Short Wave Magazine

APRIL 1988

RADIO NEDERLAND'S FLEVO TRANSMITTER
In the very early days of the BBC, in late 1922 and early 1923, the Godfrey Phillips tobacco company issued a set of 25 cigarette cards, one card included in each pack of their BVM cigarettes. The back of every card carried instructions for a complete operation in the building of a crystal set, while the front bore a coloured picture illustrating the operation. Such was the popular desire to build a crystal set in those days, that the set of cards must have boosted the sales of BVM cigarettes enormously.

The crystal set described was a large and sturdy affair built on a thick baseboard 350 x 250mm. Its main component was a massive tuning inductance 10 centimetres in diameter and 15.5 centimetres long, wound with a single layer of No. 26 d.c.c. copper wire. Two brass bars of 6.35 x 6.35mm square section ran the length of the inductance, and each carried a cylindrical ebonite slider incorporating a sprung brass contact that wiped along two bared tracks also running the length of the inductance. Tuning was effected by sliding one of the contacts along the inductance until the required station — usually the only station — was received at its loudest. The other contact determined the selectivity of the set, and was also slid along to the position giving best performance. A variable capacitor of 300pF was mounted upright at the left of the baseboard, and was connected in parallel with the tuned part of the inductance to give fine tuning. Rectification was effected by a crystal detector. Instructions were given for making both a ‘catswhisker’ type and a ‘carborundum’ type — the latter requiring a home-made potentiometer and a 1.5 volt dry cell.

Across the headphone terminals was fitted a large fixed capacitor of 2000pF which made not the slightest difference to the set’s performance, though theoretically it was necessary. With the mahogany baseboard and end-cheeks of the inductance painted with shellac varnish, and the brass slider bars and terminals polished, the appearance of the set was impressive. So was its performance, by the standards of the time.

The writer recently made one of these Godfrey Phillips cigarette-card sets, following the instructions precisely. Every bit of the set was home-made, including the variable capacitor and its graduated knob. The most difficult parts to make were the two ebonite sliders, as they had to have a hole of 6.35mm square section drilled and filed through them. These holes had to be an excellent fit over the brass slider bar so as to allow no play, with consequent wandering of the brass contact off its bared track.

Winding the inductance by hand in a home-made winder was easy — the secret was to first heat the spool of wire so that it expanded. When the wire cooled after it was wound, it contracted and gripped the former hard, so preventing the turns from loosening and slipping.

Connected to a low, outdoor antenna about 10 metres long — very inferior to the high and mighty array specified for the original — the set received at least three stations. Radio 2 on medium wave came in very loudly; Radio 4 on long wave was not quite as strong; other stations were not identified. Both sliding contacts had to be used for best reception, and the stations could easily be separated. Using a modern semiconductor diode in place of the crystal detector (the galena crystal was a poor one), an ancient horn loudspeaker could be worked at low volume. The set would even function, though not so loudly, without either an antenna or an earth — but not without both. It performed well using a television down-lead; the outer section of the coaxial cable operated as the crystal set’s antenna.

This cigarette-card crystal set, built to instructions issued sixty-odd years before, is now on display at the Vintage Wireless Museum at South Dulwich and was shown briefly, among 100 ancient radios, on BBC television. As far as is known, of the great number of such Godfrey Phillips sets that were originally built, none survives.
Whiskey, Waves and Women
SWM Review: Kenwood RZ1 Scanning Receiver
Aircraft on the HF Bands
Report from the Polder
The 1923 Cigarette-Card Crystal Set

REGULARS

First Word
A Word in Edgeways
What's New
Grassroots
Rallies
Airband
Bookcase
Scanning
Bandscan
Starting Out
Services
What Receiver?
Book Service

Editorial
Your Letters
Latest News & Products
Club News
Where to Go
Aeronautical Radio News
Books Reviewed
For the Scanning Enthusiast
Broadcast Station News
For the Beginner
Important Information
Technical Specifications
Order Your Technical Books

SEEN & HEARD

Amateur Bands Round-Up
Decode
Info in Orbit
Band II DX
Television
Long Medium & Short

Justin Cooper
Mike Richards G4WNC
Pat Gowen G3IOR
Ron Ham
Ron Ham
Brian Oddy G3FEX
FIRST WORD

It is now a whole year since we re-launched Short Wave Magazine as a monthly magazine aimed at the listening enthusiast. The new, larger and brighter format seems to have gone down very well and new readers are obviously being attracted to the fold. The steadily rising circulation figures bear witness to this.

However, we are not complacent and the completed and returned Reader Questionnaires from the March issue will be assiduously studied to see just how you think that the magazine can be improved to cater for your needs.

