSAT Colloquium

The AMSAT Colloquium will again be held at the Lecture Complex of the University of Surrey, Guildford from July 29 to 31. The University is about 48km from the centre of London, situated in very pleasant surroundings, near to shops, BR station and adjacent to Guildford Cathedral. Wheezily Royal Horticultural Gardens are also very near.

The Colloquium will be officially opened on Saturday morning (July 30) at 1000 and will run until midnight on that day, recommencing at 0930 on Sunday 31st until 1700.

A full programme of lectures, demonstrations, workshops, exhibitions by the trade and amateur radio groups in the Concourse area, large fun junk sale after the

Colloquium Dinner on Saturday evening and visits to the UoSAT Command Stations with the Stations Controllers to answer questions. The AMSAT UK callsign and amateur station GB2SAT and GB75SAT will be available to any licensed amateur to use.

Accommodation, meals and drinks have been booked at the University at prices very much lower than costs at local hotels and will be VAT free if booked in advance.

Members and friends who may wish to attend, there are daily as well as full weekend options, should apply for a booking form to:

The Hon Secretary AMSAT UK  
94 Herongate Road  
Wanstead Park  
London E12 5EQ

## 75 Years of Radio

Seventy-five years of radio is the theme behind a special day celebrating the 75th anniversary of the RSGB. The event will take place at the FE Centre, Tower Hill, Haverfordwest, Pembro on May 21. Doors will be open to the public from 11am.

On the day the Pembrokeshire Radio Society will be operating under the special callsign GB75PRS. In common with most special event stations, members of the general public may send messages of greetings to different countries, under supervision.

The station hopes to have three transceivers in operation, h.f. phone, h.f. Morse and a v.h.f. station. The society will be making a point of putting the callsign on c.w. as well as s.s.b. Morse operators may like to listen between 3.515 and 3.540MHz.

There will also be a fascinating display of vintage radio equipment on show. Many of the items in the static display will be on loan from local radio historian Eric Down GWODDK.

More details from:  
B. Smith GWOIER  
M. Haven 2825

# SCHEDULES

## Radio Sweden Schedule March 27 to September 24

English

Time (UTC)	Frequency MHz	Band (m)	Primary Target	Beam heading
0230	9.695	31	North America	320°
0330	11.705	25	Middle East	130°
0930	15.390	19	Aust, N. Zealand	70°
1100	6.065	49	Europe, Africa	210°
1100	9.630	31	Europe, Africa	210°
1100	21.690	13	Middle East	145°
1230	15.190	19	East Asia	55°
1230	21.690	13	South Asia	85°
1400	15.345	19	North America	305°
1400	15.390	19	North America	320°
1700	1.179	254	Europe	non dir
1700	6.065	49	Europe	210°
1830	15.240	19	Africa	165°
2100	1.179	254	Europe	non dir
2100	6.065	49	Europe, Africa	210°
2100	11.845	25	Africa	180°
2300	1.179	254	Europe	non dir
2300	9.696	31	North America	290°
2300	11.705	25	North America	290°

French

Time (UTC)	Frequency MHz	Band (m)	Primary Target	Beam heading
0930	6.065	49	Europe, Africa	210°
0930	9.630	31	Europe, Africa	210°
1130	9.630	31	Europe, Africa	210°
1130	21.690	13	Middle East	145°
1500	6.065	49	Europe, Africa	210°
1500	15.345	19	North America	305°
1830	1.179	254	Europe	non dir
1830	6.065	49	Europe, Africa	210°
1930	1.179	254	Europe	non dir
1930	6.065	49	Europe, Africa	210°

German

Time (UTC)	Frequency MHz	Band (m)	Primary Target	Beam heading
1030-1130	6.065	49	Europe	210°
1630-1700	1.179	254	Europe	non dir
1630-1700	6.065	49	Europe	210°
1730-1800	1.179	254	Europe	non dir
1730-1800	6.065	49	Europe	210°
1730-1800	9.615	31	Europe	210°
2000-2100	1.179	254	Europe	non dir
2000-2100	6.065	49	Europe	210°
2000-2100	9.655	31	Europe	210°

Spanish

Time (UTC)	Frequency MHz	Band (m)	Primary Target	Beam heading
0000	9.695	31	Central America	290°
0000	11.705	25	Latin America	250°
0130	9.695	31	Central America	275°
0130	11.705	25	Latin America	235°
0300	11.705	25	Latin America	250°
1630	11.955	25	Europe, Africa	210°
1930	9.655	31	Europe, Africa	210°
2130	11.705	25	Europe, Africa	210°
2230	9.615	31	Latin America	235°
2230	11.705	25	Latin America	235°

Russian

Time (UTC)	Frequency MHz	Band (m)	Primary Target	Beam heading
0300	9.695	31	North Asia	55°
1330	6.065	49	East Europe	100°
1330	15.190	19	North Asia	70°
1530	6.065	49	East Europe	100°
1530	11.955	25	North Asia	70°
1800	1.179	254	Europe	non dir
1800	6.065	49	East Europe	100°
2030	9.700	31	East Europe	100°
2200	1.179	254	Europe	non dir
2200	6.065	49	East Europe	100°

### 0200-0300UTC

Monday (Sunday in Target Area)

### USA & Canada

News, Touring RSA, DX Corner, Our Wild Heritage.

Tuesday-Saturday (Monday-Friday in Target Area)

News, Comment, Africa Today.

Sunday (Saturday in Target Area)

News, Saturday RSA, PO Box 4559, Conversation Corner.

### 0300-0356UTC

Monday-Sunday (Sunday -Saturday in Target Area)

### USA & Canada

News Comment, This is South Africa, News in Brief.

### 0400-0426UTC

Monday-Sunday

### Africa & Middle East

News, Listeners' Questions, News in Brief

### 1100-1156UTC

Monday-Friday

**Africa, Middle East, UK & Irish Rep**  
News, Comment, Africa Today, News in Brief.

Saturday

News, South African Hit Parade, Our Wild Heritage, News in Brief.

Sunday

News, PO Box 4559, the Message, Touring RSA, News in Brief.

### 1400-1500UTC

Monday-Friday

**Africa & Middle East (Also UK & Irish Rep on Saturdays & Sundays)**  
News, Women's Page/Youth Corner, Yours & Mine

Saturday

News, PO Box 4559, Yours & Mine.

Sunday

News, Sunday Magazine.

## RSA English Service Programme Schedule March-December.

### 1500-1556UTC

Monday-Friday

**Africa & Middle East (Also UK & Irish Rep on Saturdays & Sundays)**

News, Listeners' Questions, Panorama, News in Brief.

Saturday

News, Down Our Way, News in Brief.

Sunday

News, Sunday Magazine, PO Box 4559, News in Brief.

### 1800-1856UTC

Monday-Friday

### UK & Irish Rep

News, Comment, Africa Today, News in Brief.

Saturday

News, Saturday RSA, PO Box 4559, Conversation Corner, News in Brief.

Sunday

News, Touring RSA, DX Corner, Our Wild Heritage, News in Brief.

### 1900-2000UTC

Monday-Friday

### Africa & Middle East

News, Listeners' Questions, Africa Today.

Saturday

News, Saturday RSA, PO Box 4559

Sunday

News, Touring RSA, DX Corner, Our Wild Heritage.

### 2000-2056UTC

Monday-Sunday

### Africa & Middle East

News, Comment, This is South Africa, News in Brief.

## Europe & North Africa

## Voice of America

Europe (0300-0700) 6.040, 7.2MHz; (0400-0430 and 0500-0700) 7.92kHz; (0400-0700) 5.995, 7.170MHz; (0600-0700) 6.060MHz; (0600-0700) 7.325MHz; (0630-0700) 1.197, 3.980MHz. North Africa (0500-0700) 7.170; (0600-0700) 6.095, 11.805MHz.

Sunday	Mon-Fri	Saturday
0300 News	0300 News	0300 News
0310 VOA Morning	0310 Newslines	0310 VOA Morning
0400 News	0330 VOA Morning	0400 News
0410 VOA Morning	0400 News	0410 VOA Morning
0500 News	0410 Newslines	0500 News
0510 VOA Morning	0430 VOA Morning	0510 VOA Morning
0600 News	0500 News	0600 News
0610 VOA Morning	0510 Newslines	0610 VOA Morning
1700 News	0530 VOA Morning	1700 News
1710 Critic's Choice	0600 News	1710 Communications
1730 Issues in the News	0610 Newslines	World
	0630 VOA Morning	1730 Weekend Mag

Sunday	Mon-Fri	Saturday
1800 News	1700 News	1800 News
1810 Encounter	1710 Newslines	1810 Closeup
1830 Special English News & Features	1730 Music, USA	1830 Special English News & Features
1900 News	1800 News	1900 News
1910 Sunday Report	1810 Focus	1910 American Viewpoints
1930 Music, USA	1830 Special English News & Features	1930 Press Conference USA
2000 News	1900 News	2000 News
2010 The Concert Hall	1910 Newslines	2010 Music, USA (Jazz)
2055 Editorial	1930 Magazine Show	2055 Editorial
2100 News	2000 News	2100 News
2110 New Horizons	2010 Music USA (Jazz)	2110 Communications World
2130 Studio One	2055 Editorial	2130 Weekend Mag
	2100 News	
	2110 World Report	

## Lorna Mower

**Wirral & District ARC** meet alternate Wednesdays, 8pm in the Irby Cricket Club, Irby Mill Road, Irby. May 4 is a Treasure Hunt, the 11th a Quiz Night and a talk by Mr X is on the 25th. Alan Griffiths G1XYP on Moreton 7517.

**South Manchester RC** meet Fridays, 8pm in Sale Moor Community Centre, Norris Road, Sale. A spring d.f. Contest starts at 20.15 on April 29 and May 13 is Conversion on the 88 Set by G4JLG and Co., the AGM is on the 20th. More from David Holland on Sale 1837.

On May 13, **York ARS** have a Home-brew Night. They meet Fridays, 7.30pm in the United Services Clubroom, 61 Mickle-gate. Keith Cass G3WVO at 4 Heworth Village, York.

On May 9, **Atherstone ARC** have Rig Testing by the DTI Radio Investigation Service and the 23rd is d.f. Hunt 1. They meet 2nd & 4th Mondays, 7.30pm in the Physics Lab, Atherstone Upper School, Long Street. More from John Arrowsmith G4IWA on Atherstone 713670.

**Farnborough & District RS** meet 2nd & 4th Wednesdays, 7.30pm in the Railway Enthusiasts Club, Hawley Lane. May 11 is an Open Evening and the 25th a h.f. Field Day Review by GOGCI. Details from Tim FitzGerald G4UQE on Camberley 29231.

**Crystal Palace & District RC** meet 3rd Saturdays, 8pm in the All Saints Parish Rooms, Beulah Hill. May 21 is an Evening on the Air. Further info from Geoff Stone G3FZL on Forest Hill 6940.

Meetings for the **Paddington College ARS** are 1st Wednesdays at 7pm in Paddington College, Paddington Green, London W2. Contact Don Pye G1UCT on Paddington 3847 (after 7pm).

May 5 is h.f. Antenna Symposium for **The East Kent RS**, the 19th is an Operating Evening at Bishopstone. Meetings are 1st & 3rd Thursdays, 7.30pm in Parkside Lodge, Kings Road, Herne Bay or at the Radio Shack, Bishopstone. Brian Didmon G4RJS on Whitstable 262042.

On May 9, **Exeter ARS** have a talk on the Radio Control of Models. Meetings are 2nd Mondays, 7.30pm in the Community Centre, St Davids Hill. More from Ray Donno G3YBK on Exeter 78710.

On April 30, the **Cornish RAC** have the Trevithick Day Exhibition Station, Trelowarren Street, Camborne (GB2RTD). Meeting's are in the Church Hall, Treleigh, 7.30pm. More from N. Pascoe G4USB on Redruth 212314.

**Chelmsford ARS** have a Visit to Chelmsford Police HQ on May 3. They meet 1st Tuesdays, 7.30pm in the Marconi College, Arbour Lane. Roy Martyr G3PMX on Chelmsford 353221, Ext. 3815.

On May 12, the **Colchester**

**RA's** have a Construction Evening + Regional Liaison Officer — Ted Whitworth, the 26th is Kites 'n' Aerials by G4YTG. Meetings are in the Board Room, 1st Floor, "B" Block, Colchester Institute, Sheepen Road, 7.30pm. More from Mike Griggs G4YJN on Colchester 348189.

The May 10 meeting of the **Mid-Warwickshire ARS** will be a d.f. Foxhunt and Barbecue. They meet 2nd & 4th Tuesdays, 8pm in the St John Ambulance HQ, 61 Emscote Road, Warwick. Details from Peter Brown G0HH on Marton 632370.

**Dunstable Downs RC** meet in Room 3 of Chews House, High Street South on Fridays, 8pm. Sunday May 8 is a d.f. Hunt, the 13th a Junk Sale and provisionally a Visit to Fire Station is on the 20th. More from Tony GOCOQ on Luton 508259.

**South Bristol ARC** meet Wednesdays in the Whitchurch Folk House, East Dundry Road. A Demonstration of DX Broadcast TV by Ron Gardner is on May 4, the Club Project — Construction Evening G3XED on the 11th, a 14MHz Activity Evening on the 18th and a Microwave Activity Evening on the 25th. Further info from Len Baker G4RZY on Whitchurch 834282.

**Wimbledon & District ARS** meet 2nd and last Fridays, 7.30pm in St Andrews Church Hall, Herbert Road, Wimbledon. April 29 is a General Activity Evening and May 13 is Allard Motor Cars by David Kinsella. Contact David Love G4RBQ on Burgh Heath 51559.

**The North Wakefield RC** have a talk on The Police by PC Workman on May 5, On the Air on the 12th and a Visit to Jorvik Viking Centre by coach (total cost £5) on the 19th. They meet Thursdays, 8pm in The White Horse Public House, Fall Lane, East Ardsley. More from Steve Thompson G4RCH on Leeds 536633.

On May 11, **Fareham & District ARC** have the Mystery of Microwaves by G8VOI and a Talk and Slide Presentation by G6NZ on the 25th. They meet Wednesdays, 7.30pm, with Morse Classes from 6.30, in Room 12, Porchester Community Centre, Westlands Grove. Details from Bob Reeves G8VOI on Portsmouth 250830.

**Horsham ARC** have Independent Television by G3OGP on May 5. They meet 1st Thursdays in the Guide Hall, Denne Road. More from Phil Godbold G4UDU on Steyning 814516.

**Binstead ARS** meets Mondays, 7.30pm in Brickfields, Newnham Road, Binstead, Isle of Wight. Their May lecture is on Vintage Radio and TV by G3KPO. More from Bob Griffiths GOISB at 29 Dubbers, Godshill.

**Bredhurst R&TS** have two Construction/Natter Nights in May,

the 5th and 19th, the 12th is a Junk Sale. They meet Thursdays, 8pm in the Parkwood Community Centre, Deanwood Drive, Rainham. More from Kelvin GOAMZ on Medway 376991.

The lecture at **Lough Erne ARC** on May 18 is called Can you read a Map? Meetings are 3rd Wednesdays, 8pm in the Railway Hotel, Enniskillen. W. A. Ward on Enniskillen 24905.

**South East Kent (YMCA) ARC** have a Natter Night on May 4, a Practical Fault Finding Session on the 11th, a Natter Night/Waldershare weekend planning on the 18th and the 25th is a talk by G4LQI on Crystals. Meetings are Wednesdays with Instruction Classes in Morse or RAE Coaching on Mondays and Tuesdays. John Dobson on Dover 211638.

**Barry College of Further Education RS** meet Thursdays, 7.30pm, in the annex of the Barry College of FE, Barry to Bonvilston Road (A4226) near the Welsh Hawking Centre. A Video on JARL DX-pedition to China is on May 19. Further details from Dr Kevin Johnston GW4BCB at 68 Heol Isaf, Radyr, Cardiff CF4 6RJ.

On May 4, **Derby & District ARS** have a Junk Sale. Meetings are at 119 Green Lane, Derby, 7.30pm. More from Jack Anthony G3KQF on Derby 772361.

**Yeovil ARC** meet Thursdays, 7.30pm in The Recreation Centre, Chilton Grove. May 5 and 12 are, Is SWR Harmful by G3GC and the 8th is the 1988 Yeovil QRP Convention, time 0900, venue Preston School. The 19th is Absorption Wave Meter by G3MYM and a Natter Night follows on the 26th. More from David Bailey G1MNM at 46 Goldcroft, Yeovil.

**Loughton & District ARS** meet alternate Fridays at 7.45pm, in Room 20 of Loughton Hall. May 6 is Planning for the Field Weekend at Aylmers Farm, the 13-15th is the Field Weekend at Aylmers Farm and the 20th is an Informal Evening. More from John Ray G8DZH at 9 Albion Hill, Loughton, Essex IG10 4RA.

**Cheshunt & District ARC** meet Wednesdays, 8pm in the Church Room, Church Lane, Wormley. They have a Natter Night on May 4 and 18. Portable on Baas Hill follows on the 25th. More from Peter Davies G1KQA on Lea Valley 764930.

**Halifax & District ARS** meet 1st & 3rd Tuesdays, 7.30pm in the Running Man Public House, Pellon Lane. May 17 is Birketts Component Fair. David Moss GODLM on Halifax 202306.

**Felixstowe & District ARS** have got a Bank Holiday Social in the Grosvenor Hotel, Felixstowe on May 2 and ESWR Planning on the 16th. They meet alternate Mondays, 8pm in the Scout Hut.

Bath Road. Paul Whiting G4YQC on Ipswich 642595.

The **Mansfield ARS** have their AGM on May 6. Meetings are in the Victoria Social Club, 1st Fridays & 3rd Tuesdays, 7.30pm. More from Keith Lawson G4AAH on Mansfield 642719.

On May 10, **Keighley ARS** have an Informal Evening and the Annual Field Event follows on the 27/28/29th. They meet in the Club Room at the rear of the Victoria Hotel, Victoria Park (near the Leisure Centre), 8pm. Kathy G1IGH on Bradford 496222.

**Rhyl & District ARC** meet 1st & 3rd Mondays, 7.30pm in The 2nd Rhyl Scout HQ, (behind the little theatre), Vale Road. Designing and Building by GW3UTG is on May 9 and Microwaves by GW8ACG on the 23rd. More details from Mike GWOHWK on Llandegla 621.

**Wakefield & District RS** have a Junk Sale on May 17. They meet alternate Tuesdays, 7.45pm in the Community Centre, Prospect Road, Ossett. John Bryan G4VRY on Leeds 820198.

**Coventry ARS** meet in the Baden Powell House, 121 St Nicholas Street, Radford, Fridays, 8pm. April 29 is The (Indoor!) Direction Finding Contest (Cup Qualifier). May 6 and 20 are Nights on the Air & Morse Tuition. More from Jonathan Ward G4HHT on Coventry 610408.

**Radio Society of Harrow** meet Fridays, 8pm in the Roxeth Room, Harrow Arts Centre, High Road, Harrow Weald. A lecture by the Chairman on Impedance Matching is on April 29, an Activity Night on May 6 and Access Control using I.f. Transponders by Howard Berry on the 13th. Bob Pickles G3VCA on Ruislip 673287.

**South Powys ARC** have Practical Satellite TV Pt 2 on May 3. Meetings on the 1st Floor, RAFA Club, The Struet, Brecon. More from B. Carter GW8AAG on Bwlch 730158.

**Hordean & District ARC** meet 1st Thursdays, 7.30pm in Merchistoun Hall. They have the DTI on May 5. Dan Bernard G4RLE on Portsmouth 755274.

**Midland ARS** have Drayton Manor Rally on May 8 and a Junk Sale & Natter Night on the 17th. Meetings are in Unit 16, 60 Regent Place, Birmingham, 7.30pm with classes from 7pm. More info from Tom Brady G8GAZ on 357 1924.

On April 28, **Edgeware & District ARS** have a Scanner Demonstration by G4GYS/G4RMD. May 12 is Antenna Surgery — How to Cut Your Wire Antennas, the 20th is Straight Key Evening (SKE) and NFD/Constructors Contest is on the 26th. More from Ian Cope G4IUZ on Hatfield 65707.

**Todmorden & District ARS** meet



# GRASSROOTS

1st & 3rd Mondays, 8pm in the Queen Hotel, Todmorden. A Natter Night is on May 2 and talk by a Crime Prevention Officer on the 16th. Details from G1GZB on Todmorden 7572.

**Southgate ARC** meet 2nd & 4th Thursdays, 8pm in Holy Trinity Church Hall (Upper), Green Lanes, Winchmore Hill. On May 12, Stan Woods gives the third of his annual lectures on the History of Valves and the 26th is an Informal Meeting. Details from Brian Shelton on Winchmore Hill 2435.

**Reading & District ARC** meet alternate Tuesdays, 8pm in the White Horse Pub, Emmer Green. May 10 is Satellite Reception by Dave Bryant and the 24th is 23cm TV Repeater GB3HV by

G4CRJ. More from Mike Anthony G4THN on Reading 774042.

May 11 is a Social/Morse Class for the Wyre ARS. The 18th is a Barbecue and the 25th is NFD Planning/Morse Class. They meet in the Breck Sports and Social Club, 2nd & 4th Wednesdays, 8pm. More from Dave Westby G4UHI on Lancashire 854745.

**Newport ARS** have a Grand Surplus Equipment/Junk Sale on Sunday May 15 at Brynglas House. Opening times 11am-4pm (10.30 for disabled), items accepted from 10am. Talk in by GW1NRS on S22. Bob Keyes G4W4IED on Newport 280958.

**Wirral ARS** have Orbital Predictions for Satellites by G3VQT on May 4 and a Portable

Activity Meeting on the 18th. Natter Nights are Tuesday. Details from R. E. Bridson G3VEB on Wallasey 1346.

**Verulam ARC** have an Activity Evening on May 10 and the 24th is Packet Radio Networking in the UK by G3XDV. Meetings are 2nd & 4th Tuesdays, 7.30pm in the RAF Association HQ, New Kent Road, off Marlborough Road, St Albans. More from Hilary G4JKS on St Albans 59318.

**Stourbridge & District ARS** meet 1st & 3rd Mondays in the King Edward VI School. May 9 is an Informal Evening and the 16th is Formal Evening with Talk and Slides on Early Amateur Radio by G3CAQ. More information from Derek Pearson G3ZOM on Kings-

winford 288900.

Rugby ATS meet Tuesdays, 7.30pm in the Cricket Pavilion, outside Rugby Radio Station. May 3 is a Natter Night and the 10th a talk by Mr Ian Hopwood GOEDT RSGB. Preparation for special event at the Rugby Hobbies Festival on the 17th, Hobbies Festival De-brief on the 24th. More from Kevin Marriott G8TWH on Rugby 77986.

**Stevenage & District ARS** meet 1st & 3rd Tuesdays, 8pm in SITEC Ltd, Ridgemoor Park, Telford Avenue. May 1 is RSGB Convention at Sandown Park, the 3rd a Construction Evening and a Committee Meeting on the 24th. More from Peter GOGTE on Stevenage 724991.

## LISTEN OUT FOR

**GB2DWR:** The Mid Lanark ARS Motherwell are starting the 1988 series of special event stations with the Distillers plc on the Malt Whisky Run. The purpose is to activate the Whisky Route by radio.

The Whisky Route is located in the Highlands of Scotland where most of the Whisky Distillers are located.

The stations will be located at four different distilleries over a period of eight days, with a day and a half at each location. All operating will commence at 1000 local time and finish at each location at 1500 local time the following day. A special QSL card and a certificate will be available.

The venues and dates are:

15/16 May	Cardu Distillery
17/18 May	Cragganmore Distillery
19/20 May	Royal Lochnagar Distillery
21/22 May	Blair Athol Distillery

**Have you Got a  
Special Event Station  
we should know about?  
If so, write and tell us**

**GB4PCP:** Coleshill (Llanelli) ARS will be operating from Pembrey Country Park from July 16 to 23 between 0800 and 2400 +/-. .

This will be the first outside activity for their disabled members, who will include four "white-stick" operators.

All contacts will receive the special QSL card and they especially are looking forward to cards from s.w.i.s.

**GB6BH:** This station will be active from Barlborough Hall, Barlborough, near Chesterfield, IO93IH. They will be on air most weekdays and every weekend during the month of May. They will be using the following bands and modes: all h.f. bands including 50 70MHz, 144 and 430MHz, phone, ATV, AMTOR, packet and RTTY.

Peter McArdle GODAG  
QTHR

**GB8GS:** This station is being operated for the annual Humberside Scouts camping weekend at Primrose Woods camping site (near Scunthorpe). They will be using 3.5-14MHz between May 27 and 30.

John Pullen G4TGE  
QTHR

## RALLIES

★ **May 1:** The RSGB VHF Convention will be held at Sandown Park Exhibition Centre, Esher, Surrey. All the usual attractions will be there. For more details, contact:

Les Hawkyard G5HD

The Eryr

Newtown St Petrock

Torrington

North Devon EX38 8LU

**May 1:** The Kelso ARS assisted by the Borders ARS will be hosting the 5th Anglo-Scottish Rally in the Tait Hall, Kelso. Doors open from 11am to 5pm. There will be the usual trade stands and talk-in on S22. Entrance will be £1, junior ops, YLs and XYLs very welcome and admitted free.

Mr B. Cavers GM4UIB

Tel: 0573 24654

**May 2:** The 1988 Doncaster Rally will take place at Bircotes Leisure Centre (near Bawtry). Talk-in will be on S22 using G4YRD.

Audrey Wilson

Tel: 0302 721259

★ **SWM in attendance**

**May 2:** The Dartmoor Radio Club's annual mobile rally will be held at the Princetown Town Hall. Doors open from 10.30am to 5pm. All the usual traders will be there. Refreshments are available and there is ample parking. A small entrance fee will be charged.

**May 15:** The Parkanaur Rally will be held this year in the Silverwood Hotel, Lurgan, Co. Armagh. Doors open at 12 noon and the entrance fee is £1. There will be the usual trade stands, bring and buy, RSGB bookstall, QSL bureau, etc. Talk-in will be on S22. The proceeds of the rally go to The Stanley Eakins Memorial Fund.

Sam White G11BIW

Tel: 07622 22855

★ **May 15:** The Otley ARS are holding the 31st Northern Mobile Rally at the Yorkshire Agricultural Showground, Harrogate, in the Flower Show Hall. The rally starts at 10.45am, but the showground is open to visitors from 10am. Morse tests are not available. More details from:

G3QQ

Tel: 0943 602118

★ **May 22:** The Swindon & District ARC are organising a Radio, Electronics & Hobbies Fair at the Science Museum, Wroughton. It is planned to have displays of model boat, aircraft, steam engines, etc. There might even be helicopter rides over Swindon. There is ample free car parking on site and the venue is well sign-posted. Gates open at 10am.

★ **May 29:** The East Suffolk Wireless Revival will take place at the Civil Service Sportsground, The Hollies, Straight Road, Ipswich. Doors open at 10am and there is plenty for all the family to do.

Colin Ranson

Tel: Ipswich 688204

**SHORT WAVE RECEIVERS** are our speciality (and all that goes with them)



## The NRD-525 from JRC

Those of you who read about the NRD-525 last month will recall that I gave some background information about the JRC company. What I was trying to get across was the fact that a company with such a long history in the communications business can endow its products with a host of subtle details based on actual operating experience, JRC are in many ways similar to the Marconi Company (as it was), in that they can meet every possible need of their professional customers. Any owner of an NRD-525 will rejoice that a company such as JRC decided to bring their quality to the non-professional user.

But what of the NRD-525 itself? What will it do for you as a dedicated listener? In such a limited space as this page I cannot possibly cover all its outstanding features so I will draw some extracts from the Rainer Lichte review which I mentioned last month. Here's what he says about:-

Accuracy and stability.

"The tuning accuracy and the matching display are impressive indeed. Still the more impressive is this receiver's frequency stability. Drift is virtually non-existent, it was measured at less than 5Hz/hour."

And about dynamic range:-

"ICP 3rd order (3rd order intercept point) was measured at +17dBm at 7MHz and +14dBm at 25MHz. These are excellent values, and they are not the result of decreased sensitivity. The NRD-525 is amongst the most sensitive receivers I've measured so far. . . . Dynamic range was computed to 102dB, an equally outstanding value."

All very well you may say, but what does this technical jargon mean in real life? Let me quote Rainer Lichte again:-

"The signal quality under adverse conditions is remarkable, e.g. the 40 metre band here in Europe is fairly cluttered with high-power stations and most receivers just quit when you try to extract some intelligence from a weak radio amateur signal. The NRD-525 is unimpressed and functions in a truly professional manner."

In other words, there is virtually nothing you cannot resolve. If it cannot be received by the NRD-525, it cannot be received by anything. As a final quote from the review, let me give some conclusions:-

"This receiver is a joy to operate and a joy to listen to."

"The new NRD-525 very impressively manifests itself as the No. 1 receiver outside the commercial/military bracket."

"Performance-wise, the NRD-525 is way ahead of the competition because this receiver delivers outstanding results in all modes of operation."

What you will find about the NRD-525 is that with all its undoubted performance, it is so very easy to use and never thrusts itself at you like a knob bedecked military receiver. If you want to use it as a high quality broadcast receiver, then that is what it will be. As you discover more and more about the art of listening you find that the NRD-525 contains every operating feature and convenience that you might need, and there is almost nothing you cannot hear with it even when listening conditions are really difficult.

If you want to extend the use of the receiver, you will find a range of optional accessories to broaden the horizons, including a VHF/UHF converter which extends the already impressive 90kHz-34MHz range to include 34-60MHz, 114-174MHz, and 423-456MHz. (and the converter fits inside the receiver).

When you get deeper into the art, you may decide that specialised listening requires specialised receiver bandwidths, and a range of high performance filters is available for your choice.

One final comment from Rainer Lichte with which I totally agree is his remark that the internal speaker in the NRD-525 is really only suitable as a monitor, and does not do justice to the high quality available from the receiver. This being so, if voice communications are your forte I recommend the matching JRC loudspeaker the NVA-88. If however you really want to enjoy the audio from broadcast stations, we carried out a long series of tests and decided that the Wharfedale Diamond III loudspeaker produces the most excellent sound from this and many other receivers. Normally of course these loudspeakers are sold as pairs, for stereo listening, but we split the pairs and can sell you a single Diamond III to enhance your listening pleasure.

Truly happy listening.

John Wilson

**NRD-525 £1195 inc VAT**

**STOP PRESS. JST-135 matching transceiver to NRD-525 available soon.**

# FREE

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# OF SCANNING DISCS AND STEAM

Joan Ham

A visitor and his wife, who had been looking at the Chalk Pits wireless exhibition with a more than casual interest (we learn to spot them!), told us that he had helped the BBC with their programme celebrating the end of their contract with John Logie Baird. This sounded a promising story, so I sat him down to talk about it.

**Thomas W. Fishlock**, our visitor, was a chartered engineer and company director. His father returned from WWI, "imbued with this new wireless," and as with all enthusiasts of those days, made everything himself. Mr Fishlock remembered a "vast aerial array with glass bottle tops for insulators and father making resistors with led pencils and paper." By the age of 9, he was thoroughly hooked and following in father's footsteps. He made his first crystal set using his bedsprings as an aerial and remembers hearing the Savoy Orpheans on this set.