A quick look at the first batch of returned Questionnaires proved to be both interesting and informative — some of the other hobbies indulged in are fascinating! When replies are finally analysed I should be able to incorporate some changes and new ideas to make the magazine even better than you seem to think it is now.

To celebrate our first year as a listener’s magazine we have a special gatefold cover. Gatefolds are usually associated with “pin-up” mags but our’s shows the Radio Nederland Flevo transmitting site in all its glory, inside you will find in full colour, reproductions of a set of “flag-cards” explaining how to build a crystal set. These are a rare collector’s item now — and to think that I probably flicked some around the school playground more years ago than I care to remember!

DICK GANDERTON

If only one could look into the future to see just what you should keep and what to discard — I might still have my Number 9 Meccano set, 1928 and 1932 BSA 350cc motorcycles, one-valve short wave receiver. Horby “Q” Gauge clockwork train set and so on — all disposed of in the quest of "something better!"

A WORD IN EDGeways

Sir

I am writing this letter as I feel so unhappy about the way I see our hobby progressing.

Bland disregard of frequency allocations, with the result that c.w. swamps everything to the detriment of the "genuine", considerate amateur, is but one feature now more the rule than the exception, I’m afraid.

Continental "intrusion" with unnecessary wattage is making a mockery of the 80m band, so they also appear to do "what-ever" with no thought or consideration for others.

Incidentally, I am one of the "silent majority" who prefer to monitor all parts of the spectrum and for many years derived much enjoyment from the amateur bands. However, it is my opinion, becoming just that — very amateurish indeed! QSOs between the "more mature in years" operators are still interesting and s.w.l.s are invariably remembered at some time — usually just before going QRT — which is nice.

However, the puerile chatter that now seems to be flooding the air waves is beginning to force me away from the amateur bands to the DX transmissions of the BC stations worldwide. I wonder if I am alone? I expect not as I note the ever decreasing number of G2,3 and 4s in the current Call Book. Advancing years naturally reduces numbers, but falling operator standards are, I fear, the main reason. Any comments, chaps?

Fifty years an s.w.l.

DAVID J. GOMMO
CREWKERNE
SOMERSET

Mr Blanchard’s comment about a pulse type interference on 243MHz is interesting, a similar signal is audible, in this area and as far as the northern end of the M42, for long periods on 131.425MHz and, at times, 131.400MHz, this is with the receiver in both fixed and mobile situations.

I understand from a conversation over the Christmas period that the British Parachute School often picks up interference on its frequency “as though a transmitter has been left on”.

Obviously this could lead to a very dangerous situation and it is hoped that the problems are soon resolved.

BRIAN G PORTER
DROITWICH

If you have any points of view that you want to air please write to the editor if your letter is used you will receive a £5 voucher to spend on any SWM service.

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

Sir

The excellent Short Wave Magazine for February has just arrived and I read with some scorn the pompous letter from Alan Smith of Northampton attacking HCJB-UK.

Given the high power and easy, one-hop coverage of Europe by D-Welle, I should be inclined to imagine that any reception reports that he might file from Northampton are entirely superfluous and something of a waste of time. But frequency management engineers are a courteous lot and no doubt he gets letters of thanks, which must do his ego a bit of good — as one might throw an old dog a bone.

If he only sends in his reports monthly, he is hardly qualified to pontificate. DAILY reports, filed weekly, and a monthly bandscan is the real name of the game. It is what an official monitor is paid to produce. I agree entirely with HCJB-UK that most reports in, note 1988 when transmitting powers are high, are hardly worth the paper they are written on.

The references to Christian charity are a bit much, coming at the end of a particularly self-righteous letter.

Chuck it, Mr Smith.

GERARD CASEY
BORDEUX
FRANCE

Sir

Perhaps W. Blanchard should get his facts straight before giving vent to his ready wit!

At the last count a few days ago, there were still five Eureka beacons giving faithful service at Brawdy, Chivenor, Leuchars, Shawbury and Valley. How many RAF aircraft are now fitted with the Rebecca equipment necessary to use these beacons is another matter.

C. J. KIRBY
CHALGROVE
OXFORD

C. J. Kirby supplied a list of frequencies for the beacons, but these as appear in Airband this month I have not listed them here.

ED

Sir

Can anyone help me find a source of alloy tubes for antenna projects? I would dearly love to experiment but cannot find a stockholder willing to sell small quantities.

I am trying to construct a log periodic array similar to the one that appeared on page 18 of the February issue of SWM.

A. J. HARDING
10 OAKFIELDS CLOSE
STEVENAGE
HERTS SG2 8NQ

One of the antenna manufacturers such as Sandpiper Communications might be prepared to supply suitable tubing in small quantities. Alternatively Whistons can supply a limited range of alloy tubing by post. In any case a copy of their “Car” is an indispensable item for anyone who dabbles in the practical hobbies. Free from K. R. Whiston Ltd, New Mills, Stockport, Cheshire SK12 4YA, mentioning Short Wave Magazine of course. ED.
WHAT'S NEW

Dial Search

The telephone is designed to "tune-in" to all sorts of interesting and useful people. So is every portable radio, yet many radios in the home stay tuned to one station all the time!