## Television

His interest in television was sparked off by F. J. Camm somewhere about 1933, when he published an article called, "Make Your Own TV". This required an aluminium disc, approximately 760mm in diameter, with holes of 1mm evenly spaced and with the edges meeting, spiralling down from the circumference to the centre and a "beehive" type neon lamp which cost 3s 6d. This produced a 1.25in picture in red and black, which could only be seen in a dark room. The BBC had signed a contract with Baird to run his system for a fixed period. The transmissions went out on two nights a week, for half-an-hour after radio broadcasting closed down at night, because it required the whole of the medium-wave band.

Mr Fishlock's home was not wired for electricity, so the set ran on wet accumulators, which were charged up the day before. These gave about 20 minutes of power before the voltage drop caused the disc motor to slow down, thus losing picture sync, so the valuable last ten minutes of transmission was received by means of a motor-bike parked outside and running to re-charge the batteries!

Mr Fishlock evoked the eerie scene for me, of those early days of TV reception — a dark night, the racing motor-cycle engine outside, a flickering red and black spot of picture and if you put your head too near the revolving scanning disc in the darkened room, you endangered your nose with the bacon-slicer effect!

## Embryo TV

What was this embryo TV like? What kind of reception did they have? Each hole of the receiving disc had to match the transmitting hole, otherwise they would have two halves of a picture or 1/3 + 2/3.

## Chalk Pits Museum gets more than its fair share of interesting visitors. Here's the intriguing story of Thomas W. Fishlock.

The disc had to run at precisely the right speed of 720 r.p.m., governed by a superimposed impulse on the transmitted signal. At the receiving end were two electro-magnetic coils which pulled 30 pole pieces into position and whether this all worked or not depended on signal strength. During the half-hour transmission period, the eager experimenters were thrilled if they got a full picture for 5 seconds at least twice! The picture fidelity was so bad, that on one occasion, having got their picture completely synced, they couldn't decide what it was. The opinion was that it must be a row of dining-room chairs, until someone deciphered an H and an N. As transmissions went off soon after, they realised that it was "THE END".

## Prototype

This prototype set was kept until the c.r.t. came in. Five years before this breakthrough, Thomas Fishlock attended a lecture at the Royal Institute, where this wonderful thing called the cathode ray tube was demonstrated. In front of the electron gun was a piece of aluminium shaped like a Maltese cross and the image of that was thrown on the end of the tube, which was a fluorescent screen. Little did they realise the import of that experiment.

## Home-Made TVs

In common with many other enthusiasts, Mr Fishlock made his first TV set after the war with an ex-government radar tube, the VCR97 and a lot of BF50 valves, eventually graduating to a 9in Bush. Living in the eastern counties, the signal from London was dicey and in the winter they used to sit around a blazing open fire. Because the length of feeder was critical, the set had to stand on the sideboard, which meant that Mrs Fishlock could see it, but her husband couldn't, so they installed a mirror for him and she read him any text that appeared (backwards to him!)

## BBC Anniversary

The BBC decided to celebrate the 50th anniversary of the end of the Baird contract with a special programme and contacted the RSGB for anyone who had actually used the scanning disc system. About 25 attended the Pebble Mill studios to be wined and dined by the directors of the BBC, whose archives included a scanning disc. The programme went out on Pebble Mill At One.

## Veteran Viewers

Talk amongst the veteran viewers turned naturally to the problems of those early days. Mr Fishlock told of his motor-cycle power boosting but was capped by another man, who claimed to have driven his TV with a steam engine! □



The picture was taken from *Television the first fifty years* published by the National Museum of Photography, Film and Television. It is one of a series of pre-war posters "Television is here: you can't shut your eyes to it".

Peter Laughton

## Utility News

The Ontario DX Association has published a new loose-leaf guide for aeronautical enthusiasts. Written by veteran DXer Bob Evans this is a useful reference source for the utility monitor. This book explains how you can follow conversations between aircraft en route and the various control centres around the world. Check your national legislation as utility monitoring is forbidden in some countries, in others the passing on of information gained to third parties is considered an offence. The guide is to be updated quarterly. Further details from Ontario DX Association, P.O. Box 161, Station A, Willowdale Ontario Canada M2N 5S8. Enclose return postage in the form of 2 International Reply Coupons.

## Behind the Headlines

If the Home Secretary Douglas Hurd gets his way, radio in Britain will see some significant changes during the 1990s. Headlines to this effect appeared in the middle of January but many reports were confused, so let's take a close look. For a start, BBC's Radio One pop music channel will get a national chain of v.h.f. f.m. transmitters to augment the single sender that's currently on the air in the London area. Mr Hurd has announced that the two medium wave frequencies 1053 & 1089 for the Radio One pop service, and the classical music network Radio 3 on 1215kHz will be handed over to independent radio operators. The highest bidders will get themselves a national channel. It won't be run by the existing body that currently governs British commercial local radio, namely the Independent Broadcasting Authority.

In 1986 only just under half of the existing independent local commercial stations in Britain made a profit. Although figures for '87 look better, the umbrella organisation for local radio operators says it will be curious to see whether the government plans are feasible in gaining the required advertising revenue. Legal commercial radio came much later than commercial television to Britain, and as a result, the levels of creative advertising on radio are much lower in Britain compared to North America. It accounts for just 2 per cent of the total amount of money spent by industry on advertising!

In addition to the new commercial networks though, smaller town size stations on v.h.f. f.m. will be authorised. The Home Office press release quoted the Shetland Islands Broadcasting Company out on the somewhat isolated Shetland Islands as an example of commercial community radio. In fact its company secretary Ian Anderson has gone further than other community groups that have been waiting for a license. For the last two months Shetland Islands Broadcasting Company has been making daily experimental broadcasts on f.m. with 250 watts

This month, Peter takes a detailed look at the plans for domestic broadcasting in the UK — amongst other subjects.

of power. There are long-term plans for a separate medium wave service on 558kHz.

Back to the mainland, and in three major population centres, BBC local radio stations have just been given a three year reprieve. BBC Radio London along with BBC WM in Birmingham and BBC Radio Manchester have been told to look at their output to reach more of the community than at present.

## Radio 4 on 198kHz

British subjects based at the European Parliament in Strasbourg raised a media question in a debate recently. Currently the long wave signal from the BBC Radio 4 network is widely heard in North-West Europe. Euro-MPs say they are concerned about plans to create a new BBC long wave service in the course of the next decade and have produced a protest petition with more than 1000 signatures, 198kHz would continue to carry material from the existing Radio 4 programming, but occasionally switch to live reports from parliament as well as English output from the BBC's External services. Euro-MP for York, Edward McMillian-Scott, says that Britains staying outside the UK want to hear an unadulterated version of what's being heard within the country. The recently launched medium wave BBC Radio 648 is described as a "quirky attempt" and cannot meet their needs.

## Captive Audience

Another group of listeners this time inside Britain are rather concerned at the news

The 1988 EDXC Conference is being held at the Crest Hotel, Antwerp, Belgium over the period May 20-23.



that some programmes will be dropped from medium wave. In some prisons in the UK possession of v.h.f. f.m. radios are forbidden. Tune above 98MHz and you'll find out why, the police forces are still using parts of the v.h.f. broadcast band for point-to-point communication, though under an international agreement they will have to move out to other channels above 108MHz within the next couple of years.

## Satellite News Desk

A growing number of stations and cable systems across Europe seem to be re-broadcasting the English and European language programmes of the BBC External Services. Two channels of audio from Bush House have been integrated into the subcarrier on the Superchannel Television transponder on the Eutelsat communications satellite. Those equipped with the necessary satellite dish and decoder can access the radio programmes in studio quality. The Finnish government gave official approval to a Helsinki station to relay programmes from the BBC Finnish service, Europe's largest cable system in Amsterdam recently added 24 hours of English via satellite last week, and a local station in Salonika Greece is relaying some BBC programmes in Greek. On Monday January 11 came quite a major development, at 2330UTC daily the Catholic "Radio Renascensa" network takes a satellite feed of BBC's Portuguese service and puts it out nationally on medium wave and f.m. Incidentally Renascensa's 100kW short wave transmitter is off the air at that time, so don't go looking for a new BBC relay station.

From midsummer this year the topical tapes department of external services will resume live broadcasting in English to the Caribbean. The plan calls for local relays by existing stations in the area. Finally, in the next few weeks movement is expected in the BBC's World Television Service.

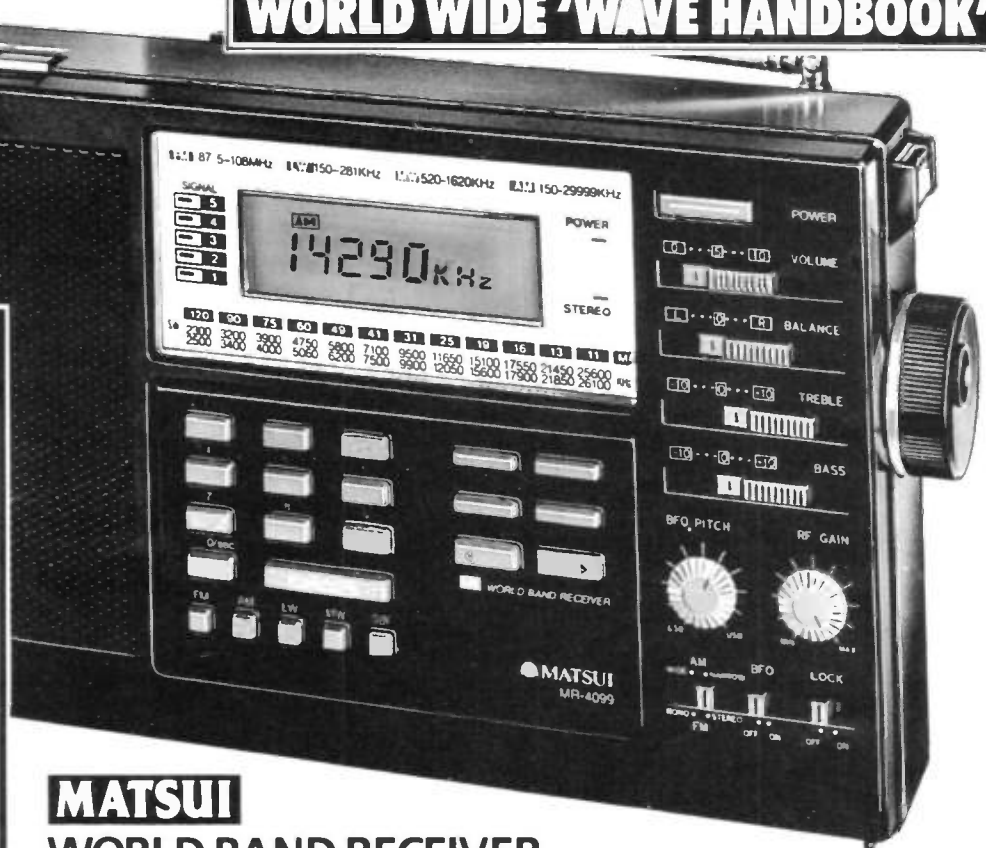
## Teletekst

The Dutch Teletekst that's carried as an integral part of the two national TV channels in The Netherlands has started broadcasting two pages of news in English, page 133 now contains selected items of news taken off the air from Radio Netherlands' newscasts. Meanwhile the Dutch Minister of Culture Mr Elco Brinkman, has given the go-ahead for a new regional radio station in the province of Flevoland. A foundation has been formed by the provisional council to run the new station which hopes to commence broadcasts in the latter part of this year. The province is made up of reclaimed land pumped dry from the former Zuyderzee, now called the IJsselmeer. Because it mainly consists of

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large farms, the population in the province is rather low. Residents of the Flevopolder will have to pay an extra 6 US dollars on their radio/TV license fee giving the station some 1.8 million dollars a year to run the studio's f.m. transmitter. Any deficit on the initial starting costs will be met by the Minister of Culture. There has been considerable public opposition to proposals for a regional radio station in the province of North Holland though. As this province includes the city of Hilversum where the national and international Dutch networks originate, there appears to be a general feeling that this part of Holland already has enough electronic media coverage.

## ANARC Board Moves

The computer bulletin board for the Association of North American Radio Clubs has moved, the new number is: 010, then 1 for North America, area code 509, followed by 534 6866. In fact ANARC has had its share of re-organisation in the last 12 months. The ANARC Newsletter was suspended in the course of last year, but now under the guidance of the Bob Horvitz, the monthly journal of radio developments has resurfaced in a much improved form. The Newsletter costs 7 dollars 50 in North America, 10 US dollars elsewhere from this new address, ANARC Publications, P.O. Box 462, Northfield Minnesota 55057 USA.

## Other North American SWL Bulletin Boards

In April 1986, Larry DiGioia, sysop of the "Neverboard" in Pittsburgh, organised a small group of BBSs running Fido software into a network to exchange short wave-related messages and files automatically every night. This arrangement not only increased the information available on each BBS, making them more interesting for callers, but callers were able to save on their phone bills by accessing the pool of messages through the node nearest to them. From this small seed grew the FidoNet's SWL EchoConference. The basic idea remains the same, and the Neverboard is still the unofficial "hub," but so many BBSs are involved now, and the number of files and messages transferred nightly is so large, that not all participating boards store the same information. Most of the messages seem to be discussions of equipment,

reports of recent DX "catches," and questions asked and answered. While there's a definite similarity to the mix of information-sharing and camaraderie one finds in radio clubs, the EchoConference has not analogue to club newsletters' consolidated lists of loggings, so useful as tuning guides, and Fido's software limits the length — thus the detail — of message texts. Here's a list of bulletin boards in the SWL EchoConference, based on information provided by Kurt Barnhart, Dennis Diaz, Larry DiGioia and David Snyder. They do their best to keep track of who's in the net, although as proud-papa Larry points out, "Now there are simply too many boards to keep an accurate list":

In Europe dial the international access code for your country (in the UK that's 010) then 1 for North America, followed by

the number listed below.

Is anyone running a short wave listener related computer bulletin board in the UK? What about our readers in Australia? There are successful boards running in Ireland and The Netherlands. Input to this column would be welcome.

## SW Reception Report Record

A listener to the Voice of America in Korea should apply to the Guinness Book of Records. He wrote them a detailed reception report on their December broadcasts, rolled it up, and posted it. When it got to Washington at the start of February the staff there uncurled it to find that it was beautifully written on a continuous roll of paper 20 metres long!

30 ▷

Telephone	Name (Fido node)	Location
913-677-1288	A•C•E (280/304)	Mission, KS
If you only try one board, the ACE Board is probably the one to try.		
404-546-7857	Athens Forum (18/43)	Athens, GA
414-738-1219	Applegate (139/630)	Appleton, WI
301-574-1984	Berkshire Board (261/204)	Essex, MD
602-742-1551	Bit Bucket (115/20)	Tucson, AZ
319-377-0004	Cedar Valley Mill	Cedar Rapids, IA
312-491-2611	Chicago Business (115/429)	Evanston, IL
716-937-3521	The Comm Centre (260/160)	Alden, NY
312-630-6282	COPH Mail (115/700)	Chicago, IL
616-363-3262	Edge CBCS (120/63)	
312-529-1586	Elk Grove Repeater	Roselle, IL
301-350-1299	Fido's 1st RBBS (109/652)	Largo, MD
206-565-1476	The Forum (17/43)	Tacoma, WA
602-235-9653	Health Info-Com Net (114/15)	Scottsdale, AZ
303-593-0766	Hip Shack (128/19)	Colorado, Springs, CO
816-331-5868	Howard's Notebook (280/301)	Raymore, MO
603-783-4239	Info Biz Canterbury,	NH
807-345-3991	M-Net (148/124)	Thunder Bay, ON
417-869-5294	The Matrix	Springfield, MO
303-972-9600	Microlink-B (104/108)	
415-752-6172	Midnight BBS (161/201)	
414-282-4181	Midwest Communication	Milwaukee, WI
413-684-2886	Mountain Top (321/131)	Windsor, MA
415-651-4147	National Family Forum	Fremont, CA
412-243-5880	Neverboard (129/17)	Pittsburgh, PA
301-454-0360	No Place Like Home (109/711)	
718-442-1056	NY Transfer (107/105)	Staten Island, NY
319-351-8783	Opus Board	Iowa City, IA
612-377-3469	PC-Info Exchange (14/321)	Minneapolis, MN
306-586-1551	Polestar (140/10)	
201-963-3115	Police Station (107/341)	
509-487-3900	Red Wolf Opus (343/14)	
306-347-4493	Regina Fido BBS (140/19)	Regina, SK
202-833-1889	Rick's Fido (109/635)	Washington, DC
301-967-3309	Ronnie's Roadies (109/999)	
415-659-9169	RSVP (10/425)	Fremont, CA
312-394-0071	Samson (115/108)	Arlington, IL
808-533-0190	Small Biz Help Net (113/1)	Honolulu, HI
306-244-8378	Software Library (140/33)	Saskatoon, SK
415-651-4147	Sonshine (161/56)	Fremont, CA
408-251-4926	Tranquility Base Number 1 (143/31)	San Jose, CA
312-630-6282	TNT BBS	Chicago, IL
615-320-6963	The Unknown Opus	Nashville, TN
413-443-6313	VetLink Number 1 (321/203)	Pittsfield, MA



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Kenwood	R2000	595.00 (-)	Bricomm	Balun 4:1 1kW	11.20 (1.00)	Kenwood	TR751E 25W multimode	599.00 (-)
Kenwood	VC10V.H.F. Converter	161.94 (2.00)	Bricomm	7.1MHz Epoxy Traps (pair)	9.95 (1.50)	Kenwood	TS711E base station	940.00 (-)
Kenwood	R5000	875.00 (-)		Self Amalgamating Tape 10m x 25mm	4.25 (0.75)	Kenwood	TH205E Handheld	215.26 (-)
Lowe	HF125	375.00 (-)		T-piece Polyprop Dipole centre	1.60 (0.25)	Kenwood	TH215E Handheld	252.13 (-)
Yaesu	FRG 8800	639.00 (-)		Small Ceramic egg insulators	0.65 (0.20)	Kenwood	TM221ES 45W Mobile	317.30 (-)
Yaesu	FRV 8800 V.H.F. Converter	100.00 (2.00)		Large Ceramic egg insulators	0.85 (0.20)	Kenwood	TW4100E 2m/70cm FM Mobile	499.00 (-)
<b>STATION ACCESSORIES</b>			<b>ANTENNA TUNER UNITS</b>			Kenwood TH25E <b>NEW MODEL</b>		
Drae	V.H.F. wavemeter	30.25 (1.50)	Yaesu	FRT 7700 Short wave listening	59.00 (2.00)	Yaesu	FT 29011 Portable multimode	429.00 (-)
A.K.D.	V.H.F. wavemeter	24.95 (1.50)	Yaesu	FC 757AT	349.00 (-)	Yaesu	FT 726R base station (70cm optional)	699.00 (-)
Yaesu	FF501DX low pass filter 30MHz 1kW	37.50 (2.00)	Kenwood	AT Z30	208.67 (2.50)	Yaesu	FT 23R Handheld + FNB10	253.00 (-)
Kenwood	LF30A low pass filter 30MHz 1kW	32.26 (2.00)	Kenwood	AT Z50 auto	366.00 (-)	Yaesu	FT211RH 45W FM mobile	309.00 (-)
Adonis	AM303G desk mic with pre-amp	53.00 (2.00)	<b>ANTENNA SWITCHES</b>			Icom	IC 2E Handheld	225.00 (-)
Adonis	AM503G desk mic with compression	69.00 (2.00)	Welz	CH 20N 1300MHz N skts	49.00 (1.50)	Icom	IC 02E Handheld	269.00 (-)
S.M.C.	Polar-phaser II 2 metre	49.00 (2.50)	Welz	CH20A 900MHz S0239 skts	29.95 (1.50)	Icom	IC 28E 25W mobile	359.00 (-)
S.M.C.	Polar-phaser II 70cms	69.00 (2.50)	SA 450N	2-way diecast 500MHz N skts	26.99 (1.00)	Icom	IC 275E base station inc. PSU	1039.00 (-)
<b>V.H.F. SCANNING RECEIVERS</b>			SA 450	as above but S0239 skts	19.49 (1.00)	Icom	IC 3200E 2m/70cm FM mobile	556.00 (-)
Icom	ICR7000	967.80 (-)	DRAE	3 way S0239 skts	21.91 (1.00)	Icom	Micro II Handheld	239.00 (-)
Yaesu	FRG9800M	509.00 (-)	DRAE	3 way S0239 skts	16.94 (1.00)	<b>70cm TRANSCEIVERS</b>		
A.O.R.	AR2002	487.30 (-)	CS 4	4 way B.N.C. skts. 1500MHz	30.39 (2.00)	Kenwood	TH41E Handheld	218.00 (-)
Signal	R535 "Airband"	249.00 (-)	<b>GOODS NORMALLY DESPATCHED WITHIN 24 HRS</b>			Kenwood	TH 405E Handheld	273.00 (-)
Sony	Air 7	249.00 (-)	<b>- PRICES CORRECT AT TIME OF GOING TO PRESS</b>			Kenwood	TH 415E Handheld	298.85 (-)
<b>V.H.F. SCANNER ACCESSORIES</b>			<b>- E&amp;OE</b>			Kenwood	TS 811E base station	1095.00 (-)
A.K.D.	HFC1 HF Converter	49.00 (1.00)				Yaesu	70cm module for FT 726R	349.00 (-)
Revone	Discone Antenna 30-500MHz	31.50 (3.00)				Yaesu	FT73R Handheld + FNB10	273.00 (-)
Icom	AH7000 Antenna 25-1300MHz	82.00 (3.00)				Icom	IC MICRO4 FM Handheld	279.00 (-)
<b>CABLES ETC.</b>			<b>MAIL ORDER AND RETAIL</b>			Icom	IC04E Handheld	299.00 (-)
URM67	low loss coax 50ohm per metre	0.75 (0.25)	<b>APPROVED KENWOOD DEALER</b>			Icom	IC475E base station inc. PSU	1125.00 (-)
UR76	50ohm coax dia. 5mm. per metre	0.30 (0.10)				Icom	IC48E 25W FM mobile	449.00 (-)
UR70	70ohm coax per metre	0.35 (0.10)	<b>WE ALWAYS STOCK A GOOD SELECTION OF FREQUENCY REFERENCE BOOKS</b>					
UR95	50ohm coax dia. 2.3mmper metre	0.40 (0.10)	<b>BREDHURST ELECTRONICS LTD HIGH ST, HANDCROSS, W. SX. RH17 6BW (0444) 400786</b>					
	4mm Polyester Guy Rope (400kg) per metre	0.25 (0.10)	<b>Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm</b>					
	50 metres 16 swg hard drawn copper wire	6.95 (1.50)						

# INTRODUCTION TO DX-TV

## Part 9

Keith Hamer and Garry Smith

### Predictable Behaviour

In the UK, a minimum of four television channels are available to the viewing public. The choice of channels is predictable, namely BBC1, BBC2, ITV and Channel 4 and so are the programmes, to some extent; the viewer knows what to expect on the screen. During periods of enhanced tropospheric propagation, neighbouring ITV regions may be available on normally blank channels. Under these conditions, the DX-TV enthusiast will be meticulously tuning through the channels with the antennas beaming to the Continent in search of foreign material. During a typical period of enhanced reception the Continental transmitters closest to the UK will tend to become available first. During periods of exceptional tropospheric enhancement, stations further afield will begin to appear, often co-channelling with closer transmissions. Towards the end of the opening, which may last many days, signals become much weaker, indicating that the end of the opening is approaching.

This sequence of events will become familiar and fairly routine after a while and the experienced enthusiast may be able to predict the likelihood of reception from certain stations or countries with a fair degree of certainty. Although tropospheric reception creates great excitement, it can be reasonably predictable in behaviour. Two major periods of tropospheric enhancement occurred towards the end of 1987. If this was your first successful attempt at DX reception and you were impressed, you have a treat in store this summer as soon as the Sporadic-E season gets underway.

### Sporadic Behaviour

Some forms of propagation tend to be totally unpredictable and consequently produce lots of surprises. In this respect,

Fig. 1: The Swedish test card as received on Channel E2 during Sporadic-E opening on 31 July 1970. The equipment used by one of the authors comprised a modified 17in Bush TV56 receiver (originally 405 lines only) and a home-made dipole antenna balanced precariously above the banister rail at the top of the stairs!



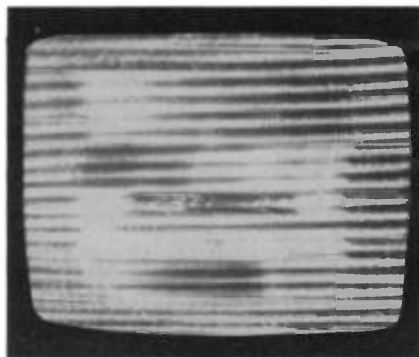
Already TV DXers are eagerly waiting the start of the 1988 Sporadic-E season and within a matter of weeks this annual phenomenon will be exploited to the full. What exactly is Sporadic-E and why is it so special?

Sporadic-E propagation perhaps rates as the most curious and unpredictable of the lot. Imagine switching on the television set not knowing whether anything will be present on the screen, let alone what the programme might consist of, or even its origin. If a signal is present, how long will the reception last and will something else take its place? From which direction will other broadcasts appear? These are just a few of the long list of uncertainties posed by Sporadic-E propagation. No wonder it generates so much interest and excitement. It also fuels a competitive spirit among many enthusiasts and it can so easily become an addiction. Many DXers agree that there is a special magic appeal with Sporadic-E reception — a quality other forms of propagation fail to provide. Every DXer has his own anecdote to tell about how, regrettably, he missed an elusive signal during a Sporadic-E opening, or how a mysterious-looking test card emerged from a snowy screen at five o'clock in the morning. Sporadic-E propagation can provide endless fun and although the season may at first seem long enough, lasting as it does between May and September, time quickly passes. It can be a thoroughly rewarding, though hectic, time. Even when the screen has been blank for hours, there is always the possibility of something unusual emerging; often it does.

### Ionisation

As many readers will know, short wave radio communication is possible due to reflections within the various layers of the

Fig. 2: An example of Sporadic-E reception showing the disruption caused by several signals competing on the same channel. Although the type of test card is easy to recognise, its centre identification is impossible to read.



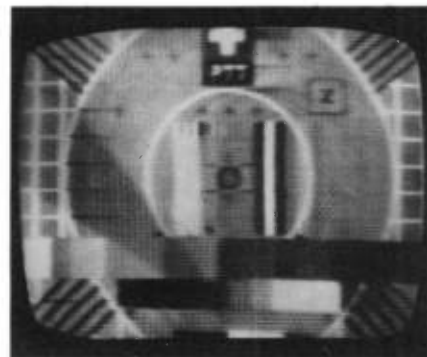
earth's atmosphere, including the "E" layer. This particular region is situated at approximately 120km above the surface of the earth. Although it is capable of reflecting short wave signals, it is normally transparent to television transmissions, these subsequently being lost forever in space. However, during the summer months, ionised gas layers form within the E-layer and if the electron density is sufficiently high, TV and f.m. radio signals within Bands I and II (approximately 40-100MHz) will be reflected, or more accurately, **refracted** back to earth. This is basically Sporadic-E propagation, usually abbreviated to Sp-E or Es. In the USA, this form of propagation is known as E-skip.

Without realising, many members of the viewing public have experienced the effects, or rather disruptions, caused by Sporadic-E activity. The dreaded "Continental Interference", which blasted Wimbledon tennis from our screens during the sixties, was caused by foreign TV transmissions mingling with our own. The technical differences between our 405-line system and the ones in use on the Continent (discussed in detail in Part 2) meant that only a mass of sloping white lines, rather than a picture, would be apparent. In areas of the UK where Channel 2 was in use, the BBC1 sound channel would very often be drowned by a severe buzz which was caused by the vision carrier of a Continental Channel E2 transmitter on the same frequency. This is the reason why areas served by the Holme Moss transmitter in the north of England were eventually allocated BBC1 outlets operating on Channels 12 and 13 in Band III.

### Reception Distances

When signals are refracted back to earth from ionised clouds formed within the E-layer, a **hop** or **skip** distance is involved. This will vary depending upon the angle of refraction, but it is typically 1200km.

Fig. 3: The Swiss test card as received by a colleague from the Uetliberg transmitter on Channel E3 at 1730UTC on 19 August 1970. A chimney-mounted vertical dipole, originally used for the local BBC-1 Sutton Coldfield transmissions, captured during a heavy thunderstorm.





# INTRODUCTION TO DX-TV

Generally, the shallower the angle, the greater the skip distance. Newcomers to the hobby are often amazed to learn that distant countries such as Yugoslavia, Spain, Italy and Russia are regularly received in the British Isles whereas transmissions from relatively closer countries can be extremely elusive. Consequently, Dutch or Belgian transmissions can be extremely difficult to capture via Sporadic-E propagation, unless the DXer happens to live in the extreme parts of the British Isles. However, during the 1987 Sporadic-E season, on July 10 to be precise, short-range Sporadic-E reception did take place and was witnessed by several DXers located in the Midlands. The sequence of events was as follows:

Sporadic-E reception from Central Europe had built up since early morning but shortly after 1000UTC many West German Band I transmitters began to show. Although this in itself is not uncommon, the more experienced enthusiasts recognised the trend for a shortening in the skip distance. Therefore, it came as no surprise when signals began to arrive from the Belgian Liege outlet on Channel E3, followed shortly by signals from the Dutch transmitter at Lopik.

The maximum distance attainable via Sporadic-E propagation is considered to be in the region of 5000km; this happens when double-hop conditions occur. It is thought that more than two hops are not possible, although Brazilian reception occurred in the Netherlands a few years ago, at a distance considerably in excess of that figure.

## Causes

There is still plenty of research being carried out into the true cause, or causes, of Sporadic-E propagation and its behaviour. Many theories have been put forward over the years as to why intense ionisation takes place within the E-layer, resulting in the formation of Sporadic-E clouds.

One theory suggests that meteorites entering the earth's atmosphere could be responsible. A few years ago, exploratory rockets directed through the Sp-E clouds discovered that the region consisted chiefly of ionised metal atoms. The types of metal found strongly suggested that meteorites were the most likely cause. Upon entry, the meteorites evaporate and the resulting gases become highly ionised. This phenomenon occurs between altitudes of approximately 150 down to 90km depending on the velocity and the mass of the meteorite. At such altitudes, strong winds exist which create an accumulation of the ionised particles resulting in the formation of Sporadic-E clouds. By coincidence, the altitudes at which Sporadic-E clouds form corresponds with the position of the E-layer.

The formation of clouds begins at an

altitude of around 150km but because there is comparatively less material from meteorites at that height, the ionisation is relatively low. However, ionisation is sometimes strong enough to reflect Band I TV signals from transmitters located at over 2000km away, although it must be stressed that such reception is usually very weak. This has been observed in the past when signals have arrived from Canada, Jordan and the Canary Islands. The signals tend to resemble those usually associated with weak tropospheric propagation with a characteristic very slow fading and with usually very little ghosting present on the picture.

## Movement

A downward shift of the Sporadic-E clouds is thought to result in a greater accumulation, and therefore a higher concentration, of ionised particles. This produces very strong signals from stations located within a range of 900-2000km from the receiving site (see Fig. 1), especially when the accumulation takes place at the lower altitude within the E-layer. Normally no further downward movement or increase in ionisation occurs, but on rare occasions when it does, it can result in short-range reception from transmitters sometimes located as close to the receiving site as 450km.

Sometimes the ionised clouds within the E-layer may be virtually stationary permitting sustained reception from one particular transmitter, area or direction. At

other times, horizontal cloud movement takes place, frequently attaining a speed of 400km/h. (250m.p.h.). Under such conditions, a multitude of transmissions from a range of different outlets can appear within a very short space of time. Reception may commence in one particular area, southern Italy for instance, and as the opening progresses, Central European countries and the USSR will be received, finally culminating in Swedish and Norwegian broadcasts. Very often Icelandic reception is preceded by an opening to Scandinavia. Although low-pressure systems and thundery weather appear to play a part in promoting Sporadic-E activity, there is no definite scientific evidence to support this. From observations by TV DXers, a reduction or absence of activity is frequently experienced when extensive anticyclonic weather conditions cause periods of intense tropospheric reception. Conversely, several enthusiasts have commented that extreme fringe reception of the Dutch Lopik E5 outlet deteriorates rapidly during the onset of a Sporadic-E opening.

## Random Activity

Sporadic-E activity predominates during the summer months. In the Northern hemisphere, the main activity occurs between early May and mid-September. In the southern hemisphere it lasts between November and March. This

Fig. 4: Map showing the area from which Sporadic-E DX reception is most likely to occur. Most openings consist of signals from transmitters located within the boundary lines A and B. This represents a distance from the centre of the UK of approximately 900 to 2000km.



# INTRODUCTION TO DX-TV

period of main activity is usually called a "season" by DX enthusiasts and the actual duration of a particular period of reception is known as an "opening", whether it be a matter of minutes or several hours. Although Sporadic-E reception peaks during the summer months, it can occur without warning at any other time of the year. Out-of-season openings are relatively few and far between compared with the summer ones and much patience and enthusiasm is required to take advantage of these. A mid-winter peak in activity is usually experienced towards the end of December, although over the past few years it has failed to materialise with any significance. However, within recent years, an upsurge in activity during October and November has produced prolonged openings as good as those experienced during the summer months.

Fig. 5: Sporadic-E reception statistics for television transmissions originating outside the UK over a 100-day period in 1978. There were 31 days throughout the period on which Sporadic-E activity was not present.

Country	Broadcasting Organisation	Number of days received during a 100-day period
USSR	TSS	31
Italy	RAI	28
Spain	TVE	22
Yugoslavia	JRT	14
Portugal	RTP	12
Poland	TVP	10
Hungary	MTV	9
Sweden	SVT	9
Czechoslovakia	CST	8
Norway	NRK	8
Austria	ORF	6
Denmark	DR	6
Finland	YLE	3
France	TDF	3
Switzerland	SRG/SSR/TSI	3
Albania	RTS	2
East Germany	DFF	2
Romania	TVR	2
West Germany	ARD	2
Canary Islands	TVE	1
Iceland	RUV	1
Jordan	JTV	1

Because of its random nature, Sporadic-E openings can occur virtually daily throughout the summer. Sometimes openings are classed as minor and insignificant with hardly any time available to identify the origin of transmission. At other times, an opening may be sustained lasting from sunrise until well after midnight. Sporadic-E reception can occur at any time of day or night, but bear in mind that very few European stations broadcast after 2300UTC. Within recent years, there has been a growing tendency for Eastern European countries to extend their programming hours until well after 2400UTC. With the introduction of early morning broadcasts in Russia (and taking the time difference of two hours into account), it is possible to log Russian signals as early as 0300-0400UTC, especially on test transmissions. A large number of private Italian TV stations broadcast identification captions throughout the night, with the sole intention of preventing other companies from stealing their channel! The Icelandic TV service radiates the colour test pattern throughout the night too, and its reception can indicate the possibility of an

opening from across the Atlantic. Sometimes it pays to look for transmissions of Arabic origin shortly after sunrise. The time difference (2-3 hours) and the absence of most European transmissions before switch-on may allow a glimpse of a test card during their early morning test transmissions. There is a lot of truth in the proverb, "the early bird catches the worm".

## Trends

Over the years experienced TV DXers tend to anticipate a particular reception trend, although this can suddenly change, of course. During some Sporadic-E seasons, openings may favour a particular area or country. In 1987, for instance, sustained openings to the south-east were very much in evidence with comparatively fewer signals from Scandinavia. In general, the reception of countries such as Russia, Italy and Spain can be considered to be common throughout any Sporadic-E season. Data collected by the authors and TV DXer Chris Howles, over specific periods (see Figs. 2 and 3), clearly shows this. The graph in Fig. 3 also shows the marked variation in the total number of readily identified countries observed on a day-to-day basis during June 1985.

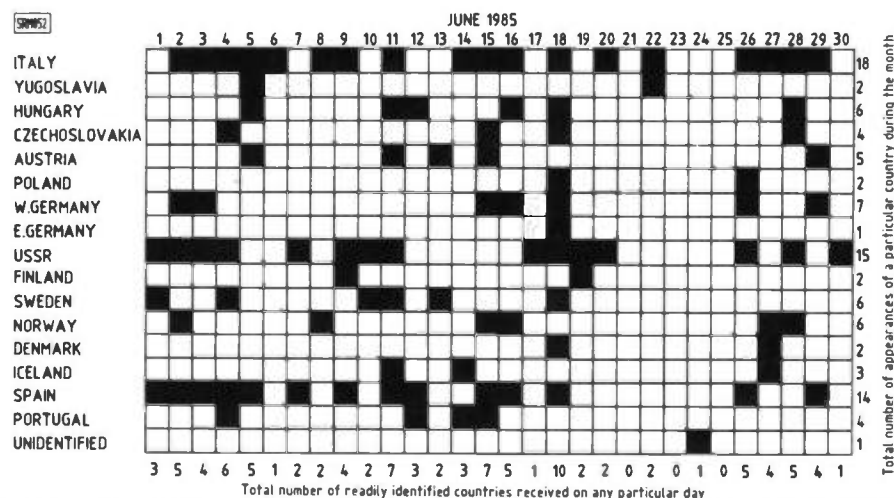
The first three months of the years are traditionally dead months where Sporadic-E reception is concerned. Often the Sporadic-E season is preceded by a series of small but interestingly April openings and in the past unexpected reception from African countries has been notably sluggish for the whole of May with many inactive days present.

Certain dates and months are regarded as special by some DXers. Many ensure they are available and watch intently during those periods. June is often a rewarding month and perhaps one of the best, when many long-haul signals may be logged. June 18-24 is often considered to be a period for "exotics" or unusual stations, while signals from across the Atlantic seem to favour July or early August. Generally the season begins to wind down after the middle of August with fewer openings. The decline becomes more noticeable during early September when the DXer realises, much to his horror, that the season is swiftly drawing to a close.

## Variable Results

The behaviour of the ionisation within the E-layer is unstable making reception strength and quality continuously variable. This is a characteristic of Sporadic-E propagation. It is not

Fig. 6: Data collection showing the frequency and daily number of countries identified during June 1985. Note that the data does not give any indication of the duration or the number of Sporadic-E openings present on any particular date.



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# INTRODUCTION TO DX-TV

uncommon to discover a solitary programme occupying a channel and remaining steady for lengthy periods. On the other hand, several stations may be competing on the same channel over a period of a few minutes. During some of the more intense openings the situation has to be seen to be believed! Many of the channels can become completely jammed solid with transmissions from almost every direction. It goes without saying that under these chaotic circumstances there is little chance of identifying anything, unless a recognisable test pattern is spotted lurking beneath the deluge of broadcasts. Signals may be reflected by more than one ionised cloud or within the cloud layer itself, creating a multi-path phenomenon with constantly changing phase distortion effects associated with typical Sporadic-E reception. These distortion effects usually cause rapid and dramatic changes in signal strength combined with severe ghosting, the degree of which varies constantly. These effects are more pronounced on the lower TV channels in Band I and often the chroma and sound channels disappear, sometimes through phase cancellation, even though the overall signal seems strong. There may also be a frequency selective element connected with Sporadic-E propagation; occasionally radio stations within the Eastern European f.m. band (63-72MHz) are noted but TV channels on lower frequencies from the same countries are not.

Polarisation changes are frequently noticed, especially on the short to medium range signals. This means that a horizontally polarised transmission can arrive as a vertical one at the receiving site.

Reception on the higher Band I channels exhibits a far superior degree of stability and in many cases it resembles tropospheric propagation with its slower fading and the relative ease at which it will support chroma and sound information.

The lower Band I channels of E2 and R1 tend to become more readily active and it is a good idea to concentrate on these for initial signs of DX reception. Not all channels will necessarily become active during an opening. This may give the impression that the opening is selective in frequency. It may be, but not all TV services make use of every Band I channel available.

## Antennas for Sporadic-E Reception

Although we intend to cover this subject in greater detail in a forthcoming article, it is important for the newcomer to realise that the strength of signals propagated by Sporadic-E ionisation often attain extremely high levels. As a consequence simple antennas can be pressed into service, especially for initial experimentation. The use of an indoor dipole antenna is not unheard of. A dipole cut to approximately 1.3m per element is quite sufficient to begin with. As with satellite reception,

height is not of great importance with Sporadic-E propagation because signals arrive at an angle. However, enthusiasts should aim for a minimum antenna height of around 5m in order to avoid problems with local obstructions. It is advisable to mount the antenna horizontally since most European stations favour this form of polarisation. Some means of rotating the antenna is recommended to enable optimum signal pick-up from different directions.

## Sporadic-E Shopping List

The following will be necessary in order to sample the joys of Sporadic-E propagation:

- (1) A television set capable of receiving v.h.f. TV channels on 625 lines. Alternatively, a special purpose-built TV DX converter such as the D-100 can be used. This plugs into the antenna socket of a standard u.h.f. television receiver.
- (2) Some form of Band I antenna — a simple home-made dipole with both elements cut to 1.3m can be used for initial experimentation.
- (3) Patience and a sense of adventure!

The D-100 DXTV Converter System, antenna hardware and various publications covering the hobby may be obtained from: HS Publications, 7 Epping Close, Derby DE3 5HR. An 18p stamp (or 1 IRC for overseas readers) should accompany all enquiries.

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# SHORT WAVE WEATHER

Dave Miers

They are of course meant for pilots, but anybody can use them to prepare their own weather maps, which can come in very useful for checking radio reception conditions!

In the UK, there are three main services — all on h.f./s.s.b. Which to choose depends on the areas covered. The Royal Air Force Transmission covers the main military bases in Britain and West Germany. These are:

Belfast	Leuchars	St. Mawgan
Benson	Heathrow	Valley
Binbrook	Lossiemouth	Waddington
Brize Norton	Lyneham	Wattisham
Conningsby	Manston	Wyton
Finningly	Marham	Yeovilton
Honington	Northholt	Gutersloh
Kinloss	Odiham	Wildenrath
Leeming	Prestwick	Keflavik

Transmissions are continuous on 4.722 and 11.200MHz, and are usually easiest to pick up. A more widespread service, covering most of Europe is available as follows:

24 hour	8.957 and 5.640MHz
Daytime	13.264MHz
Nighttime	3.413MHz

This is known as Shannon Volmet, and is only available for five minutes on the hour and half hour. Reports are received from the following places:

Amsterdam	Goteburg	Oslo
Athens	Hamburg	Paris
Barcelona	Helsinki	Prestwick
Brussels	London	Rome
Copenhagen	Lyon	Shannon
Cologne	Madrid	Santa Maria
Dublin	Manchester	Stockholm
Dusseldorf	Milan	Turin
Frankfurt	Munich	Zurich
Geneva		

This can be very useful for obtaining a general picture of the weather, but is only updated every three hours. Of the other services, the best is probably the RAF Strike Command. This covers about half the locations of the normal RAF service, but is available on more frequencies. These are:

Continuous: 4.742, 5.729, 6.738, 9.032, 11.204, 11.244, 18.018 and 23.220MHz.

Daytime only: 13.257 and 15.031MHz.

In addition to these there are three v.h.f. frequencies, but of course reception is very localised. Thus London VOLMET can be heard on 126.6, 128.6 and 135.375MHz. Further afield, it is possible to pick up forecasts from worldwide. For example, the New York VOLMET can be heard on 3.485, 6.604 and 13.270MHz.

Whichever service is chosen, the format of the information is very much the same. It is a good idea to make up a form with the place names, to be filled in as the information is read out. The intonation can take a little getting used to, especially as

Anybody who has spent time idly flicking round the dial will have come across various meteorological transmissions. To the uninitiated these are just strings of meaningless figures, but are in fact the General Aviation Visual Flight Forecast Service (GAVFFS), also known as VOLMET — provided by the National Air Traffic Service.

the official "phonetic" numbers are used — "fife" for five, "fower" for four and "niner" for nine. Having listened through several complete broadcasts, it should be possible to sort it all out.

The first item is the name of the place and the time of the forecast — usually in Zulu (Greenwich Mean) Time. Most forecasts are updated every two hours, so listening to two successive reports can give an idea of which way the weather is moving, and how fast.

Next comes the wind direction and speed in degrees and knots. "Tree six zeroh degrees, fower fife knots" (written as 360/45) would thus be a northerly, gale force wind. Following on is the visibility at ground level (in kilometres), which can usually be ignored.

## Cloud

Of most interest to the listener is the cloud, which comes next. This is often abbreviated to "CAVOK", pronounced kav-oh-kay, which means that there is too little cloud to worry about. Otherwise the readings are given in oktas and feet, usually at two or three levels. Thus "six okta, fife hundred feet; eight okta fower tousand feet" would be an unusually thick, low cloud cover.

After the air temperature and dew point (temperature at which fog will form — given in celsius) comes the final piece of useful information: the QNH or barometric pressure. This is usually given in millibars, but in the USA is given in inches of mercury. A usual reading will be between 900 (low) and 1100 (high). By joining together points of equal pressure on a map, it is possible to examine the resulting isobars and get an idea of where the cold and warm fronts are.

Having taken all this down, you should have an accurate weather report looking something like this:

Place/time	Wind	Visibility	Cloud	Temp	QNH
BELFAST 0900Z	220/15	10>	2/5000 6/7500 8/1000	11/9	1002
BENSON 0900Z	225/16	CAVOK		10/9	1012
etc. . . .					



Gatwick control tower.

There are four other terms that may be encountered:

TEMPO	Temporarily
GRADU	Gradually
INTER	Intermittently
RAPID	Rapidly

Thus, the forecast for the cloudbase may be "eight okta, fife tousand feet, GRADU tree tousand feet . . .", showing that the cloud is expected to descend slowly before the next update.

The RAF strike command has added some Weather State Colour Codes, in order to abbreviate the information:

Colour	Cloud Base (3 oktas or more)
Blue	2500 feet
White	1500 feet
Green	700 feet
Yellow	300 feet
Amber	200 feet
Red	Below 200 feet
Black	No Report

Weather forecasting is always a tricky business, but given up-to-date information it is nearly always possible to forecast 24 hours in advance, even knowing little more than "the weather comes from the West". A little experience can produce longer range forecasts, especially if worldwide information is used. Whatever the case, those "meaningless" numbers are there to be used! □

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# SONY ICF-SW1 RECEIVER

John Waite

## Introduction

The ICF-SW1S system represents a new direction for portable short wave listening, featuring not only a very capable receiver but a set of matching accessories to allow operation in a variety of situations.

The first problem encountered after opening the black plastics carrying case is finding the receiver! It is just one of five items neatly stored in the very sturdy case, the active antenna supplied is larger than the receiver. There is even a separate soft carrying case to protect the receiver. The other accessories are an active antenna, an antenna controller, an attenuator, a pair of minute stereo ear phones and a 3V mains power pack. The compact mains power unit takes any mains voltage from 100 to 240V, 50 or 60Hz without any need for adjustment. The receiver and all its accessories are the same colour making the entire outfit very visually appealing.

Stored in a specially designed pocket in the lid of the case is the operating manual and a booklet called *Wave Handbook*. The operating manual is written in four different languages, English, French and Spanish at the front and Arabic (I think) written from the back.

The quality of this operating manual is up to Sony's usual high standard with very clear diagrams illustrating most of the operations. There is also a particularly good "trouble-shooting" guide to help out if the receiver is not behaving as you would expect. This can be useful for saving an embarrassing trip back to the dealer when things don't quite work out. To augment the basic operating instructions there are hints and tips about the various facets of operating at the bottom of each page.

The *Wave Handbook* is helpful guide giving the transmission times, frequencies and target areas of many major broadcasting stations. It is laid out as easy-to-read bar charts and provides a very quick reference source.

A few points I have not mentioned yet is that the ICF-SW1S will receive f.m. stereo broadcasts, it has a clock, an alarm, a sleep timer and a timer to switch on when your favourite programme is on as well. Not bad for something that will fit inside a large matchbox! Oh yes, it also has ten memories and scans!

## Accessories

Let's talk about the front end first, i.e. the various antenna options available. When using the receiver on its own the 520mm telescopic antenna will rotate and swivel in just about any direction for best results. The telescopic antenna is only used when receiving on the short wave bands or v.h.f. f.m. The long and medium wave bands are received using a built-in ferrite rod antenna.

The active antenna system comprises two parts, the antenna controller and the antenna module. The controller plugs into

Are you interested in an up-market portable radio system covering all broadcast bands between 150kHz and 108MHz measuring a mere 118 x 71 x 24mm? If the answer is yes then the Sony ICF-SW1S system reviewed here, will be sure to interest you.



the tape socket on the left hand side of the radio and engages with the retracted telescopic antenna via a recessed pin. You don't lose the tape facility as it is extended and appears on the edge of the antenna controller itself.

Incidentally, the tape socket provides a means of recording interesting stations but only in mono. The output, 0.775mV, should be adequate to feed the DIN input of a standard tape recorder.



The active antenna has a 1.17m telescopic whip, again that will swivel and rotate, and a 3.65m connecting cable. With this length of cable you should be able to place the antenna at a window, using the cord and suction cup supplied, to provide best results. The antenna module has been very well thought out in that the cable is stored on an internal drum allowing rapid deployment and storage. In addition to storing the cable, the antenna module houses four AA size cells which power the active antenna system.

Operation of the active antenna system is achieved using three slider switches on the antenna controller. The three switches are: power on/off, band switching and a 20dB attenuator. This attenuator was particularly useful for reducing distortion caused by very strong signals. This all sounds very complicated, but it is far more difficult to describe than operate!

If you have never seen Sony's "Twin Turbo Ear Phones" then you are in for a surprise — they defy description. They are supplied in an "almost round" 70mm diameter case some 15mm deep. They also use the principle of storing the cable on a drum. The whole set looks more like a ladies compact than a stereo headphone case! Each ear phone (marked L and R) is 18mm in diameter and has a removable foam cover — presumably so you don't get cold ears! Surprisingly the sound from these phones is very good, they are also very comfortable and you hear very little of the noise going on around you when wearing them. The people sat around you can't hear what you are listening to either.

## Frequency Selection

For something so small, the ICF-SW1S was extremely easy to operate — without having to study the manual in detail first. I was able to immediately select frequencies and tune around with very little experimentation, which is great credit to the ergonomic design of the set.

There are two basic methods of frequency selection, direct entry by inputting the frequency of the station using the keypad and manual tuning using the + and - buttons. The only drawback with this radio that I found was there is no means of fine tuning. The tuning steps are defined according to the band in use, e.g. 5kHz on s.w. and 9 or 10kHz (switchable) on m.w., etc. Quite where they would have fitted fine tuning I'm not sure, but it only proved a problem for me where the stations refuse to stick to the recognised frequency spacing.

The other two methods of specialised frequency selection are the 10 memories and the scan function. The memories are very easy to program and recall is by just pressing the required memory number. If, when you are listening around the bands, you find a frequency you want to put in the memory you press the required memory number whilst holding down the ENTER key.

# SONY ICF-SW1 RECEIVER

## SPECIFICATION

<b>Frequency Coverage:</b>	f.m. — 76-108MHz l.w. — 150-528kHz m.w. — 530-1611kHz s.w. — 1.615-29.995MHz
<b>Audio Output:</b>	250mW at 10% t.h.d.
<b>Speaker:</b>	66 x 38mm, 8Ω
<b>Power:</b>	(Radio) 3V d.c. or 2 x AA cells
<b>Dimensions:</b>	118.2 x 71.4 x 23.7mm
<b>Weight:</b>	Approx 230g inc batteries



Scanning is equally as easy, you choose a start frequency and press the SCAN button and away the receiver goes. It pauses briefly (1.5s) when it finds a signal, just about long enough for you to decide whether you want to stop or not. To stop the scan you depress the SCAN button a second time.

Direct entry of frequencies is not immediately obvious, but it didn't take many seconds to find out what you do. You select the mode (a.m. or f.m.) then enter the frequency of your choosing, then press the MODE button a second time. If you try and enter a frequency that doesn't align with the channel spacing on that band, then the ICF-SW1S automatically jumps to the nearest correct frequency. If you try and enter a frequency outside the range of the ICF-SW1S then a little message appears flashing on the display "TRY AGAIN!". Very user friendly. Once you have chosen your station, you can move up and down the band using the + and - buttons if you wish.

There is a KEY PROTECT button too, so very useful if you have clumsy hands with such a small receiver. There is nothing more irritating than to be enjoying a broadcast and find that by moving your hand you have shot off up the band.

### In Use

The ICF-SW1S was great fun to use over the three weeks or so I had it for review. One of the biggest surprises was how well it worked, the audio quality was remarkable for something of that size.

I spent quite a few evenings using the ICF-SW1S whilst sat downstairs in the house with the active antenna propped up on the sofa. Here are a few examples of the stations heard:

- RC1 in Sackville Canada
- BBC on Ascension Island
- Africa No. 1 in the Gabon
- WYFR in the USA
- HCJB in Ecuador
- WCSN in the USA
- Radio Budapest in Hungary

All these stations were in the region of 15 and 22MHz. There is a very useful switch on the ICF-SW1S which helps with the clarity of the signals when DX listening. This is the NEWS/MUSIC switch, it is in effect a simple treble cut tone interference, mainly the dreadful hiss and squeals from adjacent stations, on the wanted signal.

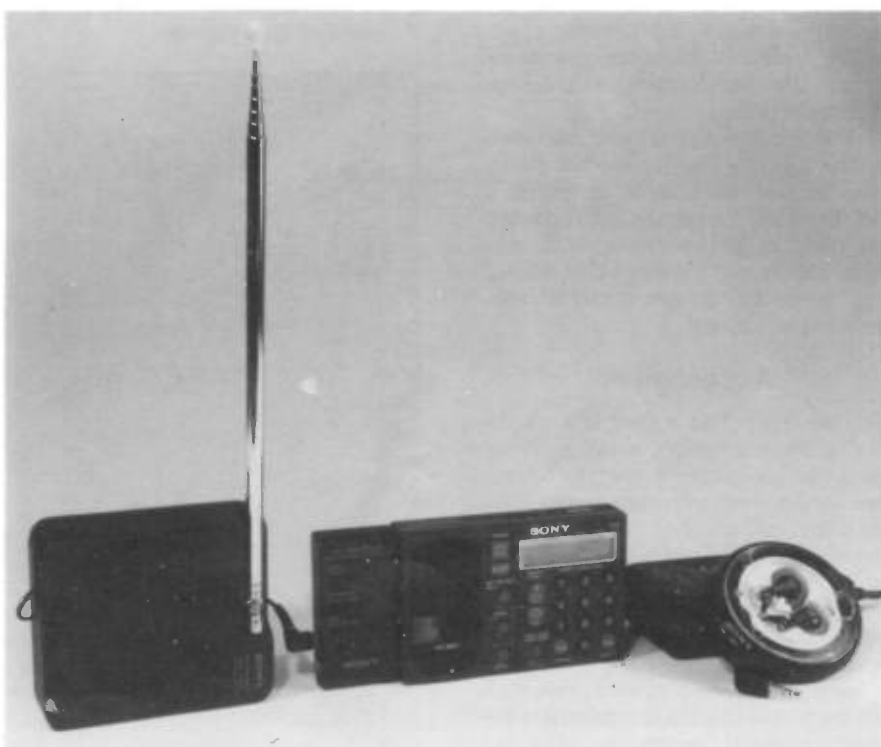
I also listened to the various local radio stations, both ILR and BBC, all in good quality stereo. Obviously to get the stereo reception it was necessary to use the twin ear pieces. The stereo headphone socket is a standard 3.5mm stereo jack which can drive 18Ω headphones.

I think that the ICF-SW1S would be quite useful for the traveller or holiday maker with its sturdy plastics carrying case. It should certainly stand up to the rigors of travel well. Unfortunately I couldn't organise a trip anywhere exciting in the three weeks the Sony was here!

If you like dropping off to sleep whilst listening to DX stations around the world then it's quite easy to do with the ICF-SW1S. The SLEEP button provides 65 minutes of use (non-adjustable) before the set closes down. There is even a little stand attached to the carrying strap so you can see the display easily. If you are in the habit of DXing in the dark then the light on the radio will be useful. It was one of the best back-lit displays I have seen for a long while, not just a tiny bulb at one end, you could read the whole display easily.

The ICF-SW1S will wake you up the next morning too if you want, the radio can be turned on automatically at any time you pre-select.

All in all I found the ICF-SW1S an enjoyable set to use and was sorry to see it Wings its way back to Sony. The set costs around £250 from any Sony outlet. Many thanks to them for the loan of such an extraordinary radio. □





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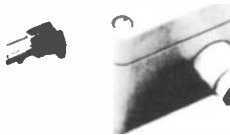
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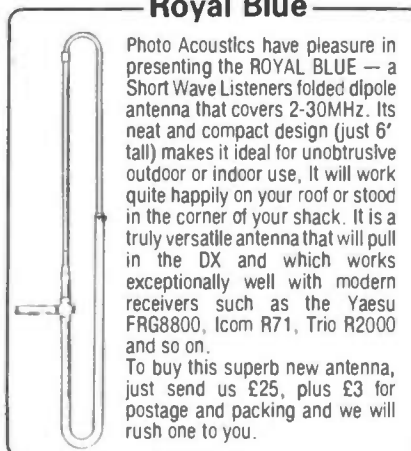


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# SCANNING

Alan Gardener

**Jim Mason** of Falkirk quite rightly corrects me for saying in the February issue that all UK Area Health Authorities use the 166MHz p.m.r. high band for ambulance communications. In Scotland because of the various geographical and administrative differences between the region and the rest of the UK it is necessary to use the p.m.r. "Low" band between 86.025 to 86.200MHz for the base transmit, coupled with 72.525 to 72.700MHz for the base receive. All these services use a.m. in order to provide better communications at the extremes of the coverage area.

## Realistic PRO2004

Jim uses a Realistic PRO2004 receiver fed from an Icom D130 discone, which judging from the mailbag seems to be a very popular combination. He wonders if it is possible to extract an i.f. output from the scanner. This I guess is so he can feed a general coverage receiver in order to receive s.s.b. transmissions, effectively using the scanner as an external converter. Taking a quick glance at the circuit diagram I would think that you could obtain a 455kHz output from TP5 on the r.f. printed circuit board. But beware, this point does carry a d.c. a.g.c. voltage on it, so take the 455kHz signal via a 100nF capacitor to be on the safe side. It may also be necessary to put a resistor in series with this feed in order to prevent any external connection from loading the a.g.c. circuit — 1k $\Omega$  would be a good starting point. As I don't own a PRO2004 I have not been able to try this out, but I would be pleased to hear from anyone who has done such a modification.

All of which leads us neatly into the next letter, which I received from another Scottish reader **Bill Wilson** of Aberdeen. He draws my attention to a modification which appeared in an American publication earlier this year. This adds 100 extra memories to the Realistic PRO2004. All that is required is an 1N914 type diode (two if you want to speed up the scan rate as well) and a steady hand.

First of all the usual disclaimer — **do not attempt this or any other modification if you are at all doubtful of your technical ability and remember that any existing guarantees in force on the receiver may be invalidated.**

So take a deep breath and follow these directions. First of all make a note of the memory contents as this modification tends to erase the existing ones. Remove the receiver's outer casing — four screws at the rear — turn the receiver upside down, and gently prise the screening can off the main processing board PC3. Partially remove this board from the main chassis by unplugging CN501 and removing the seven retaining screws. Locate the row of diodes next to IC504 (Fig. 1). Add a diode in the space provided two holes along from D512, observing the same polarity as the rest of the diodes in the group. This adds an extra set of 10

This month's column has a distinctly Scottish flavour, with several letters from north of the Border. A variety of modifications to popular scanners are described and some of the mysteries of outside broadcast radio microphones are unveiled.

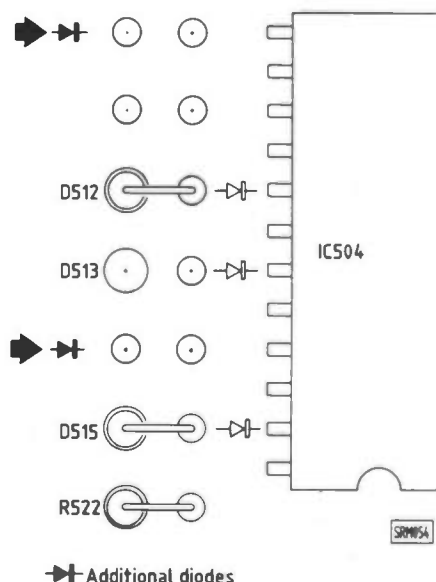


Fig. 1  
You may well ask what do the other missing diodes do? Well D513 inhibits the 855-870MHz range for the American market, D512 inhibits the default 30kHz channel spacing found on this range, D515 in conjunction with D514 sets the scanning/search speeds, and finally D511 — well the use of this one is not clear but it may well be to permit some form of factory testing on the unit, perhaps someone out there knows?

Fig. 2

1	2	3
1 - 40	41-80	81-120
4	5	6
121-160	161-200	201-240
7	8	9
241-280	281-320	321-360
0	.	
361-400		CLEAR
PROGRAM	ENTER	

Bill has also produced some artwork which can be used to relabel the front panel of the receiver, Fig. 2. His suggested method is to take the drawing along to a friendly High Street photocopy shop and to get it produced the same size on coloured paper. Cover the copy with self-adhesive, matt film, cut to size and finally place over the existing part of the front panel by spraying the back of the copy with an adhesive such as 3M "Spraymount". This permits removal at any time without damage to the original panel. Jim has been kind enough to produce a few examples in various colours, so if any of you would like one, just send an s.a.e. to me. Please state the colour you would like, and providing there are still some left I will try and oblige. My thanks to Bill for all his effort.

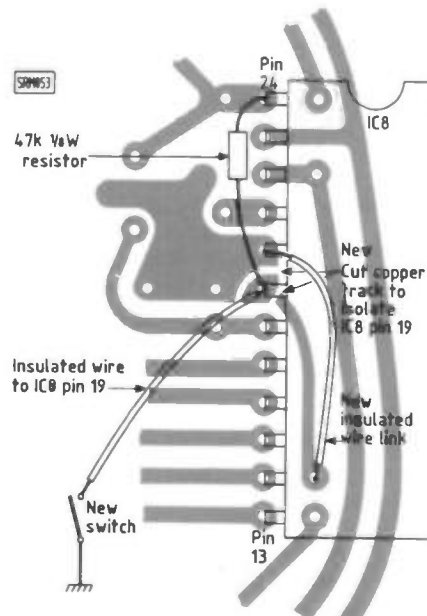
## Icom R-7000

As we seem to be on the subject of memories and modifications how about another 100 memories for the Icom R-7000? This one is just as cheap as the last but it does require the skill of a brain surgeon! Scalpels ready — away we go. Disconnect the power and remove the top and bottom covers of the receiver. A piece of Cling Film over the point of your screwdriver will help prevent marking the matt black screwheads.