Getting more variety of listening is not a matter of chance or magic or even special training, you just need the right information.

_Dial Search_ is a handy reference booklet, published every two years. It provides information for the home listener using a portable radio and its own antenna. The lists of stations are carefully designed to be easily read and consulted.

![Dial Search](image)

WAB Awards

The basic awards for British Isles stations are as follows:

- **WAB Areas Award** h.f. — 400 areas worked v.h.f. 50MHz and above — 250 areas worked
- **WAB Counties Award** — 55 British counties on h.f. and v.h.f.
- **WAB Districts Award** — 200 Districts on h.f. and v.h.f.
- **WAB Large Squares Award** for working the 100 x 100km squares of the National and Irish grid systems — 30 squares
- **WAB Bookholders Award** — 100 bookholders worked.

QSL cards are not required for any WAB award and the awards are also available to w.w.s. The main net is on 3.76MHz on h.f. and on 144.43MHz in the South of England and 144.44MHz in the Midlands and North. The h.f. net is on daily while on v.h.f. there is activity controlled from the London area on Fridays at 2030 clock time and Sunday at 1030 on 144.43MHz. The Northern Group meet on 144.44MHz at 2000 clock time on Wednesday and Friday with some activity on Sunday mornings too. There is an additional net on 144.43MHz at 2030 on Tuesdays, controlled from Hampshire.

Further information on all WAB awards is available for an s.a.e. from: Brian Morris G4KSQ 22 Burdell Avenue Sandhills Estate Headington Oxford OX3 8ED

Voice of the Andes

HCJB are offering attractive QSL cards, with a new card appearing every two months. During 1988 they will be featuring water-colour paintings of colonial Quito.

To receive a verified QSL card, you need to send the following details:

1. Name of the programme
2. Time in UTC
3. Date
4. Frequency
5. Programme details

To receive your QSL cards via airmail you must include an IRC.

Some of the different programmes HCJB produce are:
- **Being Alive** Comments and discussions on contemporary subjects.
- Call of the Andes Probing events and cultures from pre-colombian times to the present.
- **DX Partyline** The latest DX tips and news about the short wave hobby.
- **HCJB Today** An update of what's happening at HCJB.
- **Latin America Week** A review of the week's happenings in Latin America.
- **Mountain Meditations** Thoughts for a Sunday from the office of HCJB's president.
- **Musical Mailbag** Fun, food and listeners' letters.
- **Musica Del Ecuador** Music and comments from "the land of the equator".

Saludos Amigos HCJB's international friendship programme.

Shalom Looking for true peace in the midst of our complex world.

HCJB broadcasts in 12 major languages for a total of 100 programme hours daily. For a complete listing of all broadcasts by HCJB, write for an International Programme Schedule:

HCJB Casilla 691 Quito Ecuador

Dartford Tunnel Radio

The BBC, in conjunction with the Dartford Tunnel Authority, has installed a special transmitting system in both carriageways of the Dartford Tunnel. This new system carries the BBC's four national radio services as well as Radio London, Radio Kent and BBC Essex.

Motorists entering the tunnel in either direction will be able to continue hearing these BBC stations on their car radio, whether on f.m., medium wave or long wave. The system will also carry BT's radio paging service. Provision has been made to override all radio services with pre-recorded messages during extreme emergencies.

The full service is expected to commence shortly after Easter.

Barter News

Details of a very unusual service via amateur radio has arrived in the SWM office. "How many times has amateur radio caused arguments in the household? The XYL moaning because the OM is spending too much time on the air or maybe often these days the XYL is spending too much time on the air..."

If that sounds familiar and you live in or around Mirfield, West Yorkshire, you may be interested in the rest of the letter.

"Geefor Enterprises are able to offer help in the 'undone housework' area, by arrangement with their sister company Moorfoot Cleaning Company they can offer a 10% discount on carpet and upholstery cleaning to anyone buying a rig from them. Also, anyone living within 40km of Mirfield gets delivery free;" Barter News will be sent to interested parties for an s.a.e. and will carry details of things like stolen equipment and trade ads, etc.

For more details of these unusual services, contact:

Martyn Bolt G4SUI
Geefor Enterprises
112 Leeds Road
Mirfield
WF14 0JE

Short Wave Magazine April 1988
Digital Multimeter

Solex have now added the Soar ME4055 High Performance, Heavy Duty Multimeter to their range.