Turn the receiver upside down and remove the large metal plate covering the main microprocessor control board. Locate IC8, and partially remove the board in order to gain access to the underside of the i.c. Rest the board on some bunched up cloth to give support and prevent the memory back up capacitor from shorting to earth. Locate the p.c.b. track connecting pins 19 and 20 (Fig. 3).

Using your scalpel cut away part of the track so that pin 19 is left isolated — you will have to reconnect part of the existing

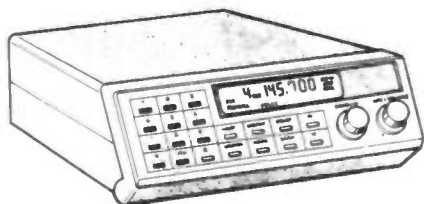
Fig. 3



track with an insulated wire link in order to be able to achieve this. Now connect a miniature 47k $\Omega$  resistor between pin 19 and pin 24 to act as a "pull-up" resistor. Run an insulated wire link from pin 19 to a convenient miniature switch and connect the other end to the earth rail or chassis of the receiver. I used the front panel noise blanker switch by disconnecting the lead which normally feeds it, and reconnecting it to the chassis. This leaves the noise blanker permanently on, but I have never found this to be a disadvantage. I suspect that the manufacturers only include this facility so that you can check if the noise blanker actually works! The pin on the switch that is now left free is connected to IC8 pin 19.

Reassemble the receiver in reverse order, power up and check to see if the modification works. After you operate the switch you will have to use a function which accesses one of the memories in order to "read" the new information. This gives you a second bank of 99 memories, a new priority memory and a new set of upper and lower search limits.

The modification originated, I believe, from Icom UK, so if you bought your R7000 from them and would like to know a few more modifications, why not ask for a copy of their *Modification Sheets*. Whilst you are talking to them how about buying a copy of the R-7000 Service Manual? At around £10 it will prove invaluable, if like me you enjoy experimenting with the receiver.



## Revco RS3000

**Garex Electronics** have just sent me information on the latest addition to their range of scanning receivers, which unfortunately arrived just a little too late to be included in last month's column. The RS3000 covers the bands 26-32MHz, 60-90MHz, 118-180MHz and 380-512MHz. It has 50 memories which are accessible in blocks of 10 and which can hold the type of modulation, a.m. or n.b.f.m. as well as the frequency. Priority and lockout functions are provided, with selectable search step sizes of 5, 12.5 and 25kHz. Sensitivity is good at around 0.5 $\mu$ V on v.h.f. and 0.8 $\mu$ V on u.h.f. for 12dB SINAD. The unit is ideal for mobile use requiring 12V d.c. at around 0.6A, and being small at around 150mm wide, 50mm high and 200mm deep. The price — good at around £199. Contact Garex Electronics, 7 Norvic Road, Marsworth, Tring, Herts HP23 4LS. Tel: (0296) 668684 for further details.

## UHF Aircraft Band Converters

You may remember that in the March issue I asked for information regarding the availability of the Samatron U-Verter on behalf of reader **A. Sheldon**. I have received several interesting letters on the subject, and I will be passing these on as requested. **Anne Reed** of Cheltenham comments on the converter from a user's point of view. She felt that the need to use a conversion chart in order to work out the received frequency was too complicated for general listening, and that the sensitivity was not as good as could be expected from a dedicated receiver. Anne is something of an airband fanatic and says that the new Signal R535 is "The Best". Being a dedicated airband receiver, it's much faster at scanning than her other favourite, the AR2002. **M. Hames** of Walsall has supplied me with the new name and address of Aero Hobby Supplies, who were the original distributors of the converter. They are now The Aviation Hobby Centre, 1st Floor, Terminal Building, Birmingham International Airport, Birmingham B26 3JQ. Tel: 021-742 0424. I hope that helps those of you who were trying to track them down. Mr Hames and another reader **Leslie Mitton** of Nottingham have both offered second-hand converters for sale so it looks as if the story has a happy ending.

## Radio Microphones

**Nigel Compton** of Wantage asks about frequencies used for outside broadcasts. He asks this question after tuning across what sounded like a very high-level, business discussion just outside the 50MHz amateur band UK allocation, at around 54MHz. After a short time he realised that he was in fact listening to a radio microphone being used in the production of a television programme, and he wondered if this was a general allocation. Well Nigel, the recent removal of TV Bands I and III has left many TV companies with a problem as many of them, particularly the BBC, have used spare channels in these bands in the past for services connected with programme production. As the use of these bands gradually changes away from broadcasting to other services the TV companies are having to find new allocations, particularly as many of the pirate radio stations are now using what were old TV allocations for studio to transmitter links. One method is to use the improved technology found in modern radio microphones and to put them on spare channels in the u.h.f. TV Bands IV and V.

The main problem with all radio microphones is the poor range obtainable, due to constraints in both the size and life of batteries. Most output powers are in the region of only a few milliwatts. In order to

overcome this problem many companies use the technique of a "repeater" backpack, and this is what I suspect Nigel heard.

The actual radio microphone was more than likely operating at around 175MHz and this would be received a few yards away by an engineer carrying a set of equipment mounted on a haversack type frame. This would then be re-transmitted at a higher power level, say about five watts at around 50MHz, back to the outside broadcast vehicle. The received signal would be transmitted on yet another frequency, say around 70MHz back to the engineer acting as the "repeater" in order for him to be able to check the quality of the signal received back at the outside broadcast vehicle. The director may also feed instructions to the engineer over this link or he may use yet another channel at say around 140MHz, so he can give instructions to all the other staff who may be at remote points. Other links are employed in the p.m.r. bands, and sometimes, when required, in the v.h.f. marine and aircraft bands.

If you are interested in reading more about the use of radio communications in programme making then try and get hold of a copy of the Department of Trade and Industry publication *Study of the requirements for a radio frequency plan for radio services ancillary to the making of programmes, films, presentations, advertisements and other entertainment and sporting purposes*, available free from the Radio Communications Division Library, Waterloo Bridge House, Waterloo Road, London SE1 8UA. Tel: 01-215 2352. With a title like that it might be a good idea to telephone during the Cheap Rate period! The publication gives examples of many different types of outside broadcasts and the bands of frequencies involved. For example during the 1984 Round Britain Powerboat Race more than 44 different communication channels were in use, and a detailed chart of communications paths is provided. An interesting section on the requirements of radio microphones is also included. I would be glad to hear of any other publications dealing with subjects such as this, so if you know of any drop me a line to the usual address PO Box 1000, Eastleigh, Hants SO5 5HB.

Until next month — good listening.

## Abbreviations

p.m.r.	Private mobile radio
a.m.	Amplitude modulation
n.b.f.m.	Narrow band frequency modulation
i.f.	Intermediate frequency
a.g.c.	Automatic gain control
s.s.b.	Single side band
SINAD	Signal to Noise And Distortion

# WAVES AWAY

Simon Spanswick

Holidays are generally a time to escape from the rat race, and the realities and pressures of every day life, a time to relax and forget about the cares of the world. No telephones ringing, no fuel bills coming through the letter box, no newspapers to bring gloom and dispondancy into your life.

But travelling abroad can mean that you become rather cut-off from life at home: it's all very well searching for a copy of the previous day's "Express" or "Telegraph", and paying a suitably inflated price for the privilege of reading old news, but how can you find out about what's really happening in the world. After all, it might be important to have the latest news — is there an air traffic controller's strike at home, or somewhere *en route*? Are the cross-channel ferries running? Is sterling plunging against major currencies, threatening to leave you short of holiday spending power? Perhaps you would like to know the football results, to see if you have won on the Pools? Or what is at Number One in the hit parade?

Information is becoming considerably more important to an increasing number of people, and whether one is travelling near or far, is it really possible to know what is happening both back at home, and around the world, without the need to read or understand Spanish, or Greek, or Portuguese, or Arabic, or Italian, or any one of the dozens of other languages spoken in holiday destinations around the world.

## In touch with home

To keep up-to-date with news from home, and abreast of events in the rest of the world, listen to programmes from BBC World Service, on the air around the clock on short wave, and in some parts of the world, on medium wave as well.

Programmes come from the central London studios in Bush House, and include international and British news, analysis, music — from the classics through to the Top Twenty, drama and more. On Saturday afternoons, Paddy Feeny's "Sportsworld" provides comprehensive coverage of major UK sporting events, with full classified results together with commentaries and analysis of results from Britain and worldwide. Daily "Sports Roundup" offers all the news from Britain and around the world.

Pop music fans are kept up-to-date with the latest charts in "Multitrack", and classical music lovers are not neglected with the weekly programme "Classical Record Review".

Some regular programmes from the BBC World Service are shown on page Four.

## World Service Frequencies

Broadcasts from Bush House are carried on numerous short wave frequencies,

**Travelling abroad on holiday this year? Then this handy pull-out guide will tell you all that you need to know about keeping in touch with what's going on in the world. . .!**

beamed to different parts of the world, and on medium wave and f.m. to certain areas, so whether you are travelling in Europe, Asia or the Caribbean, it is easy to stay in touch with home.

Our frequency chart gives details of which frequency is used at which time to which area.

BBC World Service has to cope with broadcasting to all of the world's time zones, and therefore inevitably programmes are repeated for the benefit of listeners around the world. This means that if you tune in at breakfast-time, and then listen later in the day, you may well hear a feature repeated. This is, the time, perhaps, to look elsewhere for English language programmes!

## English in Europe

For a continent where several tens of languages are spoken, it is perhaps not too well known that, if you know where to look on a radio dial, it is possible to hear English language programmes, some of them from unusual sources. Of course,

BBC programmes are readily available, but there are many other radio stations which carry some English news and information, including programmes designed especially for tourist. Details of the main English language services are shown in the table at the bottom of page Four.

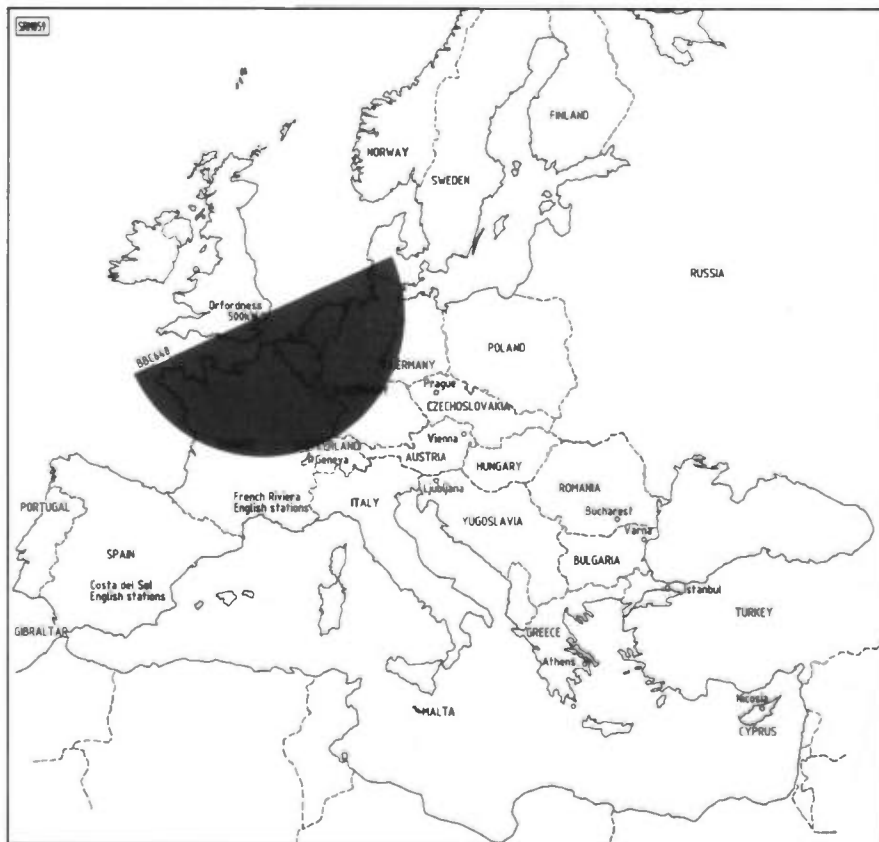
Times of all the programmes listed are given in GMT/UTC for mainland Europe, add two hours for local time until the end of September.

In the popular holiday areas of the Spanish coastal resorts, and the French Riviera, you will find several local f.m. radio stations which carry programmes in English for tourists and expatriates. These stations are liable to change frequencies without notice, so we have not included comprehensive information in this table.

## What Radio do I Need?

It is no good lugging a full-blown communications receiver on holiday with you — apart from the weight, size and power problems, imagine the trouble which could be encountered at customs! For travelling, a small, compact receiver is really all that you will need, and if you do not already have such a set, perhaps now is a good time to consider investing in one. There is a great deal of choice in the market place at present, with receivers ranging from around £40 through to almost £200 for more sophisticated models. Most low-priced sets will be quite good enough for holiday listening, but the

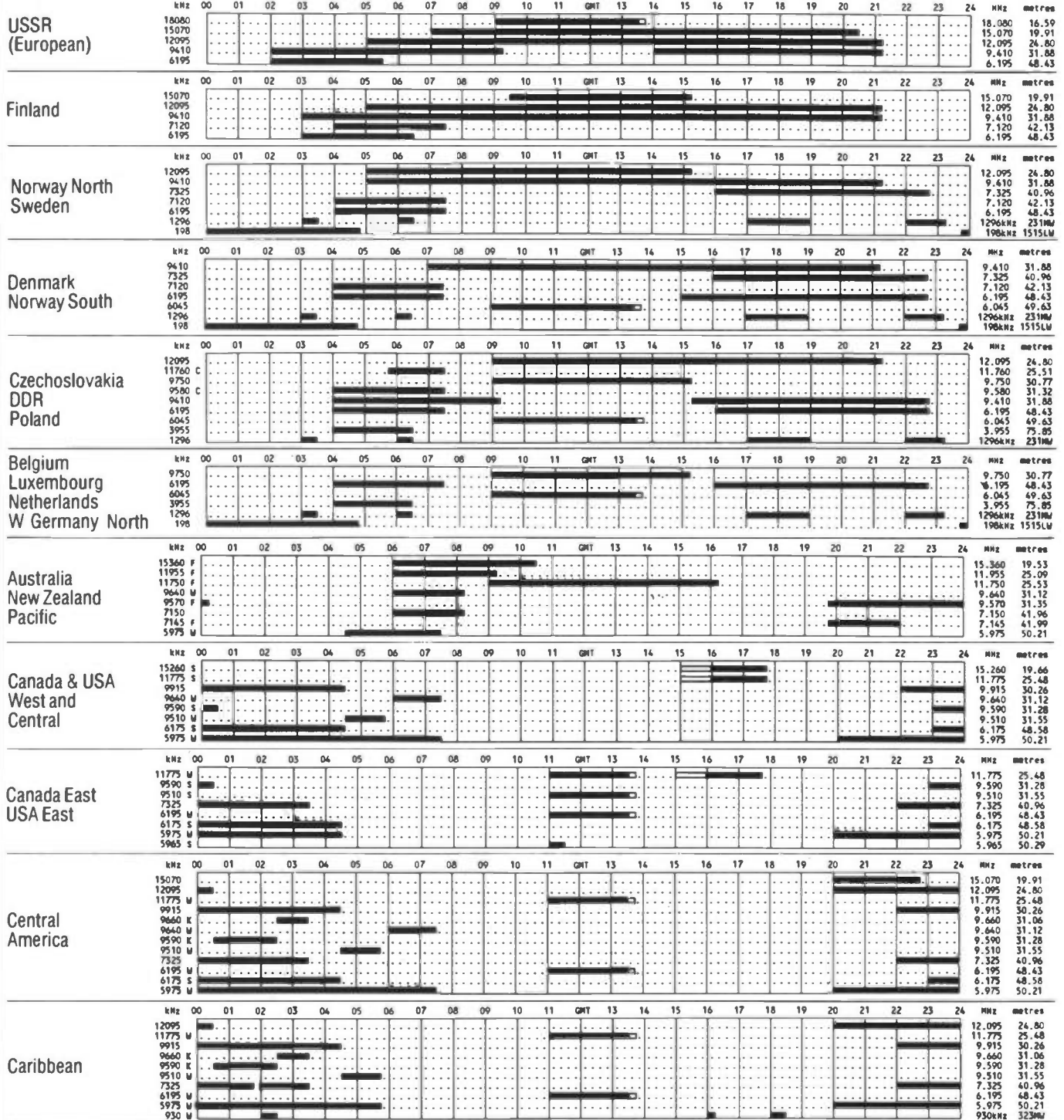
This map shows the daytime coverage of BBC648. It also indicates some of the stations with English language programming.



# WORLD SERVICE Frequency

— World Service Daily Transmissions  
 ○ Non-daily World Service Transmissions

Frequency chart courtesy Lon



LONDON CALLING APRIL 1988

ALL TIMES GMT





# WAVES AWAY

Current Affairs		
World News	Bulletins on the hour.	0000, 0200-0900, 1100, 1300, 1600 1700 (not Sat), 1800 2000, 2200, 2300 0900, 0309, 1109 0400, 0600 and 1800
News about Britain Newsdesk	Half-an-hour of world news & despatches from UK & overseas correspondents.	
Twenty-four Hours	Analysis of the day's main news stories.	0509, 0709, 1309, 2009
Radio Newsreel	Correspondents report from all over the world.	0015, 1200, 1500 (& 0215 South Asia) 2230 Mon-Fri Repeated 0450 Tue-Sat 0930 Mon-Sat 1939 Mon-Fri 1400 & 1900 Mon-Fri 0100 Tue-Sat
Financial News		
Stock Market Report Outlook	People, events & opinions, plus the latest UK news, sport and weather.	

Music and Features		
Multitrack	Pop news & music.	1830 & 2330 Mon, Wed & Fri 1215 Tue, Thurs & Sat
John Peel	Tracks from newly released albums & singles from the contemporary music scene. Edward Greenfield.	0330 Tue, 0830 Thur, 1330 Fri
Classical Record Review		1015 & 1901 Sun, 0815 Wed, 0430 Thurs 0630 & 1715 Sun, 1030 Fri
Jazz for the Asking	Peter Clayton with listeners' jazz record requests.	
Citizens	Keep up-to-date with the popular twice-weekly soap opera.	1130 Tue & Thurs repeated 1715 Tue & Thurs, 0230 Wed & Fri 0750 Sun, 0450 Mon, 1115 Tue, 0130 Thurs
Waveguide	Reporting on new receivers, equipment & developments in international radio.	

Country	Station	Time	Frequency
Austria	Blue Danube Radio	0705	585/1026/1476kHz
Bulgaria	Varna multi-lingual	0700	774kHz
Czechoslovakia	Radio Prague Interprogramme multi-lingual	0800-1100 2300-0057	927/1035/1071/1287/ 1485kHz & 102.5 [Prague] + 97.6/101.4/ 102.7MHz in the regions
Cyprus	CBC-2 Nicosia	0600-0700 1130-1300	603kHz/100.5MHz
Gibraltar	GBC (includes Spanish programmes)	0555-2300	1458kHz/100.5MHz
Greece	ERT-1	0540	729/1602kHz & f.m. relays
Luxembourg	RTL	0430 Mon-Sat 0435 Sun 1330-1600 M-S	92.5MHz 999kHz & 91.7MHz 93.7MHz 89.7MHz
Malta	R. Malta 1 R. Malta 2 R. Malta 3	0500-2200 0500-2200 0500-2200	1458kHz & 100.1/101.1MHz 101MHz
Romania	R. Vacanta multi-lingual	0700-1200 1500-1700	
Switzerland	Radio 74, Geneva includes BBC WS news	24 hours	
Turkey	TRT-3	0703, 1003, 1503, 1703 2003	various local f.m. stations
Yugoslavia	Tourist programmes R. Ljubljana 1	Sat/Sun 1712 2120 Mon-Fri	various local f.m. stations 918kHz + a.m. relays & local f.m. stations 1197kHz 0600-1730 Geneva 102.4MHz Milan 96.35MHz Toulouse 98.8MHz
VOA Europe	Munich/ Washington DC	24 hours	

points to look for are that any set you buy, intending to listen to BBC World Service, for example, covers the main short wave bands, together with out-of-band channels which major broadcasters now use. Look at the BBC World Service frequency chart and compare the frequencies shown with the coverage of any radio which you are thinking of buying.

In Europe, long wave and medium wave will be of use, as will v.h.f. f.m. for regional stations which have English language tourist programmes. Remember that when travelling, small is generally beautiful! Some of the radios which might be suitable include:

Panasonic RF-B10 or RF-20  
Realistic DX-360  
Panasonic RF-B40 or RF-B60  
Sony ICF-4900  
Sony ICF-7600DA  
Sony ICF-SW1

A comprehensive guide to portable receivers was included in the "WHAT RECEIVER?" pages of last month's *SWM*.

Local f.m. listening should prove fairly straightforward, but it is often possible to improve reception of medium wave and short wave stations if you follow these guidelines:

- take a length of insulated wire with your set when you go on holiday, attach it to the base of the radio's telescopic antenna and dangle the wire out of the window - you could find it makes listening much more pleasant and may help with medium wave and short wave reception;
- when listening to short wave broadcasts and more than one frequency is in use, try all the options;
- do not stick to one short wave frequency all day long: conditions on short waves changes, and so will reception of individual frequencies.

Try to brush up your language capabilities? Don't forget that listening to foreign radio stations can prove to be an invaluable aid to perfecting pronunciation. News bulletins generally offer an accent-less pronunciation, whilst speakers on local stations will provide an insight in to local pronunciations and dialect.

If you're a keen short wave listener, don't forget that travel to different parts of the world offers the opportunity to hear stations not normally audible at home. Even if you're travelling only as far as the Mediterranean, you could well find that conditions are different to those in the UK, with stations audible at unusual times, and the affects of jamming differing from home. If you are going further afield, perhaps to North America or the Far East, stations which are rare DX catches at home will be the norm for local listeners: low powered Latin or Central American stations will be clearly heard in the United States, and stations such as Radio Bhutan may be heard in the Far East.

Good listening - but don't forget to enjoy your holiday!



# A MONITOR'S DAY

George Hewlett

I can give no answer to that question, except perhaps to say that if you want to get something out of a pastime, even life itself, one must be prepared to put something into it!

One thing is certain: we do not do it for the money which some of us may be rewarded with, barely covering our expenses of postage and stationery.

An s.w.l. from the mid-20s, I found it difficult to settle down to the hobby after the Second World War ended, having served in the army for nearly six years. Single side-band operation had come in, my old short wave receivers had been battery operated and I had lost the patience to rebuild them.

## Back to SWLing

I renewed my acquaintance with the short waves about 25 years ago, but found the hobby lacked any real purpose.

So I decided to study reception by concentrating on certain areas of the continents or regions: North America, South Africa, and so on.

I had, of course, heard Radio Australia during the morning transmissions, and coming across the Waltzing Matilda tune one afternoon — until then I had forgotten that in the 1930s WK2ME could be heard on 31 metres. I decided to learn more about reception from Australia, eventually becoming an official monitor to its technical branch.

## The UK Summer

During the UK summer months I switch on the receiver — an old Eddystone 940, often referred to as the "old faithful" — at 0400UTC for my first check of the day; 11.910MHz which opens at that time. Three other transmissions are also checked at that time: 17.715, 17.750, and 15.240MHz.

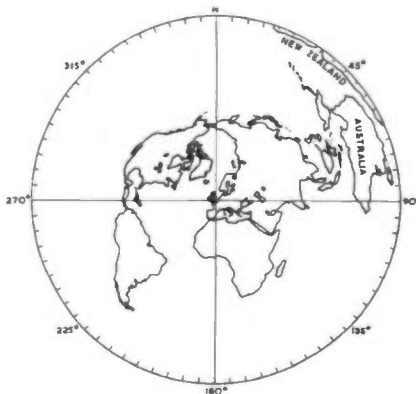
Each of these transmissions is checked every quarter of an hour, give or take a couple of minutes. At 0700UTC 9.655kHz opens up with a transmission which comes to the UK across two oceans, the Pacific and the Atlantic.

For UK s.w.l.s Radio Australia has one major advantage over the rest (most of anyway) of the world; its transmissions can be heard mainly over two routes; the short route (across Southern Asia to Europe) and the long passage (across the Pacific and Atlantic Oceans).

As one transmission goes off the air so another may well open up, including one or two off-beam receptions which are also checked, like the others, on a daily basis every quarter of an hour.

My morning listening session ends around 1030UTC, having covered up to ten transmissions. In the afternoon I switch-on again at 1530UTC during the summer (as early as 1230UTC in our winter-time) in order to check

Monitoring can be tedious, even time-wasting, but at the same time it can also be very rewarding. Dedication is essential and plenty of patience too, especially when experiencing an off-day. But why do we, the amateur radio monitors of the world, undertake such tasks?



Great Circle map based on London.

transmissions in the 7 and 6MHz bands.

Major broadcasters usually have reciprocal arrangements with other international stations for monitoring each other's broadcasts. Thus the BBC may well listen to Radio Australia, while the latter will check the BBC's broadcasts

confining any reports to transmissions directed to each other's area.

## The Other Hand

On the other hand, the specialist amateur monitor can, as I do, devote himself (or herself) to a wider range of transmissions, becoming experts in doing so on the area of their choice.

Although the average listener's report may be of great interest to the station staffs who are responsible for programming and choosing target areas, at the same time such reports may be of little or no use to the station's technical department.

Most of the major broadcast stations have computers and, with them, memory banks for the storage of reception data and other information. Invariably the monitor's report will therefore have to be compatible with the computer's memory banks.

## The SIO Code

I use the SIO code with a maximum of 4, the lowest 2, and a zero for when there is no reception. Interference is usually recorded by using various letters (such as J for jamming), and my report has to be kept strictly to this coding. I can, if necessary, add any remarks relating to the transmission and its reception such as the name of any station causing side band or co-channel interference. Otherwise there can be no deviation from the pre-arranged coding if it is to be of any use. □

### The way I set out my monitor reports

Receiver: Eddystone 940; a.t.u.  
Antenna: Folded dipole in loft

Tuesday July 28

Freq. UTC SIO Remarks

9655	0700 434 N.	— Noisy, but very strong
	0715 434 N.	— reception. Good
	0730 434 N.	— readability.
	0745 444 N.	
	0800 444 N.	
	0815 444 N.	
	0830 434 N.	
	0845 444 N.	
	0900 444 N.	
	0915 434 N.	
	0930 433 N.	
	0945 433 N.	
	1000 433 N.	
	1015 322 N.	
9770	1000 433 N.	
	1015 433 N.	
	1030 322 N.	
	1045 220 N.	

### General Services

11910	0400 434 N.	
	0415 434 N.	
	0430 434 N.	
	0445 434 J, N.	— J: Mainly c.w. inset
	0500 434 J, N.	
	0515 433 A3, N.	
	0530 433 A3, N.	
	0545 434 N.	
	0600 434 N.	
	0615 434 N.	
1194E	0600 433 N.	—BBC off the air 0600UTC
Afri.	0615 433 N.	
	0630 220 A3, N.	— A3: BBC on air again.
17715	0400 030 N.	— R. Aust. not heard.
	0415 030 N.	
	0430 230 N.	— Audible, but unusable.
	0445 322 N.	
	0500 433 N.	
	0515 433 N.	
17715	0900 433 N.	
Chin.	0915 433 N.	
	0930 322 N.	
15240	0400 434 N.	
	0415 433 N.	
	0430 433 N.	
	0445 433 A3, N.	
	0500 433 A3, N.	
	0515 322 A3, N.	— A3, Berlin Int.
	0530 220 A3, N.	



## Communication decoders

### AFR-1000 Automatic CW-RTTY Decoder



The microprocessor-controlled POCOM AFR-1000 CW-RTTY Decoder automatically processes radio teletype signals in accordance with Baudot No. 1 and No. 2, ASCII, ARQ/FEC (SITOR/SPECTOR/AMTOR) and CW (Morse telegraphy) standards and corresponds to the latest state of the art. The AFR-1000 Automatic Decoder is remarkable for its value for money. Its moderate price makes it particularly suitable for the cost-conscious RTTY beginner. Unlike the other models in the AFR series, however, it cannot be upgraded for special codes.

#### FEATURES

- Fully automatic recognition of CW, ARQ-FEC and BAUDOT No. 1 and No. 2 teletype signals with automatic decoding, independently of the shift position.
- Baud rate analysis in the range from approx. 30 to 250 bauds.
- Extremely fast phasing of ARQ-FEC signals (Typical: 1-5 seconds).
- Special narrow-band quadrature discriminator for all usual LF shifts of 50-1000 Hz and CW Morse telegraphy.
- Swiss technology and quality — 1-year guarantee.

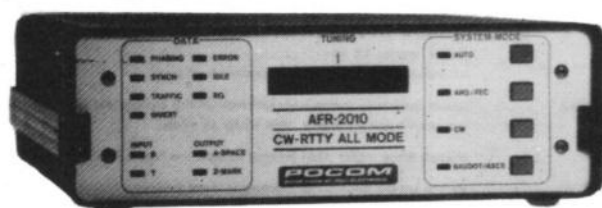
The POCOM AFR-1000 is extremely easy to use and very simple to operate. The AFR-1000 is simply connected to the loudspeaker outlet on the shortwave receiver. Operation is confined merely to choosing the mode required. No tiresome testing of the baud rate and shift position. Two LED's indicate the active operation states in each case.

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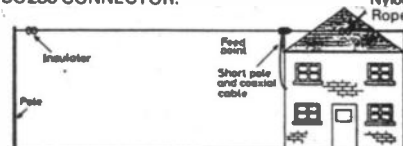
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# AIRBAND

Godfrey Manning G4GLM

No prizes for the unintentional guessing game in the March issue. Did you recognise the airfield in Chris Mlynek's photo as being Wellesbourne Mountford, near Stratford-upon-Avon, Warwickshire? Yes, that really is me looking across the field with binoculars! Active runways are 05/23 and 18/36 and the air-ground frequency is 130.45MHz. Once a wartime airfield, it is now used by flying clubs, although a Vulcan is also kept here! Visitors will welcome the light refreshment facilities and informal atmosphere. If you are thinking of visiting/flying to some light airfields *Pooley's Flight Guide* will tell you about them and is obtainable from the Airtour Flight Shop at Elstree Aerodrome, Hertfordshire. Tel: 01-953 4870.

## Frequency and Airspace Changes

A couple of navigational beacon changes have cropped up since last time (source: Civil Aviation Authority (CAA) *General Aviation Safety Information Leaflet 2/88*). The Detling v.o.r./d.m.e. in Kent is back on the air (DET: dah-di-dit, dit, dah, 117.30MHz, the d.m.e. being on Channel 120). In Cumbria, the Dean Cross v.o.r. (DCS: dah-di-dit, dah-di-dah-dit, di-di-dit, 115.20MHz) is still withdrawn and if heard on test must be ignored. Any navigational aid that puts out an unexpected Morse identity TST (dah, di-di-dit, dah) indicates a facilities under test. The Dean Cross d.m.e. is still available (Channel 99) and there is a temporary n.d.b. Pilots should **not** rely on this unofficial column to help with their flight planning, however; please consult up-to-date NOTAMs!