The unit is ruggedised and sealed which makes it drop, water and grime proof. As standard, the ME4055 comes complete with a three year warranty.

It incorporates many advanced features not found on similar models, including high accuracy — d.c. volts 1%, temperature testing, data hold, min/max hold, frequency testing, 40-segment bar graph display, auto or manual ranging and auto power down mode. A yellow case is provided.

More details on this product can be obtained from:

Solex International
95 Main Street
Broughton Astley
Leicestershire LE9 6RE

Media Network

This programme is transmitted by Radio Nederland on Thursdays. It is a weekly survey of communication developments compiled with the assistance of over 170 monitors spread across the globe. This audio magazine runs on enthusiasm, building on more than 25 years of experience in this field of programming.

March 31 Island Life. They visit Norfolk Island to the east of Australia. Jonathan Marks has arranged a link-up with Kathy Le Cren of the station there to find out how modern technology is affecting a station in an isolated part of the globe.

April 7 The Long Path Through Asia Part 2. Following the successful trip to Bangladesh back in November of last year, they now fly to Jakarta taking the train through Java.

What is happening to the Indonesian media scene? Are all the short wave stations on the way out? What is left of the Dutch colonial influence in this fast developing Asian society? They also include Pacific media news from Arthur Cushing.

April 14 Media News Roundup. This edition includes news from the African continent from Richard Ginney.

April 21 Media News Roundup. This edition includes clandestine radio news from John Campbell.

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.

The English transmission schedule for Radio Nederland, as from Sunday March 27.

<table>
<thead>
<tr>
<th>UTC</th>
<th>Frequency (MHz)</th>
<th>Mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>0400</td>
<td>13.7, 9.85</td>
<td>25</td>
</tr>
<tr>
<td>0630</td>
<td>11.9, 9.895</td>
<td>25</td>
</tr>
<tr>
<td>0730</td>
<td>9.715, 9.630</td>
<td>55</td>
</tr>
<tr>
<td>0830</td>
<td>9.63</td>
<td>25</td>
</tr>
<tr>
<td>0830</td>
<td>21.485, 17.575</td>
<td>55</td>
</tr>
<tr>
<td>1030</td>
<td>9.685, 6.020</td>
<td>55</td>
</tr>
<tr>
<td>1130</td>
<td>21.480, 17.575, 15.560</td>
<td>55</td>
</tr>
<tr>
<td>1130</td>
<td>17.605, 9.715, 5.955</td>
<td>55</td>
</tr>
<tr>
<td>1430</td>
<td>17.575, 15.560, 13.770, 11.740, 5.955</td>
<td>55</td>
</tr>
<tr>
<td>1630</td>
<td>3.540, 6.020</td>
<td>55</td>
</tr>
<tr>
<td>1830</td>
<td>21.685, 17.605, 9.54, 6.02</td>
<td>55</td>
</tr>
<tr>
<td>2030</td>
<td>6.02 (parallel to Africa service)</td>
<td>55</td>
</tr>
<tr>
<td>0230</td>
<td>15.560, 11.740, 9.895, 9.54</td>
<td>55</td>
</tr>
<tr>
<td>0530</td>
<td>8.895, 9.580, 6.615, 6.020</td>
<td>55</td>
</tr>
<tr>
<td>0530</td>
<td>9.715, 6.165</td>
<td>55</td>
</tr>
</tbody>
</table>
**WHAT'S NEW**

**Engineering Changes**

Ridge Hill: The BBC should have begun transmitting Radios 1/2, 3 and 4 in f.m. stereo from Ridge Hill, 12km south east of Hereford. The existing f.m. relay at Hereford will be closed down.

The frequencies to be used are:
- Radio 2/1 88.8MHz
- Radio 3 90.8MHz
- Radio 4 93.0MHz

Listeners will need a multi-element f.m. antenna, preferably mounted outside.

Stanton Moor: A new BBC f.m. relay should be in operation soon about 6km north west of Matlock.

The frequencies to be used are:
- Radio 2/1 89.8MHz
- Radio 3 92.0MHz
- Radio 4 94.2MHz

Again, listeners should use a multi-element f.m. antenna, preferably mounted outside.

Radio Derbyshire will be transmitted on 95.3MHz.

Port Isaac: A new television relay will shortly be beaming out 16km north west of Bodmin. It is being built jointly by the BBC and the IBA at Trevetha Lane, Port Isaac.

The channels to be used are:
- Channel 55 BBC 1 South West
- Channel 59 Channel 4
- Channel 62 BBC 2
- Channel 65 ITV/TSW

Viewers will need Group C/D antennas, vertically mounted outside for best results.

**SWL Groups**

There are quite a few different groups the short wave listener can join. The following list is just a few you may like to consider. If we have missed your favourite group out, drop us a line so we can rectify that.

ILA: The International Listeners Association
ILA, 1 Jersey Street, Haford, Swansea.
Unsure of subs.

DX Association of Great Britain: Alf Binnerving, 43 Atwood Drive, Bristol BS11 0SR.

British DX Club: Colin Wright, 54 Birkhall Road, Cefnog, London SE6 1TE.

**Andex International**

Andex is a listener's club operated in conjunction with the DX Paryline programme. Club benefits include a 8-page bimonthly bulletin featuring articles about HCJB, the short wave world, improving reception and much more.

For membership and other details write to:

ANDEX
Casilla 691
Quito
Ecuador
South America

**Anniversary Dinner**

The Isle of Man Amateur Radio Club are celebrating their 40th anniversary with a dinner on April 15. If there are any past or present members who would like details of this event they should contact:
Anthea Matthewman
Tel: Douglas 22295

**75th Celebrations**

The RSGB have quite a few events planned to celebrate their 75th Anniversary. On July 15-17 it's the National Radio Exhibition at the NEC, Birmingham. This has, by now, become a very well known event in the radio amateur's calendar, but note that it's during the summer this year, not spring. It will be a 'bigger and better' event than previous years with a larger trade exhibition. There will also be an exhibition of amateur radio through the ages.

There will be various social events held during the evenings of the exhibition, either in the grounds or in one of the nearby halls — depending on the weather. They have arranged accommodation 'packages' with the Metropolitan Hotel, which can be either for all three days or on a daily basis. You will also be able to purchase a package ticket for all the events, or daily tickets, whichever suits the visitor most.

There will be a special 75th Anniversary luncheon on the first day of the exhibition and members can purchase these tickets on a first come first served basis.

On July 18 the RSGB Headquarters will be closed to give them chance to get all the equipment back from Birmingham, and put it all back up again, this time at HQ. July 19-21 will be HQ Open Days when you will be guided tours of the operations there as well as displays of archive material and of old amateur radio equipment. Tickets for this are free, but again on a first come first served basis, although you don't have to be a member to get tickets, RSGB members will get priority. They will have the HQ station running during these three days when visitors will also be able to use the very special call sign GB7RS. Opening hours will be 10am to 4pm, and during all this they are still intending to keep the HQ running and keep the work up together!

Then, on July 22-23 there will be a Data Communications Symposium at the Historic Harrow School. There will be lectures and demonstrations of all types of data comms as used in amateur radio. It's the chance that all the various data communications groups have had a chance to get together for discussion. Tickets can be bought in various options, either a 2-day package which includes accommodation, food and entry, day tickets can be bought in advance and these included tea and coffee, lunch and entry or tickets can be purchased on the door which include entry and tea and coffee.

The next event is really a washout. July 24 is a Families Day, when the individual affiliated radio clubs and societies will take over. Just about anything goes as long as is includes the family in amateur radio and there will be a prize for the club who dreams up the most unusual event. The RSGB HQ are hoping to involve RAYNET in another exercise like Operation Hilltop, where they will pass 75th Anniversary greetings messages around the country.

On the July 28, when there will be an International Satellite Seminar near Guildford. This will be by invitation only and is very much an international event. Satellite builders, designers and engineers will gather to exchange information and views. The AMSAT Colloquium will take place on July 29-31 and, as usual, the booking for this event will be handled by Ron Broadbent. The meeting during the day of the 29th is a technical meeting for engineers and is by invitation only, the social event that evening heralds the start of the open session.

Booking forms for most of these events will appear in the April/May copies of Radcom. Overseas visitors should contact the RSGB HQ for an information pack.

There should be a 75th Anniversary Award available too for working either in the HQ Station GB7RS5 and 75 RSGB members or (ii) 5 special GB stations put on for the anniversary and 75 RSGB members. You can apply for the award for h.f. and/or v.h.f. but not mixed.

**Red Rose Award**

The Red Rose Award is issued by the West Manchester Radio Club. The rules apply to both s.w.i.s and amateurs alike.

All Bands: Fifty points are needed for the basic awards made up of the following:
- GB0RRR
- GB1RRR
- GB2RRR
- GB6RRR
- GB7RRR
- GB8RRR
- GB1RRA
- GB2RRA
- GB4RRA
- GB6RRA
- GB8RRA 10 points each
- G4MWC or G6FSA 5 points each

Any club member point 1 each

HF Bands: Twenty-five points are needed.
- VHF, UHF, SHF: 0-100km radius from club QTH 50 points needed.
- Over 100km radius from club QTH 20 points needed.
- Outside G, GD, GM, GI, GW, EX (excluding GU, GJ) 10 points needed.

Via Satellite: 1 contact 10 points.

When the correct number of points are achieved, contact the Awards Manager, Don G3BSA, QTHR or club QTH with copy of log and £1 UK, €2 Europe or $3 outside Europe to cover cost of postage for the award.