Further north still, major changes will occur to the Scottish flight information region (announced in the CAA *Aeronautical Information Circular 32/1988*). Part of the changes involve moving the Glasgow v.o.r. (GOW: dah-dah-dit, dah-dah-dah, di-dah-dah, 113.40MHz with d.m.e. on Channel 81) onto the airport itself. Also the Prestwick v.o.r./d.m.e./n.d.b. will be renamed Turnberry (TRN: dah, di-dah-dit, dah-dit, 117.50MHz v.o.r.; channel 122 d.m.e.; 355kHz n.d.b.) The airspace changes will happen in time to appear on the next issue of the half-million topographical ICAO *Aeronautical Chart* sheet 2171AB. This will be issue 11 and should be available a couple of weeks after this "Airband" is published.

## You Write

**Richard Buckby G3VGV** (Castle Donington, Derby) lives so close to East Midlands Airport that he has to be interested in aircraft! Some time ago he was based near the Daventry beacon which was then an n.d.b. around 670kHz with a T-shaped antenna. Having deduced this much about it, Richard then noticed the concentration of aircraft overhead and

**One year on and still flying! Last month this magazine celebrated its first year under new management and this month sees the first anniversary of my coverage of the world of aeronautical radio. It's all thanks to you: "Airband" exists entirely because of your letters.**

went on from this early beginning to discover much more about aeronautical radio.

One problem that exists with cheaper modern receivers is image reception. An f.m. broadcast receiver might pick up aircraft communications that are twice the i.f. higher than the frequency selected on the dial. For example, tuning around 100MHz with a set that uses a 10.7MHz i.f. could result in an image being received at  $100 + (2 \times 10.7) = 121.4\text{MHz}$ .

One of my relatives complains of this whenever the weather is wet and windy: Heathrow go onto Runway 23 during strong southwesterlies, and this brings the final approach path close to my house. Since the aircraft are thus nearer and lower than usual their signal strength is greater and more likely to be received as an image. This not only says little for the r.f. stage selectivity of the receiver — it also indicates that the limiter/discriminator or other f.m. detector is too susceptible to amplitude modulation!

By the same token, aircraft receivers could be susceptible to image reception in the 144MHz amateur band. For example, going  $2 \times 10.7$  down from 144.4 gives 123MHz, again in the aircraft communications band. Remember that the image frequency depends on whether the local oscillator is higher or lower in frequency

than the signal that it is intended to receive.

Richard remembers Ascension Island in the pre-Falkland War days when aircraft visitors were rare. Airports in general have ground maintenance vehicles which might include bird scarers (known at Heathrow as "Seagulls"), leader cars to guide aircraft during taxi, checkers to inspect the runway for foreign objects and debris (f.o.d. in RAF jargon) and repair teams for lighting and telecommunications. These might not only have their own radio channel (often u.h.f.) but also tend to talk to the ground movement controller or tower controller when it is necessary for them to venture out on to the active runways and other areas where conflicts with aircraft might arise. Richard understands that the airband will be extended up to 141.5MHz which will bother professional outside broadcasters who already use part of this allocation. It will also worry airlines and any other owners of existing equipment that can't manage this extra coverage!

The integration of civil and military traffic has set **Colin Berry** (Crawley, West Sussex) thinking. The military use u.h.f. frequencies extensively and have their own national air-traffic controllers in suites directly adjacent to the civil sectors at the London Air Traffic Control Centre (LATCC), West Drayton, near Heathrow and at ScATCC, the Scottish equivalent at Prestwick, Ayrshire. The civil controllers also tend to have a military liaison controller attached to their teams at LATCC. In principle a v.h.f.-equipped military flight will be able to use the same control facilities that are available to its civil counterpart. The problem comes when the aircraft is fitted with u.h.f. only in which case all communication must be with the military controllers.

At LATCC the civil controllers work in reasonable lighting conditions but the military ones use smaller fluoride displays



Godfrey poses with some of his instruments in his newly-expanded museum.

(Photograph Christine Mlynek).

# AIRBAND

that require dim room lighting although under these conditions an extra degree of definition is possible. A special case is the Distress and Division Cell which answers emergency calls by all aircraft on 121.5MHz but is staffed by military controllers.

The CAA produces three documents on this subject, all free of charge from the Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham, Gloucestershire GL50 2BN, but please note that you must send 50p for UK postage (£1.30 overseas). They are *National Air Traffic Services* (Document 257), *London Air Traffic Control Centre* (Document 60) and *Scottish and Ocean Air Traffic Control/Centres* (Document 259). Why not ask for a copy of their *Publications List* at the same time?

One-time 19-set operator **Peter** (Eastbourne, East Sussex) is interested in "armchair flying" (aren't we all?) and has suitably equipped himself with a multitude of books and magazine subscriptions. Peter has the right idea: it's off to Heathrow and Gatwick, not to mention the RAF Museum at Hendon, armed with camera and binoculars. My own little collection is not too far from Hendon and a visit can be arranged by 'phoning me on 01-958 5113 (weekday evenings). Peter's own radio exploits involve 934MHz; next time you write, I'd be interested as to how your designation "HL04" is derived — even columnists need to learn something new every day!

## Catalogue

Regular advertiser **Fairbotham & Co** (Stockport, Cheshire) have sent their

latest catalogue. They also refer to themselves as "Flight Deck — The Airband Shop" and this tells you all about their wares! One product to which they draw my attention is a dedicated 10mm-thick logbook for the enthusiast which consists of A4 pages ruled with a headed grid for observations. If you'd like a sample page from this please send a 13p-stamped reply envelope (or 1 international reply coupon) to me via the editorial address (offer open whilst stocks last).

## Glossary of En-Route Navigational Aids

It's a year since my "Aeronautical Radio" series appeared and it is obviously necessary to keep referring to some of the radio facilities that were covered in those earlier articles. Here then is a briefer summary of the most frequently-used *en-route* navigational beacons.

Very high frequency omni-directional radio range (v.o.r.) is the main directional facility in current use. These are on 50kHz channels from 108-117.95MHz i.e. v.h.f. navigation ("nav") band. When tuned on the nav receiver the beacon will be heard to emit its identity at short intervals as three Morse code letters. On first tuning any beacon, the identity must be confirmed: the facility might be off the air, faulty, wrongly tuned or too distant to be in range. Frequent confirmation of the ident signal should be made while using the beacon. The v.o.r. is considered to be at the centre of 360 radial spokes and the cockpit indication shows the pilot on which of these radials the aircraft is situated. This enables a track to be steered

directly towards the v.o.r. for example.

Distance measuring equipment (d.m.e.) is a transponder system where the ground station is interrogated by the airborne equipment and the delay in receiving the reply is used to calculate distance. Frequencies are in the GHz region but this does not concern the pilot. Most d.m.e.s. are co-located with a v.o.r. and are also frequency-paired. When the airborne equipment is tuned to the v.o.r. the d.m.e. will be automatically activated too.

None-directional beacons (n.d.b.s) are the older type of directional facility. The airborne equipment uses standard direction-finding techniques to work out the bearing of the beacon from the aircraft. Frequencies are between the long and medium wave broadcast bands and in fact overlap the medium waves. Again there is a Morse ident and this is especially critical since without a positive identification it is impossible to know whether the cockpit indicator is responding to the beacon or is instead just moving around randomly due to the effects of noise. Several crashes have been due to this error on the part of the pilot. Don't just tune and identify an n.d.b. but keep checking its signal at regular intervals. Our seafaring colleagues can also use these beacons with hand-held direction finders.

TACAN (TACTical NAVigation) resembles a combined v.o.r. and d.m.e. system and is still in use by the military.

As the weather improves (won't it?) I'm sure that, like me, you'll focus your attention more and more on the sky and its airborne contents. Don't forget to write with your experiences!

# BANDSCAN

<12

## Palestinian Clandestine

A medium wave clandestine voice that first starting broadcasting mainly Lebanese popular music back on September 24 has now changed its tune. In fact when the megawatt transmitter signs on in the morning and afternoon they begin by playing a simple synthesiser version of *Turkey in the Straw*. The station identification for Radio Al-Quds is clearly aimed at the Palestinian people in Israel. It is thought to be coming from Syria. So far the two v.h.f. frequencies mentioned in transmissions haven't been heard but the coverage of the medium wave signal on 702kHz is excellent in the area. Though the bulk of the programming is in Arabic, English has also been heard. The identification reads "Al Quds, the Palestinian Broadcasting Station for the Liberation of Land and Man. Good Day



listeners. We'd like to draw your attention that we transmit on the following frequencies, 105.4MHz and 96.7MHz f.m. wave, and seven hundred and two kilohertz medium wave. This is a test transmission".

## Chinese Exit 7MHz

Shozo Hara JA1AN, president of the Japanese Amateur Radio League, says that all Chinese broadcasting within the 7MHz amateur band has ceased. This objective was the result of a 17-year campaign by JARL and the Ministry of Posts and Telecommunications of Japan.

## Skytext Pages

The Dutch language teletext service of the Sky Channel TV Network has started a page devoted to hi-fi and short wave. In February page 341 was opened up to hobbyists and although primarily aimed at the entertainment channel's Dutch speaking audience in Holland and Belgium, it can be seen right across Europe by those with a connection to the service. Now why doesn't CEEFAX do the same thing?

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Please note that the AMTOR section only receives ARQ mode (mode A) but this is the most common mode and covers a lot of commercial TOR stations, also.

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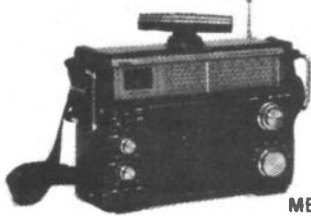
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# STARTING OUT

Brian Oddy G3FEX

## Reference Oscillator

The heart of a frequency synthesiser is a quartz crystal controlled master reference oscillator, and ideally its frequency of operation should be unaffected by vibration, changes in temperature and power supply variations. Rigid mechanical construction, good screening, high quality components and a voltage regulated power supply are essential to achieve the necessary stability. Some designs take things a stage further and mount the quartz crystal in a temperature controlled oven so that changes in ambient room temperature do not affect the stability of the oscillator; however, for the oven to be effective it is necessary for power to be applied to it at all times, so this feature is unsuitable for portable equipment.

The Wadley Loop was described last month. In another type of synthesiser the injection frequencies are generated by a separate oscillator which is "locked" to the master reference oscillator so as to achieve equal stability. Note that in this design there are no mixer stages involved in the generation of the final frequency, consequently the output signal may be relatively pure.

The separate oscillator is known as a **voltage controlled oscillator (v.c.o.)** which is similar to a v.f.o. except that the mechanical tuning capacitor has been replaced by a **Varactor diode**. The internal capacitance of a varactor diode may be varied by changing the d.c. potential applied across it, so this property is used to enable the oscillator to be tuned to any desired frequency.

## Phase Locked Loop

In order to lock the v.c.o. to the reference oscillator three additional items are required, namely a **variable divider**, the division ratio of which may be controlled by external switches; a **phase comparator** which produces a d.c. output error voltage proportional to the phase difference between two signals present at its inputs; and a **loop filter** — see later. These three components, together with a v.c.o. and reference oscillator, form the basic building blocks of a **phase locked loop (p.l.l.)** synthesiser, see Fig. 1.

If the output from the reference oscillator ( $f_r$ ) is connected to one of the comparator inputs and the output from the v.c.o. ( $f_o$ ) is coupled to the other comparator input via the divider which is pre-set to a division ratio ( $N$ ) the comparator will produce a d.c. error voltage ( $V_e$ ) proportional to the phase difference between  $f_r$  and  $f_o/N$ .

If  $V_e$  is then applied to the Varactor diode in the v.c.o. it will cause  $f_o$  to change until the phase and frequency of  $f_o/N$  is the same as  $f_r$ ; the system then

As recently mentioned in this series many of the more expensive modern portable receivers, and most of the complex communications receiver designs, employ some form of frequency synthesis to provide the highly stable local oscillator injection frequencies required for the mixer stages.

locks up and the stability of the v.c.o. is directly governed to by the stability of the reference oscillator input,  $f_r$ . If there is any phase noise present in the output from the comparator it will impair the overall stability of the system, so a low-pass loop filter is usually inserted in the d.c. path between the comparator and the v.c.o.

In a practical design the amplitude of  $V_e$  from the comparator may be insufficient to control the v.c.o., so a d.c. amplifier may be required to boost the error voltage. When the system has locked up, the output frequency of the v.c.o. ( $f_o$ ) will be  $N \times f_r$ . By varying the division ratio ( $N$ ) of the divider,  $f_o$  can be changed in discrete steps equal to  $f_r$ .

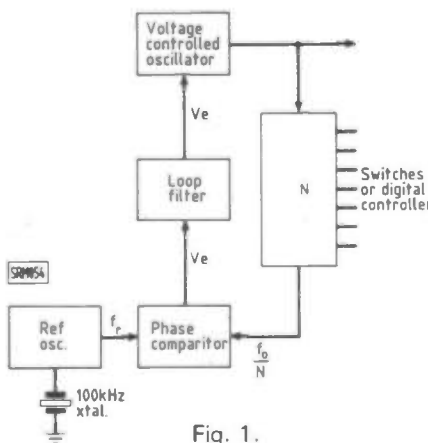


Fig. 1.

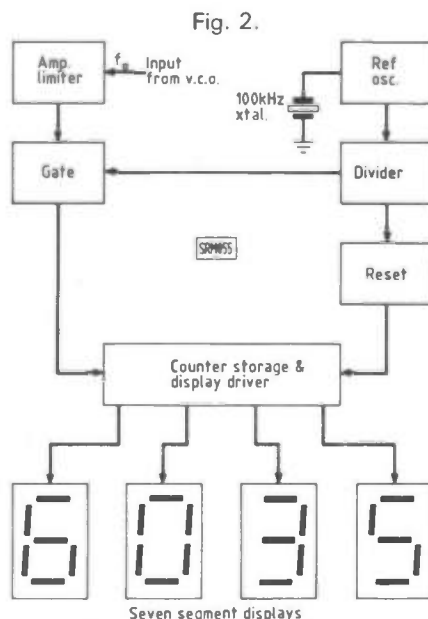


Fig. 2.

If all this seems a little complex consider a few numerical examples:

**Question 1:** If the reference oscillator output ( $f_r$ ) is 100kHz and the tuning range of the v.c.o. lies between 1MHz and 10MHz, what division ratio ( $N$ ) is required if the desired output frequency ( $f_o$ ) is exactly 2MHz?

**Answer:** It has already been explained that the system will only lock up when  $f_r = f_o/N$ ,

so  $100\,000 = 2\,000\,000/N$ ;  
transposing,  $100\,000 \times N = 2\,000\,000$ ,  
therefore  $N = 2000\,000/100\,000 = 20$ .

**Question 2:** If the division ratio ( $N$ ) is set to 40, what will be the output frequency?

**Answer:** It has been shown that  $f_o = N \times f_r$ ,  
so  $f_o = 40 \times 100\,000\text{Hz} = 4\,000\,000\text{Hz}$   
 $= 4\text{MHz}$ .

**Question 3:** If the division ratio is changed to 49, what will be the output frequency?

**Answer:**  $f_o = N \times f_r$ ,  
Therefore  $f_o = 49 \times 100\text{kHz}$   
 $= 4.9\text{MHz}$ .

From these examples it can be seen that the output frequency can only be changed in steps of 100kHz and to make smaller steps it will be necessary to decrease  $f_r$ .

In a practical design a frequency of 10MHz is often chosen for the quartz master reference oscillator, since it may be easily compared with one of the World Standard Time/Frequency signals broadcast by, for example, MSF or WWV. A fixed divider chain using integrated circuits may then be employed to produce, say, a 1kHz signal which is used in the synthesiser as the reference so that the output frequency of the v.c.o. ( $f_o$ ) may be changed in steps of 1kHz.

Only the very basic principles of p.l.l. synthesisers have been mentioned here, and many interesting and complex designs have evolved during the last decade. In many of the more advanced designs the switches used to vary the division ratio of the divider are replaced by a digital "up-down counter" which is driven by an encoder operated by a tuning knob. A digital memory bank is often used to store numerous division ratios so that they may be instantly recalled when certain channels or frequencies are required. The digital information stored in memories can also be scanned and used to control the divider in the synthesiser so that any number of desired channels may be sequentially monitored.

When rotary switches are used to control the division ratio of the divider they may be easily marked to indicate the output frequency of the v.c.o. ( $f_o$ ) in steps of 1MHz, 100kHz and 10kHz; however if they are replaced by a digital controller there may well be a lack of indication of the operating frequency unless a digital frequency display is also incorporated in the design.

## Frequency Counter

The building blocks of a simple type of

# STARTING OUT

digital frequency counter and display are shown in Fig. 2. An output from the synthesiser v.c.o. is coupled via a buffer amplifier into a limiter so as to change its sinusoidal waveform into a square wave. It then enters the counter via a gate which is only open for a highly accurate pre-determined period. A highly stable quartz reference oscillator, usually called the **clock**, is used with a divider chain to produce a suitable pulse which will open and close the gate.

When the square waves from the v.c.o. output are allowed to pass through the gate they are counted and the information obtained is then stored so that it may be displayed continuously during the next counting period — thereby ensuring the

display does not blink. At the end of each counting period the stored information is updated.

Each of the numerals depicted in the display is made up from combinations of segments within a seven-segment display; these may be produced by filament wires in a special vacuum tube, light emitting diodes or liquid crystal technology. The segments used when "6" is displayed are shown in Fig. 3.



Fig. 3.

Of course, in most receiver designs the display indicates the incoming signal frequency rather than simply the v.c.o. output frequency. The difference between them will amount to the i.f. used in the receiver and due allowance has to be made for this within the counter — perhaps by using an additional mixer stage.

The majority of the components and circuits used in p.l.l. synthesisers and frequency counters are now available as integrated circuits, thus permitting very compact designs to be evolved. If the output from the quartz master reference oscillator used in the synthesiser can also be used as the clock for the counter, a very compact layout can be achieved!

# SERVICES

## Subscriptions

Subscriptions are available at £17 per annum to UK addresses and £19.00 overseas by Accelerated Surface Post outside Europe. For further details see the announcement on page 15 of this issue. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £27.00 (UK) and £30.00 (overseas).

## Queries

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

1. We cannot give advice on commercial radio, TV or electronic equipment, nor on modifications to our designs.
2. We cannot deal with technical queries over the telephone.

3. All letters asking for advice must be accompanied by a stamped, self-addressed envelope (or envelope plus international Reply Coupons for overseas readers).

4. Write to the Editor, "Short Wave Magazine", Enefco House, The Quay, Poole, Dorset BH15 1PP, giving a clear description of your problem.

5. Only one query per letter, please.

## Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past 10 years are available at £1.45 each, including post and packing to addresses at home and overseas (by surface mail).

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

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

## Ordering

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

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# SEEN & HEARD

## AMATEUR BANDS ROUND-UP

Justin Cooper

PO Box 4, Newtown SY16 1ZZ

Where can the reader get information on what contests, DXpeditions or events are on the horizon? Well, there are a few choices, the most obvious being columns like this one! Other options are things like the W1WY Contest Calendar in CQ Magazine, or the weekly DX News Sheet, DXNS for short. Yet both of these excellent works suffer from the fickleness of organisers. Some forget to send out press releases until two days before the event, some don't bother — others change the date of a contest that has been held for donkey's years at the same time.

For the s.w.l. these are still the best thing other than a crystal ball. The DXNS is now run by Brendan G4DYO under the aegis of the RSGB. Subscription details can be obtained through them. To give you an example of what's in the DXNS it includes a tabulation of what's going on, contest news mentions the current activities in this year, DX Calendar looks forward, Ragchew picks up the odds-and-ends, IOTA covers the Islands on the Air Award, there is a section on Propagation Prediction and the historical solar figures and on the back pages is a listing of Band Reports with precise frequencies and day of the week, QSL Round-up and a few snippets of other information.

B. Patchett (Sheffield) notes how the Russians are so much better on the QSLing business. This is, I understand, because before a Russian can have his own call, he must have proof of contact with so many other amateurs from the club station. I believe the Russian s.w.l.s have a similar routine too.

R. E. Webb (Ashford) is noting the Europeans that so many s.w.l.s disregard to increase his HPX total.

A couple of queries come from

W. J. Prior (Lochcarron) on RTTY; GB6SC and VX1AJJ. The former was obviously a special event station and VX1AJJ was a Canadian, I would think in connection with the Winter Olympics.

D. B. Glover (Newton-le-Willows) has a number of queries over HPX. In accordance with the original rules, the presence of a suffix (for example, VE2PAB/P/4U) would mean that, quite arbitrarily, he is counted as a 4U2. Alternatively, you could just claim him as VE2 — but, one or the other, not both. With VE2s plentiful, and 4U2 non-existent, in the quoted case the choice is pretty obvious. With something like K2MFY/P/VP2M, where both prefixes are heard fairly regularly, the choice is less easy.

However, in modern times there has been a tendency for the suffix to become a prefix such as 4U/VE2PAP/P and this seems likely to become the normal routine. I think that to put the bit that tells you where the station actually is at the front seems an eminently sensible thing, I hope it catches on.

D. R. Degg (Stoke-on-Trent) uses a Realistic DX300, fed by way of an a.t.u. from a longwire. He queries the hearing of TU2EW on 3.639MHz. Nothing wrong with TU2 as such, but I have to admit that it seems an odd sort of frequency to find such DX on. I can't imagine an easy way in which the reception could have been from another band, unless the chap were using a multiband antenna and had a rig which put out a fat spurious signal on the wrong band.

On a different tack, Roy offers VX3FHL, VX8CHN and VX6VEY as all being from Australia. Well, until someone proves it wrong, I am going to stick with VX= Canada, for the simple reason that

this is what my information says.

M. Ribton (Gillingham) has built himself a loop antenna. At the moment, it peaks up on 3.5, 7 and 14MHz. The next move is to remote control the tuning capacitor and then to mount it on a rotator.

Turning to the letter from Neil Melville (London N18), he admits to being very much a c.w. addict. He hardly ever listens on phone these days. Neil has a couple of the VX prefixes, with VX3AT and VX6VK in the list but has a query in the form of V8AT heard at 1100Z on January 19 on 14MHz. V8 suggests Brunei, but usually as V85; that being said does anyone else have information to add?

R. G. Williams (Borehamwood) is now concentrating all his efforts on the Table, using his Joystick, a.t.u. and FRG-7 receiver. Thus 34 new ones go on including such as 6Y25RP, 8P6HV and 8Z1AB.

P. Townsend (London E17) is now "in the picture" as far as Top Band goes. I mentioned how G3BDQ set about creating an earth system, which made Philip think hard. He used a galvanised iron stake for an earth and I don't think that stands much chance. He could try driving it rather deeper and constructing a chemical earth. A chemical earth means keeping the area around the spike damp and adding chemical compounds to improve the earth conductivity. I really feel that an artificial earth made of a quarter wave radial hidden under the carpet of the shack for each band would work.

P. Davies (Market Harborough) has heard FJ5BL (St. Barthelemy Is) and SORASD. The latter, incidentally has been accepted as a new DXCC country, making the current "possible" 319. However, this has been done by re-activating the old country Rio de Oro and retitling it Western

Sahara, which creates the odd puzzle for those who have both.

US and Canadian celebratory prefixes abounded; W200AW, W200MYN, VX1CYL, VX1AT, CJ1QU, not to forget the Italian IY4FGM Marconi club station. The Russian Oblasts continue to attract and of course ZLOACF was Amir 4X6TT doing his swing-around the DX spots.

Now we turn to E. W. Robinson (Felixstowe). He heard CI8HO give his QTH as Resolute Bay, Canadian North West Territory, at the time he was working KL7XD, Fairbanks, Alaska. This complete QSO was on 14MHz at 1918Z on February 27. Others included GB75SIG, one of the RSGB 75th anniversary Commemoration stations and AK200Y came from VK.

Among the up and coming prefixes are: EI1000 part of the EI/Dublin celebration of 1000 years of the city, SX1RAAG covering the 30th anniversary of the Greek RAAG; and of course the visitors to RSGB's 75th anniversary celebrations in July will have GV calls, of the form GV/AB1CD.

Taking a breather from the ARRL Contest, N. K. Yule (Bengeo), says he has been tinkering with his antenna; it has been extended by another 10 metres or so and a pair of headphones have been acquired and found to make a lot of difference to reception. An interesting one was the recent Abu Ail effort he found they were working split-frequency because of the pile-up, but once he had the hang of it he got the complete QSO with W8AH. The 500th prefix was T77C on 3.5MHz, the band where he found 8R1RPN too. The 21MHz band yielded HH2SD, G3UJB/MM, A22BW and SORASD.

All-Time Post War HPX Ladder

Name	Phone Only	Prefixes	Name	CW Only	Prefixes
B. Hughes (Harvington)		3353	H. Scott (Rievaulx)		1396
E. M. Gauci (Malta)		3312	N. Melville (Edmonton)		1260
E. W. Robinson (Felixstowe)		2710	P. J. Barnes (Blackpool)		548
M. Ribton (Gillingham)		2181	M. Rodgers (Bolton)		347
M. Rodgers (Bolton)		1827	C. R. Eve (Jersey, C.I.)		342
R. Shilvock (Halesowen)		1700			
N. Henbrey (Northiam)		1655			
B. Patchett (Sheffield)		1321			
C. R. Eve (Jersey)		1165			
B. E. Woodcock (Leeds 17)		1122			
A. Woodcock (Denmark)		1027			
R. G. Williams (Borehamwood)		908			
A. P. Lincoln (Aldershot)		898			
S. Burgess (Stockport)		782			
L. Marcquardt (Hereford)		645			
D. R. Tanswell (Iver)		628			
R. Gawan (Preston)		569			
N. K. Yule (Bengeo)		546			
P. McAllen (Southampton)		528			

Annual HPX Ladder  
Starting date January 1, 1987

Name	Prefixes
R. E. Webb (Ashford Kent)	444
C. R. Eve (Jersey)	361
D. McGlone (Limerick)	302
D. B. Glover (Newton-le-Willows)	276
S. Myers (Liverpool 9)	275
D. Gilbert (Farnham)	223

This is the last showing of the 1987 Annual Table, to December 31, 1987. The first listings for 1988 will appear in the next issue of this piece. 200 Prefixes to have been heard for an entry to be made in accordance with HPX Rules. At score 500, transfer to the All-Time list is automatic. Note, the Annual Table is a Phone only listing.

### Most in 1988

E. M. Gauci (Malta)	276
---------------------	-----

Rules as for the Annual Listing. An entry for this listing must be in addition to any claim for the All Time Post War listing.

What a pity the Bouvet expedition was cancelled, says B. Woodcock (Leeds 17). True enough, but it must be accepted that Bouvet is a tough nut to crack in itself, before one even thinks of setting up a station. One has a significant risk of being marooned

there if the weather "plays up" perhaps for a long period. It's decidedly not one to embark on without adequate preparation.

**Finis**

That's it for another month. Please note the new mailing address.

The last dates for mail to arrive at my PO Box are: May 17, June 21 and July 19

## DECODE

Mike Richards G4WNC

200 Christchurch Road, Ringwood, Hants BH24 3AS

I'll start this month with a new subject, aircraft flight plans and SELCALs. No, this is not a take over of the Airband column but some interesting information can be received using RTTY on the h.f. bands. According to a letter I received from John Davies there are an assortment of stations out there sending aircraft flight plans and other details. The stations involved are often listed as airports i.e. Cairo Air.

Whilst idling these stations are usually left either sending continuous RYs or a constant carrier. The biggest problem with the stations is finding the schedule and therefore working out the transmission times.

As to the transmission mode, this is normally 50 baud with either 170Hz or 425Hz shift, so that should present no particular problem. Two stations which are thought to be active with this information are: Santa Maria Air (CSY) on 14.498MHz and Cairo Air (SUC) on 10.635MHz.

If any of you have received schedules for h.f. air stations then I would be very pleased to hear from you.

## ASCII

Colyn Brookes from Cape Town has sent me an interesting letter describing his station and interests. Colyn, a UK ex-patriot, is a licensed amateur with a particular interest in listening to RTTY where a HAL ST-6000 terminal unit and a HAL DS-3000 KSR teletype are employed. In addition to this he has a Commodore C-64C computer, but apparently the software is very expensive in South Africa. All this is fed from a NRD 515 receiver. Colyn also employs an old "Teletype 33" which runs 110 baud ASCII only!

This brings me nicely on to yet another request. After asking for information on regular ASCII transmissions last year I received details of several amateur transmissions, but sadly no commercials. Does anyone have details of any commercial ASCII transmissions? If so please drop me a line and I will publish them.

To continue with Colyn's story, he is also President/Treasurer of

the 34 DX Club which derives its name from the fact that they are all situated on the 34 degree parallel. Although the club is still very small they publish their own News Letter with details of all forms of short wave listening including RTTY.

## BARTG Spring h.f. Contest

Did any of you enter this contest on March 19/20 as short wave listeners? I was intending to enter but had already been booked by my local radio club to help out with an Open Day designed to encourage new blood into the hobby. All was not lost as I took along most of my station for demonstration purposes.

The band conditions for the contest seemed to be quite good, though it is always difficult to be sure when using an unfamiliar antenna system. The antenna system in this case comprising a half size G5RV using a co-axial feeder which had been hurriedly assembled and was only really effective on 14MHz and above. My monitoring showed a very high level of activity on 14MHz, though it was difficult to find any DX amongst all the high powered European signals. The most interesting band was 28MHz which was wide open in the afternoon. I worked A22BW (United Arab Emirates) and heard 3C1MB (Equatorial Guinea) and PP (Brazil) amongst others so there should be some high scores about. If you had any interesting experiences or would perhaps like to know more about contests then please let me know.

## Amstrad PCW

Although I have mentioned this computer several times I think it would be useful to clarify the situation with regard to radio software. First RTTY/ASCII, the only dedicated software that I am aware of is that sold by BARTG which enables the PCW to send and receive both RTTY and ASCII providing an Amstrad compatible serial interface and a suitable terminal unit is used. The alternative is to use an intelligent

terminal unit such as the AEA PK-323 or Kantronics KAM. When using an intelligent terminal unit the MAIL 232 communications package supplied with the computer can be used as a driver. If you require some more sophisticated software then I suggest you contact the Public Domain Software Library who can supply a communications package specially adapted for the Amstrad. This package, particularly MEX, provides a very comprehensive communications system when used with an intelligent terminal unit.

With regard to packet radio operation this is only possible by using a serial interface and a dedicated TNC (Terminal Node Controller) or again the intelligent terminal unit. If you know different then please let me know.

## Report Formats

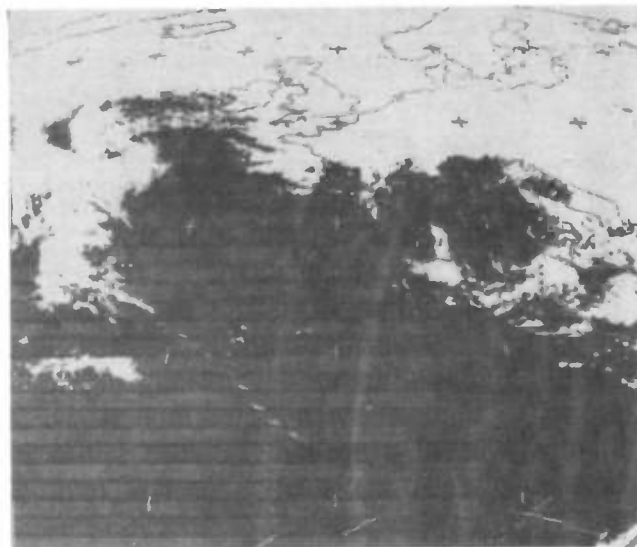
Glynn John Hather has written asking what format he should use when compiling reports for inclusion in the column. Well, generally the more information you can give the better but here are the important points: frequency, mode, speed, shift, callsign and time. If there is anything particularly interesting about the transmission then a short note is always appreciated.

Glynn continues his letter with a brief description of his RTTY station which comprises a Sony ICF-7600D feeding a Microwave Modules RTTY to TV converter.

## RTTY Mailboxes

Another question asked by Glynn John Hather was what are RTTY mailboxes and how are they used? These mailboxes are run by amateurs and normally comprise a computer system with disk storage and suitable software which is coupled to a standard RTTY station. Both the computer and radio station are usually left running 24 hours a day. The main use of the system is to enable amateurs to leave messages for other amateurs.

The mailbox is accessed by typing the mailbox callsign followed by your own callsign. Once the mailbox has received your call it searches its memory to see if there are any messages waiting for you. If it finds a message, it will tell you and give you the option of reading or storing the message. Once you have dealt with the outstanding messages you can then enter your own messages. Although this may sound complicated, mailboxes are actually very easy to use as you just follow the instructions and prompts given to you by the



Rome Meteo satellite picture.

# SEEN & HEARD

mailbox. Some mailboxes will allow you to look through an assortment of files which are often filled with allsorts of useful information, e.g. modifications to rigs.

## RTTY Frequency Lists

Jan Nieuwenhuis (The Netherlands) has discovered the English schedule of the Kyodo News Service from Japan.

Time (UTC)	Callsign	Freq (kHz)	Zone
0000-0100	JAE 58	8175	Asia
0240-0410	JAE 58	8175	Asia
0240-0410	JAQ 57	17598	Asia
0250-0320	JAN 50	10795	Seoul
0430-0600	JAL 32	12070	USA
0430-0600	JAQ 57	17598	Asia
0430-0600	JAL 82	12275	Asia
0430-0600	9VF 233	20960	Singapore
0430-0600	JAN 50	10795	Seoul
0610-0630	JAN 50	10795	Seoul
0610-0640	JAL 32	12070	USA
0610-0640	JAQ 57	17598	Asia
0610-0640	JAL 82	12275	Asia
0610-0640	9VF 233	20960	Singapore
0720-0820	JAL 44	14548	Europe
0720-0820	JAL 82	12275	Asia
0720-0820	JAG 50	10795	Seoul
0830-0950	JAB 35	5098	Seoul
1000-1100	JAL 44	14548	Europe
1000-1100	JAL 82	12275	Asia
1000-1100	JAB 35	5098	Seoul
1000-1100	9VF 233	20960	Singapore
1220-1250	JAE 58	8175	Asia

Some other stations that have been logged recently by various readers may be useful to others. They are:

- 2.474MHz RTTY 75/425 PBC32 Holland.
- 4.002MHz RTTY 50/425 YRR2 Bucharest Meteo.
- 5.195MHz RTTY 50/425 Y2V 53 ADN Berlin News.
- 6.817MHz RTTY 50/425 English News.
- 10.214MHz RTTY 50 EPD Tahrain Air.

## FAX

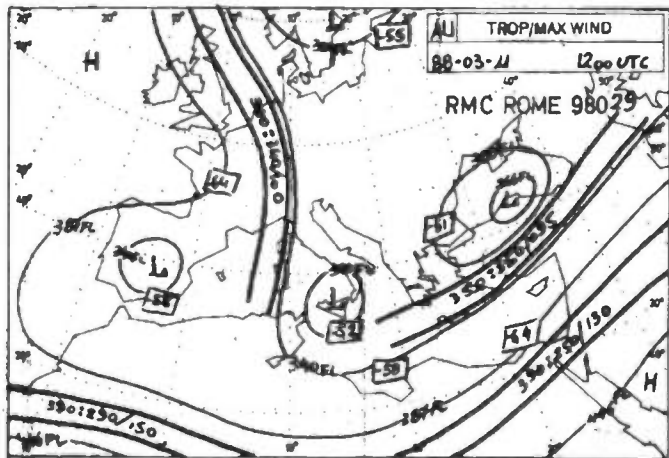
Does anyone know a source of 8½in wide high-quality roll paper with perforations? Ivor Cooper needs it for his Info Tech FAX decoder. Apparently Info Tech recommend a polished pure white paper, but not Teletype roll paper and he hasn't a clue where to start looking, any suggestions?

It would seem that Rome Meteo IMB 56 on 13.597MHz has changed its schedule. It now transmits a satellite picture at 1745, if anyone has a copy of the latest schedule I would be pleased to hear from them.

Another good station to look out for is Nairobi Met (5YE) on 11.127MHz. They transmit information on the Indian Ocean

area at around 1700. Russian text can be seen from Kiyev Meteo (RPN 75) on 4.525MHz at around

1940. Many thanks to Jan Nieuwenhuis for most of this information.



Rome Meteo on 13597.4kHz at 1730.

The last dates for mail to arrive is  
May 17, June 21 and July 19

## INFO IN ORBIT

Pat Gowen G3IOR

17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD

## Project Nodski Comm

The joint Canadian-Russian North Pole all amateur radio ski-trip should be nearing the Pole by the time this column is in print. The base camp Canadian Resolute North West Territory and the USSR Cape Artichevsky Severnaya Zemlya stations have been active both on h.f. and the satellites, with C18C, C18HO, EXODR, EXOCR and VO1SA/UAO all putting in good signals. Additional polar stations active in the expedition are 4KOC on North Pole 28, an ice island, and EXODR on Dixon Island. Look on 14.182 and 14.125MHz for h.f. activity and around 29.420-29.430MHz for signals via RS-11.

As planned, the COSPAS/SARSAT navigational satellite doppler tracked position from the parties emergency location transmitter is passed on 14.182MHz to G3IOR from EXOCR daily, from where it is passed to GO/PA3BHF and G3YJO at the University of Surrey. They then place it onto the packet radio bulletin boards and the 145.825MHz UoSAT-OSCAR-11 'Digitalker'. As the satellite performs the polar pass, the information "spoken" by the

satellite is taken for the expedition by member Laurie Dexter VE8LD, on his tiny Icom hand-held. Then he knows the moving group position, as do the many enthusiasts now following the expedition all over the world.

Table 1 gives a few suggested times when readers in the UK might like to listen to OSCAR-11. It will be close to overhead and easily read on a modest antenna. It is recommended that listening should commence up to ten minutes before the times given, as dramatic increases in solar flux are likely. This could expand the earth's atmosphere sufficiently to cause an increase in drag, bringing the satellite to a lower, shorter period orbit, and arriving earlier than the predictions.

Many hundreds of schools and

individual enthusiasts are involved in tracking the expedition. Several reports have come in from frustrated would-be-listeners who are having the satellite transmissions wiped out by inconsiderate amateur stations using the space band for local contacts, contrary to IARU agreements. If any reader should experience this outrageous behaviour, please report the call sign, date and time heard to the RSSGB and/or G3AAJ of AMSAT-UK.

## Help Line

Shaun Smith writes to ask if any weather satellite fans can help him locating any computer programs for the Commodore-64 that will enable him to decode and display amateur and weather satellite

information. He has been disappointed to find that, despite all attempts, he has only so far able to trace programs for the BBC and Amstrad computers. "This seems very surprising, in view of the excellent graphics capability of the C-64," says Shaun. If any reader can help him, who has performed or knows of any "translations" of alternative computer programs for his computer, please write to him at 12 Westparade, Warminster, Wiltshire BA12 8LY.

Leslie Sargent uses a Yaesu FRG-7700 communications receiver with a FRG-VHF converter, allowing him to explore from 118 to 150.63MHz. He has been hearing satellites on the following frequencies...

149.994 149.975 149.979  
149.984 145.989 150.021  
150.023 150.024 150.026  
150.029 150.035 150.037  
150.039 150.039 150.042 (all frequencies in MHz)

Leslie wonders if any readers are able to identify these satellites, their identification, mode, etc. Leslie lives at 2 Bartlegate Close, Brookvale, Phase 2, Runcorn, Cheshire WA7 6BX.

Many readers have written in complaining of a new source of

## UoSAT-2/OSCAR-11 near to overhead for the UK

Day	Date	Times when closest to overhead pass			
Saturday	April 30	1041	1220	2014	2152UTC
Sunday	May 1	0941	1119	1915	2051UTC
Monday	May 2	1019	1157	1952	2129UTC
Tuesday	May 3	0920	1057	1854	2029UTC
Wednesday	May 4	0957	1135	1931	2107UTC
Thursday	May 5	1035	1213	2005	2144UTC
Friday	May 6	0935	1113	1909	2044UTC

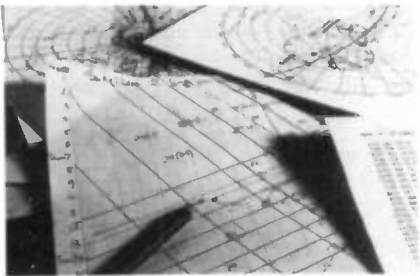


Fig. 1: A different way of predicting orbits.



Fig. 2: The station at Howard Barnes home.

interference blocking their ability to receive weathersats. Investigation has shown that the vast majority of these problems emanate from British Telecom and Mercury telephone paging systems that use frequencies only just above 138MHz. These signals are very strong, often well above 100dB over the satellite signals only 250kHz lower, as they run high power from elevated antennas, intended to give adequate and maximum coverage to mobile telephone systems.

Such signals in close proximity can totally block satellite reception by overdrive and blocking of the first r.f. stage. These signals also overcome the selectivity of the intermediate frequency stages, particularly when these are wide band, e.g. up to 60kHz wide for the NOAA satellites. Although the bandwidth of the Soviet Meteor satellites is less, they are in fact much closer to 138MHz, so all weather picture sources can be critically effected.

A number of remedies may be sought, one or all of which should be effective. First, a Faraday screen mesh reflector could be placed on that side of the effected antenna, i.e. in line with the paging signal, to reduce the capture lobes from the low angle interfering source. This would permit the receiving antenna lobes to "see" the satellite at high elevation angles, but substantially reduce the blocking signal.

Any vertical satellite receiving antenna, or one with any major vertical component will be effected far more than a horizontally polarised system,

such as a "turnstile" (crossed dipoles) as the problem signals are strongly vertically polarised. Circularly polarised crossed dipoles that nevertheless exhibit pure horizontal polarisation off the sides at low angles should be employed, preferably with a reflector below to minimise the low angle lobes that would otherwise capture the undesired signal. (Such an antenna was described in this column in the June 1987 issue). Great care should be taken to ensure minimum s.w.r. so that the coaxial down line does not act as part of the antenna system.

A cavity low-pass filter as depicted in some v.h.f./u.h.f. handbooks could be tried in the antenna line. With critical adjustment should reduce the source of the problem by at least 40dB without sufferance of the bandwidth needed for the satellite signal resolution.

A further method is to re-design the i.f. filter of the satellite receiver, using a well tuned crystal filter with sharp sides, as used for s.s.b. transceivers. Of course, it needs to be substantially wider than the 2.7kHz in the conventional circuit. Circuits for these will be found in most technical handbooks dealing with amateur radio receiver techniques and only require a recalculation of the crystal frequency spacing to give the bandwidth needed, with a

sharp fall off at the i.f. equivalent of the local oscillator frequency less 138MHz.

## Ground Stations

Howard Barnes of Wivenhoe, near Colchester has sent in some photographs of his satellite station. The first, Fig. 1, shows the sum total of his prediction apparatus, consisting of two AMSAT-UK derived "Oscars", a table of predictions from the Remote Imaging Group newsletter, a pad of graph paper and a pencil. Howard points out that only a few days observation of any particular satellite enables one to enter times on a daily calendar in such a way that a grid of times will accurately predict the future passes for several weeks ahead. "I hit on this idea after remembering seeing a page of Kepler's note books," says Howard, "A recent *Oscar News* describes the same method, in an article by Geoff Perry". (This involves plotting the time heard vertically on graph paper against the day date on the horizontal axis, when a dropping sloping line will appear on joining the marks vertically, an extension of which will give future appearances).

You can try his method by using Fig. 1 for OSCAR-11 to give future predictions. The sloping chart lines from April 30 to May 4 will result, and on May 5 and 6 a new pass comes into our window from the

"right", the older having slipped below our horizon. Note that the passes come some 22 minutes earlier on alternate days and that after 5 days the passes almost repeat, coming just some 6 minutes earlier. Most certainly, one does NOT need a computer to predict satellite appearances!

Howard's current set-up is shown in Fig. 2. The monitor is a new Philips 12in, made for desktop publishing with a white screen giving a high resolution image with a good scale of greys. The rest of the system comes from Maplin. The receiver is a fully tuneable (by Varicap diode, tuned by a slow motion dial and potentiometer) single conversion superhet with no phase lock loop. It is found to be far less susceptible to interference than the original dual conversion with p.l.i. and permits tuning over the whole band.

Howard uses a microprocessor controlled 64-pin diode video i.c. made by Yamaha for a video store which, whilst rather expensive, takes the uncertainty out of construction. The display consists of 212 lines, after which the picture is re-written from the bottom. He has no north-south reversal switch, but does not find this to be disadvantageous. He finds NOAA pictures to be very good, but prefers the USSR Meteor satellites as they are less demanding in all respects. They have only 30kHz bandwidth (compared with 50kHz for NOAA), have less modulation to cope with and permit recording on a simple cassette recorder. This is not the case with NOAA, as the wider bandwidth requires a "Hi-Fi" approach!

The characteristic distortion from the raw unprocessed radiometer image is evident, appearing, as Howard says, . . . "as though there were two observers on the satellite back to back, each looking at opposite horizons . . ." The explanation and reasons for this will appear in our next column, as although the space for satellites may seem limitless, it is not so in the context of our column length!

The last dates for mail to arrive is:  
May 17, June 21 and July 19

## BAND II DX

Ron Ham

Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

It is almost certain that we will see the start of the 1988 Sporadic-E season sometime during May. It should then be possible, during the peak of an intense disturbance, to receive signals in Band II from stations in countries ranging from North Africa to Iceland. At the same time, it is likely that television sound from the USSR on Chs. R4 (91.75MHz) and R5 (99.75MHz) and strong f.m. transmissions from broadcasting

networks in Bulgaria, Czechoslovakia, Hungary, Poland and Romania will be heard in the UK. These f.m. transmissions normally operate between 66 and 73MHz.

Look out for DX and don't be too surprised at what you hear during a spell of Sporadic-E. It is well known that some of the massive disturbances which occur in June and July can create varying degrees of havoc from 20 to 150MHz.

## Early Warning

During the summer months it is worth dedicating a button on a scanning receiver to the R1 vision frequency (49.75MHz). When television synchronising pulses appear on this channel, you will know that Sporadic-E is present. Take note of the signal strength and when these pulses becomes very strong it is time to carefully tune through Band II looking for

programmes from Italy, Spain and the USSR. If possible, try and get some idents which can be passed on, through this column, to fellow enthusiasts.

## Meteor Scatter

I also suggest that readers with scanning receivers should tune one of their pre-sets to 70.31MHz and patiently listen for tiny "pings" of speech or music being

# SEEN & HEARD

transmitted by the Polish broadcast station at Gdansk. These "pings" will suddenly burst above the receiver's background noise. Random "pings" are frequently heard and these numbers are expected to show a marked increase in May, especially around the 5th and 13th when the earth, on its orbit around the sun, encounters the Aquarids and Scorpiids meteor showers.

Incidentally, signals from Gdansk sound like a low-pitched "burble" when reflected from an auroral event. They usually have exceptional strength, coupled with deep and sharp fading, throughout the life-time of a Sporadic-E disturbance.

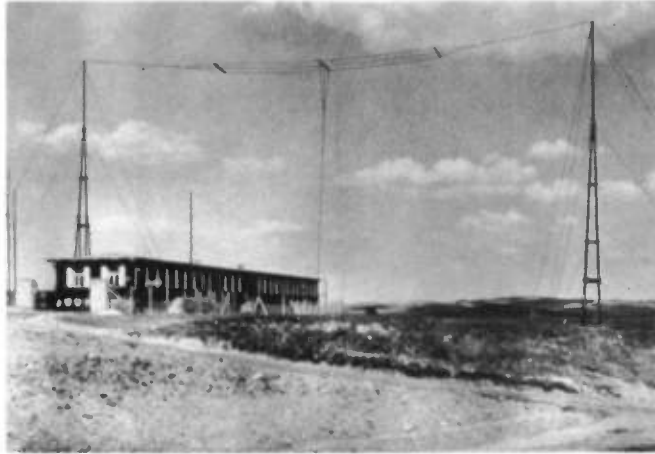


Fig. 1: German QSL card received by Tim Shirley.

## Reports

In Bristol, **Tim Shirley** listened to BBC Radio Manchester from 0700 to 0730 on February 25 and BBC Radio Leeds during the mid-afternoon of the 27th. He also heard signals from Belgium at 1800 on the 26th and Germany (Saarlandischer Rundfunk) on 88MHz at 0100 on the 28th. "My best catch was RTBF on 102.7MHz," said Tim. His report to the German station, SR 1, was acknowledged with their QSL card.

The last dates for mail to arrive is:  
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Fig. 1, Tim has Realistic, Trio and Vega receivers and for Band II he uses a 7-element rotatable beam.

I know that many of you are interested in keeping weather records especially as this subject is so closely allied to the propagation of signals in Band II. On a recent visit to a local garden centre

I noticed various types of simple rain-gauges costing less than £5. The one I selected, Fig. 2, is supplied with mounting bracket which I fitted to a 2m length of antenna boom. This now protrudes from our lawn in a position that is clear of unwanted water sources such as trees or roof



Fig. 2: The author's recently purchased rain gauge.

spans. This type of rain-gauge is ready calibrated and easy to use so it is just a matter of logging the reading, at a fixed time each day and not forgetting to empty it.

I am always pleased to hear from readers with details about their weather stations and observations.

## TELEVISION

Ron Ham

Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

**John Raleigh** (Bedford) saw a "quick flash" of picture from the USSR at 1400 on March 7. "I just recognised the announcer, this station normally has the logo '1 NPORPAMMA'," said John. He also logged pictures from Belgium (RTBF) on Ch. E3 and Holland (PTT-NED 1) Ch. E4 at midday on about 12 of the days between February 15 and March 14. "That Russian station is just a short glimpse of things to come," he remarked. Let's hope so John, or these pages will be empty.

## Tropospheric

"G8PYP alerted me to a good lift on 144MHz which had been going since early morning on February 14," said Ian Galpin. He checked Band III and at 1120 logged French TV on Channels L5 and L8 and identified some as coming from the Dieppe area. He received weak pictures from France again at 1514 on the 22nd.

While in Laurencekirk on the 20th, **George Garden** noted that his barometer was really high (30.5in) and reacted by taking his JVC 610GB receiver to his favourite local high spot, Cairn O' Mouth. At 1700, with a vertical

rod antenna, he saw Border News in good colour from Border TV on Ch. 23. After a series of checks and getting poor results with a horizontal antenna, he realised that this signal was coming from the vertically polarised 2kW transmitter at Eyemouth on the coast near Berwick on Tweed. George also found a bit of u.h.f. DX during the afternoon of March 5 and as it was snowing he stayed indoors and logged a few black and white pics at his station, Fig. 11, in an upstairs room.

The Mancinis received pictures in Band III from Belgium (BRT TV-1 and RTBF-1) on February 22, sometimes spasmodic pictures from France (Canal +) on the 10th, 11th, 16th and 22nd and test-cards from Ireland (RTE 1) on the 11th, 16th and 19th. They also watched the Winter Olympics and ice hockey from RTE-2 on the 19th and football from RTE-1 on the 20th.

Simon Hamer logged test cards from Belgium in Band III as well as France (TDF) and Holland (PTT NED 1 and 2) in the u.h.f. band on February 21. He gave a similar report, plus the reception of Luxembourg (RTL Plus) on Ch. E7 and the French A2, TF1 and FR3

networks, from Dunkirk on March 9. To add to the fun of DXing he watched the programmes *Planet Earth* and *Junkyard News* on RTE 1 and 2 respectively.

John Raleigh checks Band III between 1300 and 1400 on most days and received signals from France (Canal +), Chs. L5 and 9, on February 15, 15, 22, 23, 24, 26, 27, 29, March 1, 2, 6, 8, 9, 10, 11 and 12. He also saw Belgium (RTBF 1), Ch. E8, on most of those days after the 20th, but (BRT), Ch. E10, only appeared on February 21, 22, 25, 26 and 27.

## News From India

"To date this year we have had just 4 tropo-openings," wrote Lt. Col. **Rana Roy** (Meerut) on February 19. Rana received excellent pictures, in colour from Pakistan in Band III on Chs. 5 and 10, Figs. 9 and 10, throughout the morning of January 1 and early on the 31st. He watched a "keep fit" programme, followed by the news in English from Jalandur TV on Ch. 9. At 0935 on February 5, he saw prayers on the Lahore station, Ch. 5, of Pakistan TV and before this event faded, at 1030. He had

logged programmes for schools on Chs. 9 and 12 from the low power transmitters at Agra and Bathinda. "Doordarshan is planning to set up 45 u.h.f. transmitters which are being manufactured by Bharat Electronics Ltd in Hyderabad, who also provided six colour TV o.b. vans which were used during the World Cup Cricket," said Rana. He added, "Arunachal Pradesh will have 16 very low powered TV relay centres functional by March 1989." Rana told me that six are already established at Along, Bomdilla, Namsai, Seppa, Towang and Ziro and by now they should be operational.

## SSTV

During the month prior to March 3, **Les Hobson GOGUI** (Rotherham) exchanged 8 seconds slow scan pictures with stations in Austria, Brazil, Italy, Spain and South Africa on 14MHz. On the 6th he worked 5 stations in England, 2 in Wales and 1 in Scotland on 3.5MHz. Les, whose first time SSTV QSOs now number 251, tells me that GOAZX is organising a net for 1600 on Sundays and would welcome a call on this band with 8 seconds b/w pictures, from

# SEEN & HEARD

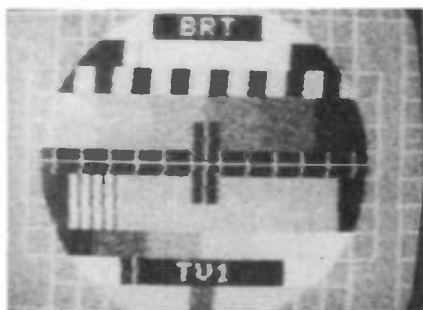


Fig. 1: Belgium



Fig. 2: Denmark

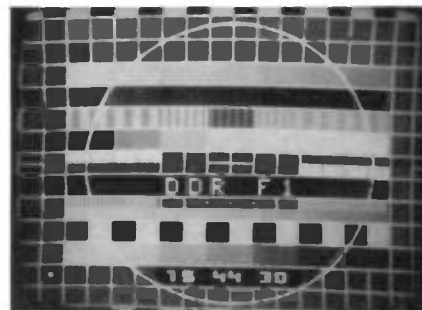


Fig. 3: East Germany

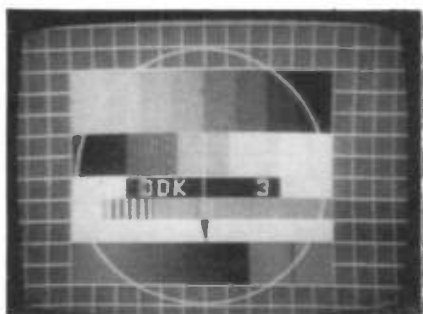


Fig. 4: Czechoslovakia



Fig. 5: West Germany



Fig. 6: West Germany

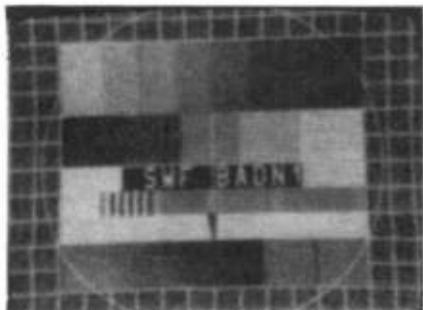


Fig. 7: West Germany

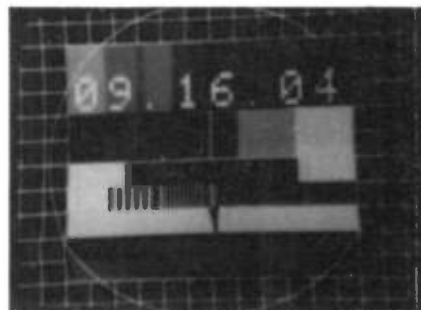


Fig. 8: West Germany



Fig. 9: Lahore



Fig. 10: Bhawalpur

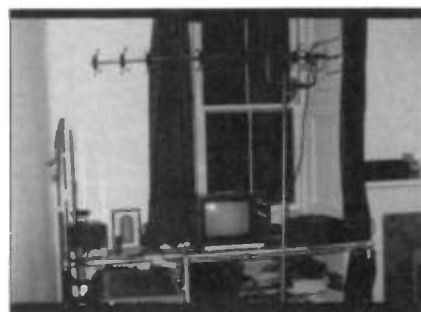


Fig. 11



Fig. 12

anyone wishing to take part.

At his QTH in Rhayader, Bert Mills GW3LUP produced a picture of Simon Hamer, with our sister magazine *Practical Wireless*, Fig. 12, while showing him a new development of his home-brew SSTV gear.

Further to the television pictures, Figs. 2 and 3 published in the March issue, John Coulter (Winchester) suggests that the former is of Scandinavian origin and the latter is Greek. He says that "Halvfem" (half past four) seen at the bottom left of Fig. 2 is the same in all three Scandinavian languages.

From Denmark, Erik Koie says

that Fig. 2 is from Sweden 1, nowadays called KANAL 1 and that Fig. 3 is most likely to have come from Greece.

"Fig. 2 is a Swedish TV clock caption," said Ian Galpin G1SMD from Poole.

"Fig. 2 is Sweden," say Edwina and Tony Mancini from Belper.

Not much doubt about that now and my thanks to all for the gen because such information is always valuable to the DXer, especially when only a glimpse of a caption or logo is seen.

Before I start filling these pages with reports about the 1988 Sporadic-E season, let's use my picture space this month to give

new readers a chance to see some of the television signals received, in Band III, during some of the 1987 tropospheric disturbances.

Early in the year, I logged test cards from Belgium (Fig. 1) and Denmark (Fig. 2). Garry Smith (Derby), received test patterns from East Germany (Fig. 3) and in November, a rare one, Czechoslovakia (Fig. 4) on Ch. R10. Signals from West Germany are

often received in many parts of the UK when the troposphere is open as Peter Lincoln (Aldershot) and Noel Smythe (Caerphilly) found when Figs. 5 and 6 and 7 and 8, respectively, appeared on their screens. Peter referred to "the amazing strength" of the pictures he logged and Noel said that SWF BADN (Fig. 7) was being "knocked" by a signal from Switzerland and that Hessischer

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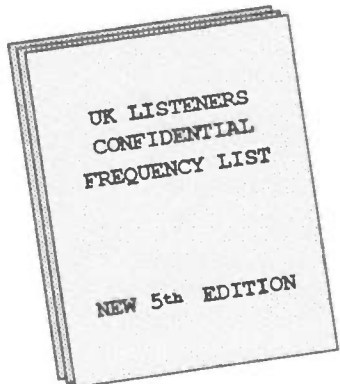
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Runfunk (Hr 1) (Fig. 8) was "coming in all day" on August 31.

Edwina and Tony Mancini recently added a Grundig 265RC video recorder to their station to match their Grundig multi-system receiver. This enables them, at the touch of a button, to record any system that comes up. Sounds good to me and it should add a great deal more to your enjoyment

of TVDXing during the forthcoming Sporadic-E season.

## Band I

Ian Galpin, using a JVC 3040 multiband receiver and dipole antenna for Band I, logged a burst of picture via meteor scatter from

Poland on Ch. R1 at 2043 on February 4. He also heard synchronising pulses for several minutes on Chs. E2 and R1 at 1926 on the 6th, many good bursts of m.s. pictures on these channels between 1300 and 1500 on the 17th and, using his FT-690R and dipole, heard a very strong TV carrier on 53.75MHz, via aurora, during the early

evening on the 22nd.

In New Radnor, Simon Hamer received mainly test cards from Sweden (SVT Kanal 1 Sverige) on March 1 and 9, Iceland (RUV Island) and the USSR on the 3rd, Czechoslovakia (RS-KH), Norway (Norge Gulen) on the 4th, Denmark (DR Danmark) on the 5th and Czechoslovakia and Poland on the 7th.

## LONG MEDIUM & SHORT

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

If you intend to take a holiday abroad, taking a portable with you will be very rewarding since a whole new range of broadcasts will be at your finger tips. No doubt you will soon discover just how well the BBC World Service and other broadcasts reach that distant location. Be sure to compile a simple log and send it along to me so that other DXers may have some idea of the type of reception to expect when they go on holiday.

### Long Wave DX

(Note: l.w. and m.w. frequencies in kHz, s.w. in MHz: Time UTC.)

When the second stage of the new l.w. band plan was implemented last February, all but one of the broadcasters affected moved to their new operating frequencies so as to continue the 9kHz spacing introduced below 200kHz in the first part of the plan in February '86. At the time of going to press Radio Monte-Carlo, Monaco have still not complied with the plan and their broadcasts via Roumoules (1400kW) continue on 218. It is not clear why this situation exists but, by continuing to operate 2kHz off the frequency of 216 nominated in the new plan, two undesirable effects have arisen. These are a potent 2kHz heterodyne whistle that arises when their signal beats with the broadcasts from Norway via Oslo (200kW) now on 216 and their upper sideband now interferes with the lower sideband of the broadcasts from Warsaw, Poland via Konstantinow (2000kW) now on 225.

The broadcasts from Radio Monte Carlo are audible for much of the day in the UK and the 2kHz heterodyne whistle is evident between 216 and 218 when the broadcasts from Norway cross our shores. Writing from Newcastle, Glen Davison says he could hear the heterodyne with his receiver tuned anywhere between 214.5 and 222kHz, but the intensity of it varied with time of day.

Although Glen rated the signal from Oslo as 33352 during a

check at 1850, he says that in general their transmission does not reach him at all well during the day. In contrast the signal from Kalundborg, Denmark on 245 (300kW) is a comfortable 44454 during the day; similarly those from Montala, Sweden on 189 (300kW) rate as 43454. The poorer "I" rating is due to adjacent channel interference from Saarlouis, W. Germany on 183, but it is not bad.

The report from David Edwardson in Wallsend also mentioned the 216/218kHz situation. He found that he could hear either Oslo or Roumoules provided he used the "narrow" (2.7kHz) i.f. filter position on his Trio R600. However, such a narrow bandwidth severely restricts the audio response of the demodulated signals.

Because the sensitivity of the Trio R600 receiver is rather poor on the l.w. band, David employs a PW "Taw" i.f. converter ahead of his receiver to improve the performance. He compiled his log for the chart by using this combination with a home-built l.w. loop measuring 0.25m by 0.25m and consisting of 55 turns of 22 s.w.g. wire — see Fig. 1.

While tuning around the l.w. band one Saturday evening at 2120 David noticed that many of the stations were broadcasting the same type of programme. Allouis 162, Saarlouis 183, Roumoules 218 and Junglinster 234 were all carrying reports on the various football matches played in the French leagues. A commentary on Olympic ice-hockey could be heard via Konstantinow 225, Lahati 254 and Topolna 272. In contrast Kaliningrad 171, Moscow 263 and Minsk 281 were broadcasting a piano recital from the USSR.