To gain the bronze endorsement on all bands, all six RRA stations must be worked. On the h.f. bands two RRA stations must be worked. On v.h.f., u.h.f., s.h.f. up to 100km radius all six RRA stations must be worked, over 100km two RRA stations outside G, one RRA station and satellite one RRA station.

The Awards Manager can give you details for the silver, gold and platinum endorsements.

**worked All Britain Contest Dates**

<table>
<thead>
<tr>
<th>Band</th>
<th>Mode</th>
<th>Day/Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5MHz</td>
<td>phone</td>
<td>Sunday May 22</td>
<td>1400-2100UTC</td>
</tr>
<tr>
<td>144MHz</td>
<td>QRO</td>
<td>Sunday June 19</td>
<td>0900-1600UTC</td>
</tr>
<tr>
<td>144MHz</td>
<td>QRO</td>
<td>Sunday July 10</td>
<td>0900-1300UTC</td>
</tr>
<tr>
<td>432MHz</td>
<td>s.s.b.</td>
<td>Sunday July 10</td>
<td>1400-1800UTC</td>
</tr>
<tr>
<td>50MHz</td>
<td>s.s.b.</td>
<td>Sunday October 9</td>
<td>0900-1200UTC</td>
</tr>
<tr>
<td>3.5MHz</td>
<td>c.w.</td>
<td>Sunday November 6</td>
<td>0930-1230UTC</td>
</tr>
</tbody>
</table>

For further details concerning contest and supplies of contest sheets, send a s.a.e. (9 x 4in) plus three First Class stamps to:

Laurie Segal G6XXL, 21 Blackstone Road, Cricklewood, London NW2 6DA
This month we start with the Yarmouth RC who have two Informal Evenings planned, one for March 30, the other for April 7. All meetings start at 7.45pm, with formal programmes beginning at 8pm. For further information contact A. Besford on Yarmouth 721173.

On April 18, GBHJS will be giving a talk on Chassis Bashing for all those at the Mid & Mor ARS. They meet every Tuesday, the 1st in the month being a Committee Meeting, the 2nd a Computer Night G4OMP, the 3rd a monthly meeting and the 4th the Birmingham Central RAYNET monthly meeting. Every Wednesday they have Morse Class and any Thursday is their Night on the Air with G4SEA. All meetings start at 7.30pm, with classes at 7pm, and are now held in Unit 16, 60 Regent Place, Birmingham. More from Tom Brady GBG2A on Hamstead 1924.

Horndean & District ARC meet every 1st Thursday at 7.30pm in Merchistoun Hall, Horndean. On April 7 they have the Rowner Club visiting. More details from Dan Bernard G4RLE on Portsmouth 755274.

South Pows ARC meet every 1st and 3rd Tuesday, the 1st Tuesdays are Talks, the 3rd Tuesdays are Social evenings. All meetings take place on the first floor of the Village Hall, The Street, Becon. On April 5, they have the first part of Practical Satellite TV. If you would like more details then contact B. Carter GQBAAG on Bwich 730158.

The Radio Society of Havant meet every Friday evening at 8pm, in the Roxeth Room of the Havant Arts Centre, High Road, Havant Website: www.rs-havant.org.uk. March 14, 15 and 16 are their AGM, April 8 and the 22nd are both Activity Nights, and the 15th is a talk on Cables by GODIN. Details from Bob Pickles G3VCA on Ruston 67326.

Sutton and Cheam RS have the 39th S & C Dinner at the Stoneleigh Inn on March 26, a Natter Night on April 4, an Inter-Club Quiz (No. 1) CATS versus S & C at St Swithin's Church Hall, Grovelands Road, Purley on the 11th and a Junk Sale on the 15th. Meetings are every 3rd Friday at 7.30pm, in the Downs Lawn Tennis Club, Holland Avenue, Cheam. Natter Nights are on the 1st Mondays in the Downs Bar. More details from Tony GBWY at 53 Alexandra Avenue, Sutton.

There is really a full month ahead for those at the Coventry ARS. March 25, April 1, 8 and 22 are all Nights on the Air, and March 14 and April 15 is an evening of Mini Lectures. They usually meet every Friday at 8pm, in Baden Powell House 121 St Nicholas Street, Radford. For any further details contact Jonathan Ward G4HTT on Coventry 610408.

The Wakefield & District RS usually meet every Tuesday evening at 7.45pm in the Community Centre, Prospect Road, Ossett. On March 29 they have the Club's Activities on Video and Photography on the Air and the 12th is their AGM. More from John Bryan on Leeds 820198.