A Vega Selena B210 portable enabled George Millmore to compile an interesting log for the chart in Wootton, Isle of Wight during daylight. He found the internal ferrite rod antenna useful for separating Lahti, Finland and Tipiza, Algeria on 254. In Coventry, Alan Taylor compiled

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

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

his list for the chart between 1600 and 1700 while using a "Sooper Loop" with a "Car Radio Signal Booster" (PW, March '87) ahead of his Realistic DX302 portable.

Writing from Great Missenden, Howard Newell has been writing to several of the French speaking l.w. broadcasters and requesting their QSL. So far he has received a letter from France-Inter confirming reception of their broadcasts via Allouis on 162. He now awaits verification from Europe No. 1 (183); RT Luxembourg (234); Radio Monte-Carlo (218) and RT Algerienne (254). Howard uses a Matsui MR-4099 portable with just the built-in antenna when checking the l.w. band.

A QSL card from Europe No. 1 has been received by Colin Godwin in Malvern to confirm his reception of their broadcasts via Saarlouis, W. Germany (2000kW) on 183. Colin used either a Vega 215 portable or a Trio R600 receiver to search the band.

### MW Transatlantic DX

Using an RCA AR77 receiver in Grimsby, Jim Willett made the earliest entry in his report at 2359, when he heard CJYQ in St.

DXers:

- (A) David Edwardson, Wallsend
- (B) G. Glen-Davison, Newcastle-on-Tyne.
- (C) David Hackwell, Warrington.
- (D) P. Hawkyard, Newcastle-on-Tyne.
- (E) Alex Mackow, London.
- (F) George Millmore, Wootton, IOW
- (G) Howard Newell, Great Missenden.
- (H) Philip Rambaut, Macclesfield.
- (I) Robert Taylor, Edinburgh.
- (J) N. Wheatley, Newcastle-on-Tyne.

John's, Newfoundland on 930. Jim says he was surprised by the distinct lack of signals from the Caribbean area and Central America. However, that must have been a feature of the conditions prevailing during the nights he checked the band because the Caribbean Beacon, Anguilla 1610 was logged before midnight by several DXers including Christopher Dane. He rated their signal in Middlesbrough as SIO 233 at 2248.

Christopher has strung a random wire antenna around the loft space with an a.t.u. Having coupled it to his Grundig Satellit 650 receiver he tried m.w. transatlantic DXing and was delighted to log twelve stations. The strongest signal stemmed from WSSH in Boston, MS on 1510, which rated as SIO 322 at 0039.

The Caribbean Beacon, Anguilla 1610 was also heard by Howard Newell at 0035. Howard uses a



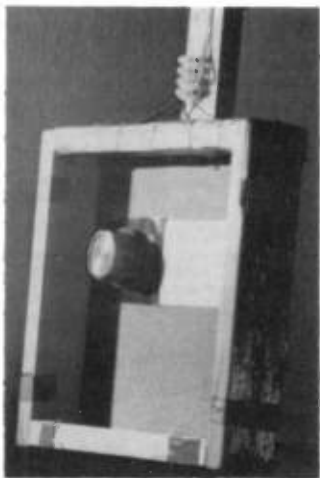


Fig. 1: D. Edwardson's I.w. loop. loop with his Matsui MR-4099 portable. During the month he added another transatlantic station, VOXM in St. John's, Newfoundland on 570 at 0150.

The Atlantic Beacon, Turks and Caicos Islands on 1570 was heard by Tim Shirley in Bristol at 2300. Using a Trio R600 receiver with a home-made loop antenna, Tim logged several stations in Canada and the USA. At 0130 he logged Roseau, Dominica on 1210 for the first time and is now awaiting their QSL.

Not all DXers have been quite so lucky, this may be due to the high level of electrical noise which exists in many of the major cities and towns in the UK. Writing from Coventry, Alan Taylor says that has been his problem recently, consequently he could only hear CJYQ in St. John's, Newfoundland 930 on the odd occasion.

Reporting from George, S. Africa Dick Moon says that the static levels were low enough one night to enable him to try some m.w. transatlantic DXing for a change. He picked up a number of broadcasts from Argentina, Brazil and Uruguay. Dick says that many of the signals from the S. American stations are loud and clear in George, but it is very difficult to hear any from N. America. However it seems that DXers in the Cape Town area find the reverse is true!

## Other MW DX

The broadcasts of the Italian Radio 2 programme via the 540kW transmitter in Rome, Italy on 846 were received in S. Africa by Dick Moon at night, although no other European signals were heard. Their signals have also been reaching the UK well during the early evening. Phil Townsend rated them as SIO 333 in London at dusk and by 1950 they peaked to 444.

However at 2005 a rapid waning effect was observed and the rating fell to SIO 422. It would be interesting to know if other DXers have observed this effect.

The broadcasts from Torshavn on the remote Faroe Islands 531 (5kW) are seldom mentioned by DXers, although they may be audible in the UK at times. They will confirm reception reports by letter. Listening in New Radnor, Simon Hamer recently picked up their station announcement "Utvarp Foroya" in New Radnor at 2100.

Some of the broadcasts by RNE in Spain become audible in the UK at night via sky wave paths. Using an Eddystone 680X receiver in Tunbridge Wells, Darran Taplin rated the signal from RNE-1 via Madrid on 585 as SINPO 54444 at 1959 and via La Coruna on 639 as 53434 at 2000. La Coruna 639 was also logged by Howard Newell at 2210, who also heard RNE-1 via Barcelona on 738 at 2130.

Using a Matsui MR-4099 portable with just the built-in antenna in Newhaven, Martin Andrews listens to some of the broadcasts at night from Europe and N. Africa. The programmes from Alger, Algeria 981 between 1900 and 2000 usually rate as SINPO 44444. He tunes into the daily broadcasts from Radio Mediterranean via Cyclops, Malta on 1557 at 2230. On Sundays he listens to *Radio World* by BRT via Wolveterm, Belgium on 1512. He says, "this programme is full of information for the DXer".

The broadcasts from Alger, Algeria 981 were also mentioned in the report from John Evans, but he can receive them during daylight as his location in Shawforth is some 365m a.s.l. on top of the Pennines! Using a Vega 206 portable he rated their signal as SIO 333 at 1245. The broadcasts from Manx Radio, Isle of Man 1368 also reach him via ground wave paths during daylight at SIO 333, whereas their signals are inaudible until after dark in many areas of the UK. John also checked the band at night and logged AFN Frankfurt, W. Germany 873 as SIO 444 at 2147; Milan, Italy 900 as 433 at 2155; Monte-Carlo, Monaco 1467 as 434 at 2245 and Langenberg, W. Germany 1593 as 444 at 2227.

Using a Sony ICF-7600D portable with the internal antenna in London, Alex Mackow often listens to *Programme 2*, broadcast via Katowice, Poland (1500kW) on 1080. He rated their signal as 23333 at 2011. Other broadcasts noted during the evening stemmed from Zagreb, Yugoslavia 1134; Prague, Czechoslovakia 1233; Valencia, Spain 1260; Rome, Italy 1332; Wien-Bisamberg, Austria 1476 and Sarnen, Switzerland 1566.

Scandinavian broadcasts reach Edinburgh well after dark, Robert Taylor rated the signals from Vigra, Norway 630; Pori, Finland 963; Kalundborg, Denmark 1062; Solvesborg, Sweden 1179

and Kvitsoy, Norway 1314 as SIO 444.

Three broadcasters who employ 1000kW transmitters were mentioned by Ken Whayman in Bexleyheath. He rated the signal from Radio Tirana via Lushnje, Albania 1395 as 43444 at 2250; TWR Monte-Carlo, Monaco 1467 as 54444 at 2315 and Radio Moscow via Kaliningrad, USSR 1386 as 54555 at 2258.

Listening in Eyemouth at 0030, David Middlemiss received Radio Moscow via Kaliningrad, USSR (150kW) on 1143, answering listeners' letters in English. During the day he heard two broadcasts from S. Ireland, RTE-1 via Tullamore 567 and RTE-2 via Dublin 1278. He also picked up BBC Radio Ulster via their 1kW relay transmitter on 873 in Enniskillen, N. Ireland.

## MW Local Radio DX

BBC Radio Sussex via their 1kW transmitter in Brighton on 1485 were logged in Newcastle-upon-Tyne by Neil Wheatley at 0830. This was probably his best DX for the month, although he did hear BBC Essex via their 0.1kW transmitter on 1530 in Southend-on-Sea! BBC Radio Sussex has also been logged in Eyemouth by David Middlemiss, he heard their faint signal via Reigate on 1368 (0.5kW) underneath Manx Radio, IOM.

Howard Newell uses a loop antenna with his Matsui MR-4099 portable for local radio DXing. Martin Andrews has been putting his Matsui MR-4099 portable to good use too. He's received QSLs from ILR Devon Air Radio 954 and BBC Radio Jersey 1026, but he still awaits confirmation from others.

Stewart Russell wrote to BBC Radio Cumbria saying he was receiving their programme in Forfar and got a mention on one of their Sunday request shows! He says, "They found it quite surprising I was picking them up here. I also told them I was receiving Radio Norfolk and the DJ couldn't believe it!"

Radio Norfolk was also mentioned in the report from Sheila Hughes in Morden. She now has a m.w. loop too. Sheila says, "When I heard the ident and frequency of BBC Radio Merseyside this evening I could hardly believe it! But sure enough it was right, as I listened for half an hour and heard mention of local place names and a station ident again".

Darran Taplin uses a 25m random wire antenna with his recently purchased Eddystone 680X receiver, but he is considering trying a "Sooper Loop" instead. Using a Vega 206 portable with just the built-in

ferrite rod antenna, John Evans found his first venture into local radio DXing very worthwhile.

## Short Wave DX

Although Radio Norway International are making good use of the 25MHz (11m) band to reach their listeners in S. Africa, at the time of going to press no other broadcasters have been tempted to use the band.

The daily transmissions from Radio Norway International, Oslo are beamed to S. Africa via Fredrikstad, SE Norway on 25.730 between 1200 and 1345. They are being very well received there, often SINPO 55555. The skip distance is too long for reception in the UK, although part of their signal does reach us via back scatter. Frequent variations in the strength of the signal exist and reception here is generally poor, Robert Taylor mentioned SIO 222.

There has been a marked improvement in the conditions prevailing on the (21MHz (13m) band and many of the transmissions have been reaching their target areas at considerable strength! The daily broadcasts to Europe from Radio RSA Johannesburg, S Africa on 21.590 have been reaching the UK well. Using a Panasonic DR-22 receiver with a long wire antenna in Needingworth, Christian Pritchard rated their signal as 44434 at 1300.

Programmes in English and Japanese are broadcast to Europe by Radio Japan in Tokyo via Moyabi, Gabon on 21.700 from 1500 until 1700. Christian rated their signal as SINPO 43334 at 1500. Their transmission to Europe via Gabon on 21.695 from 0700 until 0830 is monitored daily by John Berridge in Cardiff. He finds that fading and phase distortion often makes reception poor at 0700. UAE Radio Dubai beam their programmes in Arabic and English to Europe on 21.605 from 0615 until 1400. Their signal was rated as SIO 444 at 1336 by Paul Hawkyard in Newcastle-upon-Tyne.

During the day other broadcasters were logged, Radio Nederlands via Talata Velon, Madagascar 21.480 (English to SE Asia 1130-1225) rated as SINPO 24422 by David Edwardson; RBI via Nauen, GDR 21.540 (Hindi, English to SE Asia 1145-1445); Radio DW via Julich, W. Germany 21.600 (Hausa, French to C. Africa 1130-1350) both logged by Darran Taplin; RFI via Issoudun, France 21.620 (French, English to the Middle East 1000-1500); Radio Moscow, USSR 21.635

The last dates for mail to arrive is  
May 17, June 21 and July 19

# SEEN & HEARD

Freq kHz	Station	ILR BBC	Power in kW	DXer
585	R. Solway	8	2.00	E,G,K,O,P
603	Invicta Sound	1	0.10	H,J,K
630	R. Bedfordshire	8	0.30	A,B,E,H,J,K,N
657	R. Clwyd	8	2.00	D,E,J,K,N,P
666	DevonAir R.	1	0.34	B,N
666	R. York	8	0.50	C,E,G,I,N,O,P
729	BBC Essex	8	0.10	J,M,N
756	R. Cumbria	8	1.00	G,I,L
756	R. Shropshire	8	1.00	D,E,J,K
765	BBC Essex	8	0.50	E,H,J,M
774	R. Kent	8	0.70	H,J
774	R. Leeds	8	1.00	D,E,G,I,K,M,P
774	Severn Sound	1	0.14	E,K
792	Chiltern R.	1	0.27	E,J,K,N,O
792	R. Foyle	8	1.00	L*,O*
801	R. Devon	8	2.00	B,E,I,J,K,N
828	R.WM	8	0.20	E,J,K
828	R. Aire	1	0.12	C,D,E
828	Chiltern R.	1	0.20	H,J
837	R. Cumbria	8	1.00	D,G,L
837	R. Furness	8	1.00	E,I,K,L
837	R. Leicester	8	0.70	E,H,J,K,N
855	R. Norfolk	8	1.00	H,J,L,N
855	R. Lancashire	8	1.00	D,E,K
873	R. Norfolk	8	0.25	H,I,J,M,O*
936	GWR	1	0.18	E,J
945	R. Trent	1	?	D,E,J,K,L*,N
954	Devonair	1	0.32	A,E
954	R. Wymern	1	0.16	E,J,K,N
990	R. Devon	8	1.00	A
990	Beacon R.	1	0.09	E,J,K
990	Hallam R.	1	0.25	E
999	Red Rose R.	1	0.80	C,D,E
999	R. Solent	8	1.00	H,J,M,N
1026	R. Cambridgeshire	8	0.50	H,J,K,N
1026	Downtown R.	1	1.70	E
1026	R. Jersey	8	1.00	A,J
1035	R. Kent	8	1.00	H,J,M
1035	North Sound R.	1	0.78	C,G,I,L,P
1035	R. Sheffield	8	1.00	E
1107	Moray Firth R.	1	1.50	L
1107	R. Northampton	8	0.50	E,J,N
1116	R. Derby	8	0.50	F,J,K,M
1116	R. Guernsey	8	0.50	A,F,N
1152	R. Clyde	1	3.60	L,O
1152	LBC	1	23.50	J,N
1152	Metro R.	1	1.80	C,P
1152	Piccadilly R.	1	1.50	D,E,K
1152	Plymouth Sound	1	0.32	B
1161	R. Bedfordshire	8	0.08	B,J
1161	GWR	1	0.16	8

(English, Indonesian to SE Asia 0900-1200) both noted by Tim Shirley; Radio Bucharest, Romania 21.665 (English to E Asia 1200-1225) rated as SIO 444 by Robert Taylor; SRI via Schwarzenburg, Switzerland 21.695 (English, French, German to S Asia 1315-1500) rated as 44333 by Darran Taplin.

The BBC use several UK based transmitters to enable their World Service to be heard by listeners in Africa during the day. Their broadcasts to E Africa is via Daventry, Northants on 21.470 (100kW) between 1100 and 1345. Leighton Smart rated their signal in Trelewis as SIO 322. Their broadcast to W Africa via Woolferton, Shropshire on 21.710 (250kW) from 0900 until 1100 was noted in the report from Tim Shirley. Their broadcasts to N Africa commence on that frequency at 1100 via Rampisham, Dorset (100kW) and end at 1515.

Some broadcasts from the USA reach the UK well during the afternoon although intended for other areas. Two were logged by Kenneth Buck in Edinburgh, WCSN in Boston 21.515 (English to S Africa 1600-1800), rated as SIO 454 at 1700 and WHRI South

Bend, Indiana 21.640 (English to Africa rated as 454 at 1630. Darran Taplin heard WYFR via Okeechobee, Florida 21.525 (English, Arabic, French, Portuguese to W Africa 1600-1945), he rated their signal as 55434.

The single sideband (u.s.b.) broadcasts from Radio Sweden via Varberg on 21.555 were mentioned by John Parry in Northwich. This service will be closed from July 1.

The reception conditions on the 17MHz (16m) band have enabled DXers to log a number of interesting signals during the day. Yet broadcasts from Radio Australia via Carnarvon, W Australia to S Asia on 17.715 have seldom reached the UK. George Hewlett has only heard their transmissions on rare occasions, he thinks this may be partly due to a jamming transmission on 17.720. Their signals were logged by Kenneth Reece in Prenton on a few occasions. His report mentions considerable fading and distortion, the best SINPO rating was 23322 at 0625. Howard Newell also logged their signal one morning, only rated as 12321 at 0720. The only other report came from David

Freq kHz	Station	ILR BBC	Power in kW	DXer
1161	R. Sussex	8	1.00	J,N
1161	R. Tay	1	0.70	I,L
1161	Viking R.	1	0.35	D,E
1170	R. Orwell	1	0.28	J*,N
1170	Signal Radio	1	0.20	E,K
1170	R. Tees	1	0.32	G
1170	Ocean Sound	1	0.12	H,J
1242	Invicta Sound	1	0.32	H,J
1251	Saxon R.	1	0.76	J,N
1260	GWR	1	1.60	J
1260	Marcher Sound	1	0.64	D,E,K
1260	Leicester Sound	1	0.29	E,J,N
1260	R. York	8	0.50	I
1278	Pennine R.	1	0.43	P
1305	R. Hallam	1	0.15	D
1305	Red Dragon R.	1	0.20	J
1323	R. Bristol	8	1.00	E,I
1323	Southern Sound	1	0.50	J,N
1332	Hereward R.	1	0.60	E,J,L*,N
1359	Essex R.	1	0.28	H,J,N
1359	Mercia Sound	1	0.27	E,K
1368	R. Lincolnshire	8	2.00	D
1368	R. Sussex	8	0.50	H,I,J
1431	Essex R.	1	0.35	J
1431	Radio 210	1	0.14	H,J
1449	R. Cambridgeshire	8	0.15	J,N
1458	R. London	8	50.00	J,N,O*
1458	R. Newcastle	8	2.00	I
1458	R. Manchester	8	5.00	D,E,K
1476	County Sound	1	0.50	H,J,N
1485	R. Humberside	8	1.00	D
1485	R. Merseyside	8	2.00	D,E,H*,K
1485	R. Oxford	8	0.50	J
1485	R. Sussex	8	1.00	H,J*,P
1503	R. Stoke-on-Trent	8	0.50	D,E,J*,K,L*
1521	R. Mercury	1	0.64	H,J*,N
1530	R. Essex	8	0.10	J,P
1530	Pennine R.	1	0.74	E,K,L*
1530	R. Wymern	1	0.52	J*
1548	R. Bristol	8	5.00	B,J*
1548	Capital R.	1	97.50	J,N
1548	R. City	1	4.40	D,E,K
1548	R. Cleveland	8	1.00	G
1548	R. Forth	1	2.20	L
1557	Hereward R.	1	?	L*,N
1557	R. Lancashire	8	0.25	E
1557	Northants 96	1	0.76	G*,J
1557	Ocean Sound	1	0.50	A,J*
1584	R. Nottingham	8	1.00	D,E,K
1584	R. Tay	1	0.21	L
1602	R. Kent	8	0.25	J

Edwardson, he noted 23432 in his log at 0820.

Some broadcasts were logged by Kenneth Reece between 0555 and 0700, Radio Kuwait 17.895 (Arabic to SE Asia) rated as SINPO 25443; FEBA Radio, Seychelles 17.855 (English to Middle East) at 35444; Radio Moscow, USSR 17.665 (English to E Africa) at 23332; UAE Abu Dhabi 17.644 (Arabic to Middle East) at 45554; Voice of Israel, Jerusalem 17.555 (Hebrew to Europe 0615-1400) at 45554; Radio Beijing, China 17.700 (Chinese) at 34343; Radio Bucharest, Romania 17.790 (English to Australia) at 55444; UAE Radio Dubai 17.865 (Arabic, English to Europe 0615-1645) at 54444; RSA 17.825 (English to W Africa) at 54554.

Later, Radio Moscow, USSR 17.775 (English to E Africa) was logged by John Nash in Brighton as 34433 at 1000. Radio DW Cologne via Kigali, Rwanda 17.800 (English, Hausa, French to W Africa) was received at 1130 by Leslie Hollis in Grantham at 45533. At noon John Nash picked up AWR via Gabon 17.890 (English to W Africa), noting their signal as 32122. Glen Davison heard Radio Bucharest, Romania

Note:

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

Dxers:

- (A) Martin Andrews, Newhaven.
- (B) John Berridge, Cardiff.
- (C) Alan Curry, Stockton-on-Tees.
- (D) John Evans, Shawforth.
- (E) David Hackwell, Warrington.
- (F) Simon Hamer, New Radnor.
- (G) Paul Hawkyard, Newcastle-upon-Tyne.
- (H) Sheila Hughes, Morden.
- (I) David Middlemiss, Eyemouth.
- (J) Howard Newell, Great Missenden.
- (K) Philip Rambaut, Macclesfield.
- (L) Stewart Russell, Forfar.
- (M) Tim Shirley, Bristol.
- (N) Darran Taplin, Tunbridge Wells.
- (O) Robert Taylor, Edinburgh.
- (P) Neil Wheatley, Newcastle-upon-Tyne.

17.720 (French, English to Europe) at 35334.

Some broadcasts logged during the afternoon were the BBC World Service to E Africa via Limmasol, Cyprus 17.885, rated as 35432 by Leslie Hollis at 1215; ; AIR via Aligarh, India 17.785 (Burmese to SE Asia), rated as SIO 333 by Philip Rambaut in Macclesfield at 1214 - he also heard VOA via Ascension Island 17.830 (Spanish to S America) and noted 322 in his log at 1240; UAE Radio Dubai 17.865 (Arabic, English to Europe), rated as 43333 at 1340 by Ian Curry in Stockton-on-Tees; Radio RSA Johannesburg, S. Africa 17.755 (English to W Africa), logged at 1400 by Edward Broadsmith in Worcester.

# SEEN & HEARD

Later, a number of broadcasts from Canada, North, Central and South America were noted in the reports. A home-built "straight" receiver employing two 1T4 valves enabled Ron Pearce in Bungay to hear Radio Surinam International via RNB, Brazil 17.835 (Dutch, English 1700-1745). Using a Matsui MR-4099 portable, Leighton Smart picked up the African Service of RCI Montreal, Canada 17.820 and rated their signal as 333 at 1808. WYFR via Okeechobee, Florida was logged by Leslie Hollis on 17.750 at 1600 (English, German to Europe 1600-1745); also by Kenneth Buck on 17.612 at 1725 (English to N America 1500-2345) and on 17.845 at 1915 (Spanish, Arabic, Italian, English to Europe 1600-1945).

Listening in Newcastle-upon-Tyne at 1900, Ron Proudfoot heard KUSW Salt Lake City, Utah on 17.715 at SINPO 34443 (English to N America 1900-2200). WHRI South Bend, Indiana 17.830 (English to S America 1900-2300) was logged by John Thompson in Rainham at 2050. The DX programmes beamed to Europe by Radio HCJB Quito, Ecuador 17.790 at 2130 were mentioned by Martin Andrews. John Parry picked up their broadcast in Spanish to S America on 17.890 and rated their signal as 45545 at 2120.

The reception conditions on the 15MHz (19m) band have been good. The broadcasts from Radio New Zealand 15.150 to the Pacific have sometimes been reaching the UK around 1830, but their signal suffers from a rapid form of fading. The SINPO 25432 noted by Ron Proudfoot at 1830 is a typical assessment of their signal under favourable conditions. Kenneth Reece logged their transmission several times during the month, he says, "This station is usually at its best roughly between sunset and one-and-a-half hours after. Even so the reception is accompanied by considerable mush and only on exceptional days will the signal be clear".

Although not intended for the UK, the broadcasts from Radio Australia have also been audible here. George Hewlett monitored their transmission to the Pacific via Shepparton on 15.240 from 0400, noting their signal as SIO 433 at 0530, but fading out by 0630. Tim Shirley logged their broadcast to S Asia via Carnarvon on 15.415 at 0930. Using a rod antenna on the balcony of his flat in Birmingham with an a.t.u., a Codar PR30 pre-selector and a CR70A receiver, Alf Gray picked up their broadcast to the Pacific area via Shepparton on 15.160 at 2130. At 2300 Tim Shirley heard their transmission to N America via Shepparton on 15.395.

Some other broadcasts noted during the day include the Voice of Nigeria, Lagos 15.120 (English, Arabic to N. Africa 0700-1030) logged by Martin Andrews at 0830; Radio Bangladesh, Dhaka 15.525 (English to Europe 1230-1300) rated as 44434 by Christian Pritchard; Radio RSA Johannesburg, S Africa 15.125 (French, English to W Africa 1200-1556) received by Peter Vlietinck in London; UAE Radio Dubai 15.320 (Arabic, English to Europe 1500-1915) rated as SIO 212 at 1600 by Julian Wood in Buckie. Later, Ron Pearce picked up RNB Brasilia, Brazil 15.265 (English, German to Europe 1800-1950) while checking the band with his two-valve receiver.

During the evening some broadcasts from the USA were evident KUSW Salt Lake City, Utah 15.225 was logged by Christopher Dane as SIO 444 at 1808 (English to N America 1600-1900); VOA via Greenville, N Carolina 15.410 (English to W Africa 1600-2200) was received at 1850 by Eddie Fox — he uses a Sangean ATS 803A receiver in Bolton and rated their signal as 32322. Using a Vega 242 receiver, Peter Vlietinck listened to AFRTS via Bethany, Ohio 15.430 at 1915 and to WHRI South Bend, Indiana 15.105 at 2015. In Glasgow, Alexander Little heard WRNO New Orleans, LA 15.420 at 2000, rating their signal as 55545.

Some other broadcasts received during the evening were the Voice of Vietnam, Hanoi 15.010 rated as 23232 at 1933 by Ian Baxter in Blackburn; RAE Buenos Aires, Argentina 15.345 noted at 33333 at 2100 by Alan Curry in Stockton-on-Tees; VOFC Taipei, Taiwan relayed via Okeechobee, Florida 15.440 heard by Peter Vlietinck at 2130; also KYOI Saipan, N. Mariana Islands 15.405 (English to E Asia 2200-0200) logged as 232 at 2315 by Christopher Dane.

The 13MHz (22m) band attracted several DXers, Philip Rambaut logged Reykjavik, Iceland 13.775 as SIO 444 at 1215; Darran Taplin noted Radio Prague, Czechoslovakia 13.715 as 55544 at 1430 and Howard Newell heard Radio Netherlands via Flevo, Holland 13.770, noting 22222 in his log at 1430. Several broadcasts stemmed from the USA, namely WCSN Boston, MS 13.760, logged by John Nash as 55544 at 1400; WYFR via Okeechobee, FL 13.695 rated as 43433 at 1459 by Darran Taplin; WHRI South Bend, Indiana 13.760 noted as 23232 at 1935 by Howard Newell; WRNO New Orleans, LA 13.760 received by John Berridge at 2300.

There is certainly plenty to interest the DXer on the 11MHz (25m) band. A broadcast from TWR on Guam in the Pacific was

Freq MHz	Station	Location	Time (UTC)	DXer
870	WWL	USA New Orleans, LA	0430	E
880	WCBS	New York, NY	0230	G
1010	WINS	New York, NY	0210	A,D,E
1030	WBZ	Boston, MS	0348	A
1050	WFAN	New York, NY	0047	A,G
1130	WNEW	New York, NY	0351	A,G
1190	WOWO	Ft. Wayne, IN	0230	E
1210	WCAU	Philadelphia, PA	0100	A,D
1220	WGAR	Cleveland, OH	0230	G
1500	WTOP	Washington, DC	0238	A
1510	WSSH	Boston, MS	0039	A,E
1520	WWKB	Buffalo, NY	0300	G
1540	WPTR	Albany, NY CANADA	0300	G
580	CFRA	Ottawa, ON	0300	E,G
0590	VOCM	St. John's, NF	0150	A,D,G
620	CKCM	Grand Falls, NF	0245	G
670	CHYQ	Musgrave town, NF	0130	G
930	CJYQ	St. John's, NF	0037	A,D,F,G
1200	CFGO	Ottawa, ON	0228	A
1220	CKCW	Moncton, NB	0042	A
1570	CKLM	Lavel, PQ	2230	E
1580	CBJ	Chicoutimi, PQ C.AMERICA & CARIBBEAN	0215	G
1210	R. Caraibes	Dominica	0130	E
1570	Atlantic Beacon	Turks & Caicos IIs	0105	D,E
1610	Caribbean Beacon	Anguilla	2230	A,B,D
720	R. Club Penambuco	SOUTH AMERICA Brazil	?	C
740	R. Soc.de Bahia	Brazil	?	C
760	R. Machete	Brazil	?	C
820	R. Jornal de Goios	Brazil	?	C
840	R. Bandeirantes	Brazil	?	C
850	R. Carve	Uruguay	?	C
860	R. Mundial	Rio, Brazil	?	C
870	R. Nacional	Argentina	?	C
880	R. Inconfidencia	Brazil	?	C
950	R. Vision	Caracas, Venezuela	0245	G
980	R. Nacional	Brazil	?	C
1100	R. Globo	Sao Paulo, Brazil	0300	G
1220	R. Globo	Rio, Brazil	0155	G
1350	R. Buenos Aires	Argentina	0300	G

## DXers

- (A) Christopher Dane, Middlesbrough.
- (B) Alexander Little, Glasgow.
- (C) Dick Moon, George, S Africa.
- (D) Howard Newell, Great Missenden.
- (E) Tim Shirley, Bristol.
- (F) Alan Taylor, Coventry.
- (G) Jim Willett, Grimsby.

picked up by John Evans on 11.805 at 0815 (English to E Asia 0805-0930). The broadcasts to the S Pacific area from Radio Australia via Shepparton 11.910 (0400-0630) are often audible here. George Hewlett rated them as SIO 322 at 0430, peaking 434 by 0530.

Radio New Zealand 11.780 (English to Pacific area 1830-2115) was logged for the first time this year by Simon Hamer at 1900. Listening in Lockerbie, Neil Dove picked up three broadcasts from S America, namely Radio Globo, Brazil 11.805 noted as SINPO 25442 at 1840; Radio Bandeirantes, Brazil 11.925 at 35443 at 2145; Radio HCJB Quito, Ecuador 11.79 at 35444 at 2155. In Sheffield, Cyril Kellam logged RAE Buenos Aires, Argentina 11.710 at 2200 (Spanish, Polish, English to N America 2200-0500) at he rated their signal as SIO 232.

Using a Vega 206 portable in Peterborough, Bob Isaacs logged VOFC via Okeechobee, Florida 11.805 (Chinese, French, German, English to Europe 1900-2300) as SIO 333 at 2200; Radio Japan via Moyabi, Gabon 11.800 (Japanese, English to Europe 2200-2359) as 444 at 2300; also Radio Beijing, China 11.980 (English to Western N America 0300-0355) as SIO 444 at 0330.

News is broadcast to Europe on the 9MHz (31m) band by Radio Australia via Shepparton 9.655

between 0700 and 1030. Ken Whayman rated their signal via the "long path" as 54445 at 0800. Their broadcast to SE Asia from Shepparton 9.770 was received via the "short path" by David Glover in Newton-le-Willows as 23332 at 1015.