RhyL & District ARC meet every 1st and 3rd Monday at 7.30pm, in the 2nd RhyL Scout HQ, behind the little Theatre, Vale Road, RhyL. On April 11, GW3RBM will be giving a talk on Home-brew h.f. Liners and on the 25th, Eddie Douglas will talk about Radio Astronomy. Further information available from Mike GW0HVK on Llandegla 621.

Sudbury & District RAS meet on the 1st Tuesdays at 8pm, in The Saffrons Head, Newton Green, Sudbury. More details from Colin Maddimer on Sudbury 77004.

On Thursday April 21, the Eden Valley RS have planned a visit to the Oxford Castle Radio College. Meetings start at 7.30pm and are usually held in the Ullswater Centre, Penrith. For further information contact Martin G4FUI on Penrith 56728.

Keighley ARS have America — The First 25 Years in Space by G4ZUD on March 29, a Junk Sale on April 12 and Weather Fax Interpretation by G. Baker Esq on the 26th. All meetings commence at 8pm in the Club Room at the back of the Victoria Hall, Victoria Park, Keighley. Further details available from Kathy G11GH on Bradford 496222.

On Friday April 1, the Mansfield ARS have a Construction Competition with Guest Speaker. They meet every 1st Friday and 3rd Saturday in The Victoria Social Club, Mansfield, at 7.30pm. More from Keith Lawson G4AAH on Mansfield 642719.

The Rugby ATS meet every Tuesday at 7.30pm in the Cricket Pavilion, outside Rugby Radio Station. April 12 is their AGM and the Construction Competition Judging follows on the 19th. Further information available from Kevin Marriott GBTRY on Rugby 77986.

Felixstowe & District ARS are closed on April 4 for Easter, but on the 18th they have a Talk on Noise by G4FRE. All Lecture and Social Evenings take place at 8pm in the Scout Hut, Bath Road, Felixstowe, unless otherwise specified. Further details from Mr Kevin Whitson G4YQC on Ipswich 642595.

Meetings for the Halifax & District ARS are every 1st and 3rd Tuesday, 1st Tuesdays being informal “Noggin and Natter” Nights. They meet in the Running Man Public House, Pellan Lane, Halifax at 7.30pm prompt. A Club Dinner is being organised for sometime in April by David Moss G0DLM on Halifax 202360.

Torbay ARS holds its weekly meetings on Friday evenings, at 7.30pm, in the English China Clay Social Club, Highweek, near Newton Abbott. On March 26, G4FLW will be giving a slide show on DX Trips and on April 23 they have their AGM. For further information you'd best talk to Bob McCreddie GOFOG on Haytor 233.

Cheshunt & District ARC meet every Wednesday at 8pm, in the Church Room, Church Lane, Wormley. March 30 is a Lecture by G3JOJ, April 6 and 20 are Natter Evenings and the 27th is a Construction Contest. Further information available from Dave Davies G1KQA on Lea Valley 764930.

Meetings for the Loughton & District ARS are usually every Thursday at 7.45pm in Room 20 of Loughton Hall. March 25 is their RSGB Film Night, April 8 is their AGM and the 22nd is an Informal Evening. Club Project Building Night. More from John Rad GD0ZBH at 9 Albion Hill, Loughton IG10 4RA. Prestel Mob No. 0150838434.

York ARC meet every fourth Thursday at 7.30pm in the Recreation Centre, Clayton Grove, Yeovil. March 31 and April 28 are Natter Nights, on April 7 G3MYM will be giving a talk on Trans-equatorial Propagation, the 14th is Simple h.f. Antennas by G3GC and their AGM follows on the 21st. Contact David Bailey G1GOM on Yeovil 738004 for more details.

On March 30 Derby & District ARS have a Visit to the Royal Observer Corps HQ at Rugby. April 6 is a Junk Sale and the 21st is a Talk and Demonstration on Microwave Modules by G4EFO. All meetings begin at 7.30pm and are held at 119 Green Lane, Derby. More details from Jack Anthony G3KQF on Derby 772361.

Barry College of Further Education RS have a Video Film Presentation on the Story of Electronics on April 14 and a Tape Slide Presentation — DXpedition to St Pierre et Miquelon island on the 28th. They meet on a Thursday evening at 7.30pm in the annex of the Barry College of FE. Barry to Bonvillston Road (A4226), near the Welsh Hawking Centre. For more details contact Dr Kevin Johnston G4WQ on BCB at 68 Heol Isaf, Radv. Cardiff, South Glamorgan CF4 6RJ.

Ealing & District ARS have a Junk Sale on March 29, Morse Training G3SGT on April 5, The Radio Interference Service G6KHL on the 12th, an Open Evening on the 19th and the 26th is Operating New Equipment by G4KHS. All meetings take place at 7.30pm on a regular Tuesday evening, in The Community Centre, 71a Northcroft Road, Ealing. Further information available from Anton Berg on North Ealing 1416.