Many interesting broadcasts were heard including SRI via Schwarzenburg, Switzerland 9.885 at 1000 (Sheila Hughes); Radio Veritas Asia, Manila 9.770 at 1520; TWR Guam 9.870 at 1545 (Leslie Hollis); Radio Pyongyang, N Korea 9.325 at 1700 (David Glover); RHC Habana, Cuba 9.670 at 1950 (Leslie Hollis); Radio Damascus, Syria 9.950 at 2037 (John Thompson); WCSN BOSTON, Mass 9.495 at 2014; WYFR via Okeechobee, Florida 9.850 at 2100 (logged by Colin Diffell in Corsham); Radio RSA Johannesburg, S Africa 9.580 at 2115; WHRI South Bend, Indiana 9.770 at 2305; AIR via Aligarh, India 9.535 at 2354 (Alan Curry).

Whilst in Florida, S Africa Paul O'Connor has been checking this band around noon with a new Telerad WBR 2000 receiver (similar to a Matsui MR-4099). He logged the BBC World Service via Maseru, Lesotho 9.515; Radio Sud-Afrika 9.555; also SABC

# SEEN & HEARD

Freq MHz	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2055	J
2.310	PBS Yunnan	China	0040	Z
2.325	ABC Tennant	Australia	2140	J
2.340	R. Itacoatiara	Brazil	2230	U
2.340	Fuzhou	China	2227	J
2.380	FBS	Falklands	0145	J,Z
2.390	Voz de Atitlan	Guatemala	0130	U
2.470	R. Cacique	Brazil	0200	Z
2.485	ABC Katherine	Australia	2107	D,J,N
3.205	TWR	Swaziland	2108	N
3.210	R. Mozambique	Mozambique	1930	J,N
3.215	R. Orange	S. Africa	1702	J,N
3.220	R. Togo, Lome	Togo	0530	T,Z
3.230	R. Nepal	Kathmandu	1700	J
3.230	ELWA Monrovia	Liberia	0621	T
3.270	SWABC 1	Namibia	2223	J,N,S
3.300	R. Cultural	Guatemala	0627	T
3.305	R. Zimbabwe	Zimbabwe	1836	N,S
3.320	R. Onon	S. Africa	2150	J,T
3.320	R. Suid Afrika	S. Africa	1845	N,S
3.325	R. Liberal	Brazil	0400	Z
3.325	FRCN Lagos	Nigeria	2150	J,S,T
3.330	R. Kigali	Rwanda	0300	Z
3.355	R. Botswana	Gaborone	0020	Z
3.365	AIR New Delhi	India	1600	J
3.365	GBC Radio 2	Ghana	2200	C,J,S,T
3.400	S.B.C. Reykjavik	Iceland	1925	J
3.905	AIR New Delhi	India	2145	E
3.915	BBC Kranji	Singapore	2242	J,T
3.955	BBC Daventry	England	2130	C,K,T,V,W
3.955	R. Orion	S. Africa	2113	N
3.965	RFI Paris	France	0521	T,W,Y
3.975	BBC WS Skelton	UK	0533	T
3.980	VOA Munich	W. Germany via SRI Berne	0552	T
3.985	R. Beijing, China	China	2235	C,E,F,P,V
3.985	SRI Berne	Switzerland	1827	T,V,W
3.990	RFE Munich	W. Germany	0545	T
3.995	DW Cologne	W. Germany	1828	K,V,W
4.000	R. Greenland	Greenland	2200	J
4.060	R. Moscow Kharkov	USSR	2200	B,C,K,L,M,T,V
4.220	PBS Xinjiang	China	0135	T
4.330	PBS Xinjiang	China	2345	F
4.460	R. Capt. V. Ustariz	Bolivia	0130	Z
4.635	R. Dushanbe, Tadzhik	USSR	0027	T
4.680	R. Nac. Espejo	Ecuador	0614	T
4.735	Xinjiang	China	2315	H,T
4.740	R. Afghanistan	via USSR	1901	E,T,V,W
4.750	R. Bertoua	Cameroon	2040	O
4.750	R. Lubumbashi	Zaire	2116	N
4.760	ELWA Monrovia	Liberia	0600	B,E,P,T
4.760	R. Afghanistan	via USSR	1915	C,E,T
4.765	R. Moscow	via Cuba	1939	L,T
4.770	FRCN, Kaduna	Nigeria	2030	E,G,L,O,Q,T,V
4.775	R. Los Andes	Bolivia	0100	Z
4.775	AIR Gauhati	India	1852	T
4.780	V. Carabobo	Venezuela	0120	Z
4.785	RTM Bamako	Mali	2315	E,H,T
4.785	R. Baku	USSR	0406	T
4.795	R. Nueva America	Bolivia	0345	R
4.795	R. Moscow	USSR	2217	T
4.795	R. Ulan Ude	USSR	2015	T
4.800	PBS Xinjiang	China	2340	T
4.800	R. Popular, Cuenca	Ecuador	0410	T
4.800	LNBS Lesotho	Maseru	2135	B,E,N,S
4.805	R. Nac Amazonas	Brazil	0030	E,T,Z
4.805	R. Itatiaia	Brazil	2305	H
4.810	R. Yerevan	USSR	1946	E,G,T
4.815	R. Beijing	China	2300	L,T
4.815	R. diff TV Burkina	Ouagadougou	2045	B,E,L,O,P,T
4.820	R. Botswana	Botswana	1900	A,B,H,N,O,S
4.820	Khanty-Mansiysk	USSR	0414	T
4.825	R. Ashkhabad	USSR	2145	E
4.825	R. Moscow Yakutsk	USSR	2322	H,L
4.830	Africa No. 1	Gabon	2000	A,E,F,G,J,K,L,N,O,P,S,T,V
4.830	R. Reloj	Costa Rica	0721	F,T,Z

Freq MHz	Station	Country	UTC	DXer
4.830	R. Tachira	Venezuela	2310	E,L,T,V,Z
4.835	RTM Bamako	Mali	?	A
4.840	R. Bukavu	Zaire	2250	Z
4.845	R. Nacional, Manus	Brazil	0120	F,T,X
4.845	ORTM Nouakchott	Mauritania	2123	E,N,S,T
4.850	R. Columbia Pt	Costa Rica	0422	T
4.850	R. Tashkent	USSR	1850	T,W
4.850	R. Yaounde	Cameroon	2000	A,E,L,O,T,V
4.850	R. Capital, Caracas	Venezuela	0440	F,T
4.855	R. Saná Yemen	Yemen	0310	T
4.860	AIR New Delhi	India	0700	U
4.860	R. Chita, Kalinin	USSR	2130	E
4.865	PBS Lanzhou	China	2315	L,T
4.865	R. Mozambique	Mozambique	1930	N
4.865	R. Verdes	Brazil	0130	U
4.870	R. Cotonou	Benin	2020	E,L,O,S,T
4.870	R. Jornal Rio	Brazil	0030	U
4.870	Rio Amazonas	Ecuador	0100	U
4.880	SABC Radio 5	S. Africa	2005	A,E,H,J,N,O,T,V
4.885	R. Beijing	China	2340	H
4.885	R. Than Hoa	Vietnam via Gabon	0105	Z
4.890	RFI Paris	France	0400	G,T
4.890	R. Huanta Ayachucho	Peru	0100	U
4.890	ORTS, Dakar	Senegal	2040	E,H,O,T
4.895	Ashkhabad	USSR	1925	B
4.895	R. Moscow Kalinin	USSR	2300	K,L,T,V
4.895	R. Bare, Manus	Brazil	0450	T
4.905	N'djamena	Chad	2040	N,O,T
4.905	R. Relegio, Rio	Brazil	2255	E,F
4.910	R. Zambia	Zambia	1930	G,J,N
4.915	Guangxi Nanning	China	2050	H
4.915	R. Ghana, Accra	Ghana	2040	E,G,J,L,O,T,Z
4.915	R. Anhanguera	Brazil	0711	T
4.915	Voice of Kenya	Kenya	1915	J
4.915	R. Nac. Macapa	Brazil	0755	F
4.930	Ashkhabad	USSR	1940	E,L,T
4.935	R. Tropical	Peru	0700	U
4.935	SWABC Windhoek	SW Africa	1905	J
4.940	R. Abidjan	Ivory Coast	0604	T
4.940	Kiev	USSR	1935	B,E
4.945	Carcacol, Neiva	Colombia	0606	T,Z
4.950	R. Nac. Luanda	Angola	2200	E
4.955	RR1 Banda Aceh	Indonesia	0506	T
4.955	R. Baku	USSR	1949	E,L
4.970	RFO Cayenne	Fr. Guiana	0030	Z
4.970	R. Rumbos	Venezuela	2250	E,R,V
4.970	Cabinda	Angola	2320	Z
4.975	R. Uganda	Uganda	2010	I,O
4.980	R. Swaziland	Swaziland	2015	G,N
4.980	Ecos del Torbes	Venezuela	2252	E,L,T,V
4.985	R. Brazil Central	Brazil	0705	F,T
4.990	AIR New Delhi	India	2359	V
4.990	VOIRI Tehran	Iran	1630	G
4.990	FRCN, Lagos	Nigeria	0618	T
4.995	R. Andina	Peru	0420	R
5.005	R. Nacional, Bata	Eq. Guinea	1927	B,E,I,O,T
5.010	R. Garoua	Cameroon	2200	E,G,S,T
5.015	R. Truth	S. Africa	1737	N
5.015	R. Vladivostok	USSR	2016	L
5.020	ORTN Niamey	Niger	2030	O,T
5.025	R. Rebeide Habana	Cuba	0014	B,T
5.030	R. Los Andes	Peru	0047	T
5.030	R. Continente	Venezuela	2359	H
5.035	Alma Ata	USSR	0005	H,T
5.035	R. Aparecida	Brazil	0200	Z
5.035	R. Bangui	C. Africa	2120	E,T
5.040	R. Tbilisi	USSR	2036	B,L
5.045	R. Togo Lome	Togo	2235	E,O,T
5.050	R. Singapore	Singapore	1600	J
5.057	Gjrokaster	Albania	2140	E,L,T,Y
5.060	PBS Xinjiang	China	2359	H
5.075	R. Beijing	China	2210	T
5.095	R. Sutatenza, Bogota	Colombia	2340	B,E,H,X,Z
5.190	R. Continente	Peru	0250	Z
5.260	R. Alma Ata	USSR	2359	H

Johannesburg 9.665 — all rated 55555. Using a Sony ICF-2001 portable whilst in Cairo, Egypt Bill Griffith logged several stations during the evening, REE via Noblejas, Spain 9.675 at 2030; Radio Nederlands via Flevo, Holland 9.895 at 2100; also Radio Budapest, Hungary 9.585 at 2130 — all rated 55555.

Many broadcasts were noted on the 7MHz (41m) band including WHRI South Bend, Indiana 7.355 at 0855 (Ian Curry); Radio Australia 7.205 (logged by

Graham Johnson at 2004 using a Panasonic DR49 portable in Nuneaton); AIR New Delhi, India 7.410 at 2110 (Neil Dove); Radio Polonia, Poland 7.270 at 2205 (Alex Mackow); Voice of Israel, Jerusalem 7.460 at 2255 (Colin Godwin); Radio Vilnius, USSR 7.400 at 2300 (Cyril Kellam).

While monitoring the 6MHz (49m) band during the evening Philip Rambaut logged Radio Beijing, China on 6.933 at 1755; Edward Broadsmith listened to Radio Pakistan, Islamabad 6.210

- (A) Martin Andrews, Newhaven
- (B) Ian Baxter, Blackburn.
- (C) Alan Curry, Stockton-on-Tees.
- (D) Christopher Dane, Middlesbrough.
- (E) Neil Dove, Lockerbie.
- (F) David Edwardson, Wallsend.
- (G) John Evans, Shawforth.
- (H) David Glover, Newton-le-Willows.
- (I) Bill Griffith, while in Cairo, Egypt.
- (J) Simon Hamer, New Radnor.
- (K) Paul Hawkyard, Newcastle-upon-Tyne.
- (L) Alex Mackow, London.
- (M) John Nash, Brighton.
- (N) Paul O'Connor, Florida, S. Africa.

- (O) Fred Pallant, Storrington.
- (P) Ron Pearce, Bungay.
- (Q) Christain Prithcard, Cambridge.
- (R) Ronald Proudfoot, Newcastle-upon-Tyne.
- (S) Philip Rambaut, Macclesfield.
- (T) Kenneth Reece, Prenton.
- (U) Tim Shirley, Bristol.
- (V) Darran Taplin, Tunbridge Wells.
- (W) Philip Townsend, London.
- (X) Ken Whayman, Bexleyheath.
- (Y) Neil Wheatley, Newcastle-upon-Tyne.
- (Z) Jim Willett, Grimsby.

at 1718; Alf Gray picked up Radio Sophia, Bulgaria 6.070 at 2130; Paul Hawkyard heard Vatican Radio, Rome 6.190 at 2150 and

Julian Wood heard the BBC World Service via Limmasol, Cyprus 6.180 at 2150.

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# WHAT SCANNER

**JIL SX-200N**  
Monitor Scanner



- **COVERAGE:** 26 to 88MHz, 108 to 180MHz, 380 to 514MHz
- **MODES:** a.m., n.b.f.m.
- **SENSITIVITY:** f.m. = >60dB at  $\pm 25\text{kHz}$ ; a.m. = >60dB at  $\pm 10\text{kHz}$
- **SELECTIVITY:** 26 – 180MHz f.m. =  $0.4\mu\text{V}$  at 12dB s/n; 380 – 514MHz =  $1.0\mu\text{V}$  at 12dB s/n; 26 – 180MHz a.m. =  $1.0\mu\text{V}$  at 10dB s/n; 380 – 514MHz a.m. =  $2.0\mu\text{V}$
- **RESOLUTION:** 5, 12.5kHz
- **IMAGE REJECTION:**
- **IF STAGE:** 10.7MHz 455kHz
- **AUDIO OUTPUT:** 2 watts
- **SCAN RATE:** 4 and 8 channels per second
- **SEARCH RATE:** 5 and 10 channels per second
- **MEMORIES:** 16
- **FEATURES:**
- **REVIEWED:** Practical Wireless October 1981
- **PRICE:** £325

**AOR AR2002**  
Monitor Scanner



- **COVERAGE:** 25 to 550MHz, 800 to 1300MHz
- **MODES:** a.m., n.b.f.m., w.b.f.m.
- **SENSITIVITY:** n.b.f.m. =  $0.3\mu\text{V}$  (12dB SINAD); w.b.f.m. =  $1.0\mu\text{V}$  (12dB SINAD); a.m. =  $0.5\mu\text{V}$  (10dB s/n)
- **SELECTIVITY:** n.b.f.m. =  $\pm 7.5\text{kHz}$  at 6dB; w.b.f.m. =  $\pm 25\text{kHz}$  at 60dB; a.m. =  $\pm 10\text{kHz}$  at 70dB
- **RESOLUTION:** 5, 12.5 or 25kHz steps
- **IMAGE REJECTION:** –50dB
- **IF STAGE:** 750MHz, 45.03MHz (w.f.m.), 455kHz (n.f.m./a.m.)
- **AUDIO OUTPUT:** 1W at <10% distortion
- **SCAN RATE:** 5 channels per second
- **SEARCH RATE:** 6 seconds per MHz
- **MEMORIES:** 20
- **FEATURES:** Tuning knob in addition to key pad and computer control facilities
- **REVIEWED:** Practical Wireless December 1985
- **PRICE:** £487

**JIL SX-400**  
Monitor Scanner



- **COVERAGE:** 26 to 520MHz continuous (100kHz to 1.4GHz with converters)
- **MODES:** a.m., n.b.f.m., w.b.f.m.
- **SENSITIVITY:** v.h.f. f.m. =  $0.5\mu\text{V}$  at 12dB s/n; v.h.f. a.m. =  $1.0\mu\text{V}$  at 10dB s/n; u.h.f. f.m. =  $0.5\mu\text{V}$  at 12dB s/n; u.h.f. a.m. =  $2.0\mu\text{V}$  at 10dB s/n
- **SELECTIVITY:** 60dB at  $\pm 15\text{kHz}$  (f.m.), 60dB at  $\pm 10\text{kHz}$  (a.m.), s/n ratio: 45dB
- **RESOLUTION:** 5, 6.25, 10, 12.5kHz
- **IMAGE REJECTION:** 50dB (v.h.f.)
- **IF STAGE:** 10.7MHz, 455kHz
- **AUDIO OUTPUT:** 2W (40 load)
- **SCAN RATE:** 4 and 8 channels per second
- **SEARCH RATE:** 5 and 10 channels per second
- **MEMORIES:** 20
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £650

**AOR AR2001**  
Communications Scanner



- **COVERAGE:** 25 – 550MHz
- **MODES:** a.m., n.b.f.m., w.b.f.m.
- **SENSITIVITY:** At 70MHz. Input signal for 12dB SINAD n.b.f.m. =  $0.39\mu\text{V}$ ; Input signal for 10dB S + N/N a.m. =  $1.35\mu\text{V}$ .
- **SELECTIVITY:** n.b.f.m. =  $13\text{kHz}$  @ 6dB,  $21\text{kHz}$  @ 70dB; w.b.f.m. =  $180\text{kHz}$  @ 6dB,  $446\text{kHz}$  @ 70dB; a.m. =  $13.5\text{kHz}$  at 6dB.
- **RESOLUTION:** 5, 12.5, 25kHz
- **IMAGE REJECTION:** –50dB
- **IF STAGE:** 750MHz & 455kHz
- **AUDIO OUTPUT:** 1W at 10% distortion
- **SCAN RATE:** 5 channels per second
- **SEARCH RATE:** 6 seconds per MHz
- **MEMORIES:** 20
- **FEATURES:** Good coverage of v.h.f. and u.h.f. airband
- **REVIEWED:** Practical Wireless May 1984
- **PRICE:** Available in limited quantities on special production runs. Apply Lowe Electronics.

**Uniden Bearcat UBC 175XL**  
Base Station Scanner



- **COVERAGE:** 66 – 88, 118 – 174, 406 – 512MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** For 12dB SINAD: 29 – 54MHz =  $0.3\mu\text{V}$ ; 118 – 136MHz =  $0.8\mu\text{V}$ ; 136 – 174MHz =  $0.3\mu\text{V}$ ; 406 – 512MHz =  $0.5\text{V}$
- **SELECTIVITY:** –45dB at  $\pm 25\text{kHz}$
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:** –55dB
- **IF STAGE:** 10.85MHz & 450kHz
- **AUDIO OUTPUT:** 800mW at 10% t.h.d.
- **SCAN RATE:** 5 and 15 channels per second
- **SEARCH RATE:** 5 and 15 channels per second
- **MEMORIES:** 16
- **FEATURES:** Channel lockout, auto squelch, priority channel and short term memory back-up
- **REVIEWED:** Short Wave Magazine December 1987
- **PRICE:** £179.99

**Saikou SC-1600**  
Mobile Monitor Scanner



- **COVERAGE:** 10MHz within 65 to 90MHz, 20MHz within 130 to 175MHz, 30MHz within 390 to 500MHz
- **MODES:** n.b.f.m.
- **SENSITIVITY:**  $1.0\mu\text{V}$  for 10dB s/n
- **SELECTIVITY:**  $\pm 15\text{kHz}$  at 50dB,  $\pm 7\text{kHz}$  at –6dB
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:** –40dB
- **IF STAGE:** 10.7MHz, 455kHz
- **AUDIO OUTPUT:** 1.5W at 10% distortion
- **SCAN RATE:**
- **SEARCH RATE:**
- **MEMORIES:** 16
- **FEATURES:** Squelch, delay key, i.c.d. channel display, d.c. power cable and mounting bracket supplied
- **REVIEWED:**
- **PRICE:** £159.95

**Realistic PRO 2004**  
Programmable Scanner



- **COVERAGE:** Continuous 25 to 520MHz, 760 to 1300MHz
- **MODES:** a.m., w.b.f.m., n.b.f.m.
- **SENSITIVITY:** (w.b.f.m. 30dB signal to noise at 22.5kHz dev). 25 – 520MHz =  $3\mu\text{V}$ ; 760 – 1100MHz =  $3\mu\text{V}$ ; 1100 – 1300MHz =  $10\mu\text{V}$ . (n.b.f.m. 20dB signal to noise at 3kHz dev). 25 – 520MHz =  $0.5\mu\text{V}$ ; 760 – 1100MHz =  $0.3\mu\text{V}$ ; 1100 – 1300MHz =  $3\mu\text{V}$ . (a.m. 20dB signal to noise at 60% mod). 25 – 520MHz =  $2\mu\text{V}$ ; 760 – 1100MHz =  $2\mu\text{V}$ ; 1100 – 1300MHz =  $3\mu\text{V}$
- **SELECTIVITY:** (n.b.f.m. & a.m.)  $\pm 9\text{kHz}$  @ –6dB,  $\pm 15\text{kHz}$  @ –50dB; (w.b.f.m.)  $\pm 150\text{kHz}$  @ –6dB,  $\pm 300\text{kHz}$  @ –50dB
- **RESOLUTION:** 5, 12.5 or 50kHz
- **IMAGE REJECTION:** –60dB
- **IF STAGE:** 611.5 – 607.505MHz, 48.5MHz, 455kHz (a.m.)
- **AUDIO OUTPUT:** 1.8W @ 3% t.h.d.
- **SCAN RATE:** Band 16 steps per second
- **SEARCH RATE:** Band 16 steps per second
- **MEMORIES:** 300
- **FEATURES:** Lock-out key, squelch, priority function key and large i.c.d. readout.
- **REVIEWED:** Short Wave Magazine April 1987
- **PRICE:** £329.95

**Revco RS-2000E**  
Monitor Scanner



- **COVERAGE:** 60 to 179MHz, 380 – 520MHz
- **MODES:** a.m., n.b.f.m.
- **SENSITIVITY:**  $0.5\mu\text{V}$  v.h.f. f.m.,  $1.0\mu\text{V}$  u.h.f. f.m.
- **SELECTIVITY:** –60dB at  $\pm 25\text{kHz}$
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:**
- **IF STAGE:**
- **AUDIO OUTPUT:** 2W
- **SCAN RATE:** 5 or 10 channels per second
- **SEARCH RATE:** 5 or 10 channels per second
- **MEMORIES:** 70
- **FEATURES:** Auto search and store.
- **REVIEWED:**
- **PRICE:** £279

**Realistic PRO-2021**  
Programmable Scanner



- **COVERAGE:** 68 to 88MHz, 108 to 136MHz, 138 to 174MHz, 380 to 512MHz.
- **MODES:** a.m., f.m.
- **SENSITIVITY:** 66 – 88MHz =  $1\mu\text{V}$ ; 108 – 136MHz =  $2\mu\text{V}$ ; 138 – 174MHz =  $1\mu\text{V}$ ; 380 – 512MHz =  $1\mu\text{V}$
- **SELECTIVITY:** –6dB @  $\pm 9\text{kHz}$ , –50dB @  $\pm 15\text{kHz}$
- **RESOLUTION:** 5, 12.5 and 25kHz
- **IMAGE REJECTION:**
- **IF STAGE:** 10.7MHz, 455kHz
- **AUDIO OUTPUT:** 300mW
- **SCAN RATE:** 4 and 8 channels per second
- **SEARCH RATE:**
- **MEMORIES:** 200
- **FEATURES:** Easy-to-read i.c.d. readout, squelch control, mobile mounting bracket included, sockets for external antenna, speaker and tape recorder
- **REVIEWED:**
- **PRICE:** £219.95

# WHAT SCANNER

## Regency MX 7000 Monitor Scanner

- **COVERAGE:** 25 to 550MHz continuous, 800MHz to 1.3GHz
- **MODES:** a.m., n.b.f.m., w.b.f.m.
- **SENSITIVITY:** n.b.f.m. = 0.4µV at 12dB SINAD; w.b.f.m. = 1.0µV at 12dB SINAD; a.m. = 0.8µV at 10dB s/n
- **SELECTIVITY:** n.b.f.m. ±7.5kHz at 6dB; w.b.f.m. = ±50kHz at 6dB; a.m. = ±5kHz at 6dB
- **RESOLUTION:** 5, 12.5 and 25kHz
- **IMAGE REJECTION:** -50dB
- **IF STAGE:** 750 MHz, 45.03MHz, 5.5MHz, 455kHz
- **AUDIO OUTPUT:** 1W at 10% distortion
- **SCAN RATE:** 5 channels per second
- **SEARCH RATE:** 6 seconds per MHz
- **MEMORIES:** 20
- **FEATURES:** Tuning dial as well as keypad, priority channel, mains adaptor and mounting bracket available as extras
- **REVIEWED:**
- **PRICE:** £399

## Bearcat 100FB Handheld Scanner

- **COVERAGE:** 66 - 88MHz, 138 - 174MHz, 406 - 512MHz
- **MODES:**
- **SENSITIVITY:** For 12dB SINAD. 66 - 88MHz = 0.6µV; 138 - 174MHz = 0.6µV; 406 - 512MHz = 1µV
- **SELECTIVITY:** 50dB @ ±25kHz
- **RESOLUTION:** 5, 12.5kHz
- **IMAGE REJECTION:**
- **IF STAGE:**
- **AUDIO OUTPUT:** 300mW
- **SCAN RATE:** 15 channels per second
- **SEARCH RATE:** 15 channels per second
- **MEMORIES:** 16
- **FEATURES:**
- **REVIEWED:** Practical Wireless September 1982
- **PRICE:** Available second-hand

## Regency HX850E Handheld Scanner

- **COVERAGE:** 75-106MHz or 60-90MHz, 118-136MHz, 136-175MHz, 406-496MHz
- **MODES:** a.m., n.b.f.m.
- **SENSITIVITY:** v.h.f. f.m. = 0.7µV at 12dB SINAD, u.h.f. f.m. = 1.0µV at 12dB SINAD; v.h.f. a.m. = 1.0µV at 10dB s/n
- **SELECTIVITY:** f.m./a.m. ±7.5kHz at 6dB
- **RESOLUTION:** 5, 10 and 12.5kHz
- **IMAGE REJECTION:**
- **IF STAGE:** 21.4MHz, 455kHz
- **AUDIO OUTPUT:** 10mW, 10% or less t.h.d.
- **SCAN RATE:** 12 channels per second
- **SEARCH RATE:** u.h.f. = 7 sec per MHz; v.h.f. 9 seconds per MHz
- **MEMORIES:** 20
- **FEATURES:** NiCads, flexible antennas and 240V charger supplied
- **REVIEWED:**
- **PRICE:** £280

## Yaesu FRG-9600 VHF UHF Scanner



- **COVERAGE:** 60-905MHz (up to 460MHz for s.s.b.)
- **MODES:** n.b.a.m., w.b.a.m., n.b.f.m., w.b.f.m., s.s.b.
- **SENSITIVITY:** At 435MHz 12dB SINAD n.b.f.m. 0.35µV. At 435MHz 10dB S+N/N n.b.f.m. 0.51µV. At 435MHz 15dB S+N/N s.s.b. 0.38µV
- **SELECTIVITY:**
- **RESOLUTION:** 100Hz, 1, 5, 10, 12.5, 25, 100kHz
- **IMAGE REJECTION:** At 145MHz -39dBm
- **IF STAGE:**
- **AUDIO OUTPUT:** 1W into 8Ω
- **SCAN RATE:**
- **SEARCH RATE:**
- **MEMORIES:** 100
- **FEATURES:** 0.6m whip antenna, mobile mounting bracket, wire stand, 1.8m d.c. power cord.
- **REVIEWED:**
- **PRICE:** £525

## Realistic PRO 32 Programmable Handheld Scanner



- **COVERAGE:** 68 to 88MHz, 108 to 136MHz (a.m.), 138 to 174MHz, 380 to 512MHz.
- **MODES:** a.m., f.m.
- **SENSITIVITY:** (a.m. 20dB signal-to-noise at 60% modulation). 108 - 136MHz = 2µV; (f.m. 20dB signal-to-noise at 3kHz deviation). 68 - 88MHz = 0.6µV; 138 - 174MHz = 1µV; 380 - 512MHz = 1µV
- **SELECTIVITY:** -6dB @ ±9kHz, -60dB @ ±15MHz
- **RESOLUTION:** 5, 12.5 or 25kHz
- **IMAGE REJECTION:**
- **IF STAGE:** 455kHz, 10.7MHz
- **AUDIO OUTPUT:** 300mW
- **SCAN RATE:** 4 and 8 channels per second
- **SEARCH RATE:** 4 and 8 channels per second
- **MEMORIES:** 200
- **FEATURES:**
- **REVIEWED:** Short Wave Magazine November 1987
- **PRICE:** £239.95

## Realistic PRO 38 Handheld Scanner



- **COVERAGE:** 68 - 88, 136 - 174, 406 - 512MHz
- **MODES:** f.m.
- **SENSITIVITY:** 68 - 88MHz = 0.5µV normal, 2µV limit; 136 - 174MHz = 0.7µV normal, 3µV limit; 406 - 512MHz = 0.7µV normal, 4µV limit
- **SELECTIVITY:** At 155MHz, -6dB = ±10kHz, -50dB = ±17kHz
- **RESOLUTION:**
- **IMAGE REJECTION:**
- **IF STAGE:**
- **AUDIO OUTPUT:** nominal 260mW
- **SCAN RATE:** 10 channels per second
- **SEARCH RATE:**
- **MEMORIES:** 10
- **FEATURES:** Keyboard lock switch, l.c.d. channel readout, jack for earphone, belt clip and flexible antenna supplied
- **REVIEWED:**
- **PRICE:** £129.95

## Uniden Bearcat 70XL Handheld Scanner



- **COVERAGE:** 29 - 54, 135 - 174, 406 - 512MHz
- **MODES:** f.m.
- **SENSITIVITY:** 29 - 54MHz = 0.4µV, 136 - 174MHz = 0.5µV, 406 - 512MHz = 0.7µV
- **SELECTIVITY:** -55dB @ ±25kHz
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:** -50dB
- **IF STAGE:** 10.8MHz
- **AUDIO OUTPUT:** 140mW at 10% t.h.d. into 8Ω
- **SCAN RATE:** 15 channels per second
- **SEARCH RATE:** 15 channels per second
- **MEMORIES:** 20
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £199.99

## Uniden Bearcat 50XL Handheld Scanner



- **COVERAGE:** 29 - 54, 136 - 174, 406 - 512MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** For 12dB SINAD. 29 - 54MHz = 0.4µV; 136 - 174MHz = 0.5µV; 406 - 512MHz = 0.7µV
- **SELECTIVITY:** -55dB @ ±25kHz
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:** -50dB
- **IF STAGE:** 10.8MHz
- **AUDIO OUTPUT:** 500mW at 10% t.h.d. in 8Ω
- **SCAN RATE:** 15 channels per second
- **SEARCH RATE:** 15 channels per second
- **MEMORIES:** 10
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £99.99

## Uniden Bearcat 100XL Handheld Scanner



- **COVERAGE:** 66 - 88, 118 - 174, 406 - 512MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** For 12dB SINAD. 30 - 50MHz = 0.3µV; 118 - 136MHz = 0.8µV; 136 - 174MHz = 0.4µV; 406 - 512MHz = 0.5µV
- **SELECTIVITY:** 50dB at ±25kHz
- **RESOLUTION:** 5kHz
- **IMAGE REJECTION:** -50dB
- **IF STAGE:** 10.8MHz
- **AUDIO OUTPUT:** 300mW at 10% t.h.d.
- **SCAN RATE:** 15 channels per second
- **SEARCH RATE:** 25 frequencies per second
- **MEMORIES:** 16
- **FEATURES:** Priority channel, keyboard lock, auto squelch and battery low indicator
- **REVIEWED:**
- **PRICE:** £189.99

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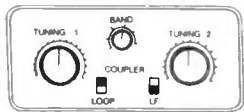
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