Meetings for the Lough Erne ARC are every 3rd Wednesday at 8pm in the Railway Hotel, Enniskillen. On April 10 there is the Mobile Rally, taking place at Killyhevlin Hotel and a talk entitled Secure your Rig follows on the 20th. Further information available from John Jeffers on 6 BR 6DX, or telephone Enniskillen 24905.

South East Kent (YMCA) ARS have two Natter Nights planned, one on March 30, the other on April 20. April 6 is their AGM and the 13th is a Natter Night/Committee Meeting. And showing of interest to all by G4VRB follows on the 27th. Meetings are held on Wednesday evenings and Construction Classes are on the 14th and 28th of each month. Amateur Radio Examiner Coaching are on Monday and Tuesday evenings. All events held at the Dover YMCA, High Street, Dover, 7BR 6DX. More from John Dobson on Dover 211638.

Another busy month ahead for everyone at the Bredhurst Receiving and Transmitting Society. April 7 and 21st are Construction/Natter Nights, the 14th is a surprise event organised by G5YLW and an Inter Club Quiz follows on the 28th. And more meets every Thursday evening at 8pm, in the Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham. Kelvin G3OMZ on Dover 673850 will fill you in on any other details.

Thursday April 7 is an Open Meeting for those at the Horsham ARC. They meet every 1st Thursday in The Guide Hall, Denme Road, Horsham. Anyone wishing to obtain further information about the club can contact Phil Godbold on Steyning 814516.

 Fareham & District ARC usually meet every Wednesday evening at 7.30pm, with Morse classes from 6.30pm in the Pockeather Community Centre, Westlands Road, Fareham. More from Paul Whiting G4YQC on Fareham 288139.

Meetings for the South Bristol ARC are usually held in the
All meetings in the Board Room, first floor "B" block, Colchester Institute, Sheepen Road, commencing at 7.30pm. Further information available from Mike Griggs G4YJN on Colchester 3481189.

On April 14, the Southgate ARC have a Grand Slupus Equipment Sale followed by an Informal evening on the 28th. You will have every 2nd and 4th Thursday at 7.45pm, in the Holy Trinity Church Hall (Upper), Green Lanes, Winchmore Hill. More from Brian Shelton on Winchmore Hill 24356.

An Annual Quiz between local clubs is being organised for all those at the Exeter ARC for April 11. All meetings are at 7.30pm every 2nd Monday, in the Community Centre, St. Davids Hill, Exeter. Contact Ray Donno G3YHB on Exeter 787110 for more details.

Meetings for the Acton, Brentford & Chiswick ARC are every 3rd Tuesday at 7.30pm, in the Chiswick Town Hall, High Road, Chiswick. On April 19 there will be a discussion on Test Instruments. More details from W. G. Gyer G3GEH on Acton 3778.

Wiral & District ARC meet every other Wednesday evening at 8pm in the Ibby Cricket Club, Ibby Mill Road, Ibby. April 13 is Film Night and the 27th is The Great Egg Race. For further information contact Alan Griffiths G1XYX on Moreton 7517.

The Cheltenham ARC have a talk and demonstration on Amateur Radio Test Equipment by G4UAZ on April 8 and the 22nd is an Informal Evening. They meet every 1st and 4th Friday at Charlton Kings Library in the Stanton Room. If you would like to know more about the club then contact Dave Abbott G4FRU at Holmbury, Thorncliffe Drive, Cheltenham.

Meetings for the Cornish RAC are at 7.30pm in the Church Hall, Treleigh, on the old Redruth Bypass. April 23 is the Marconi Event at Poldhu Cove G4MIOD. For any further details contact N. Pascoe G4USB on Redruth 212314.

The East Kent RS meet every 1st and 3rd Thursday at 7.30pm at Parkers Lodge, Kings Road, Herne Bay. On April 7, the Kent Repeater Group make a Presentation and an RSGB Video Show follows on the 21st. More from Brian Dimmon GARS on Whitstable 262042.

The Irish RT's meet every Monday evening at 8pm, in The Spanish Convent, Finglas, Dublin 11. Further information available from Chris Yeates E7AABB at 75 Georgian Village, Castleknock, Dublin 15 or telephone (Dublin) 01-440466.

Clacton RC meet every 1st and 3rd Wednesday at 7.30pm, in the Eldorado Amusement Centre, Faywick. R. P. Neave G4DAN on Colchester 395968 can fill you in on any other details.

On April 16, Crystal Palace & District RC have "Bring along a Morse key or keyer" arranged by Street Parkers Radio Club every Saturday at 8pm, in the All Saints Parish Rooms, Beulah Hill, London SE19. More from Geoff Stone G3FL2 on Forest Hill 6940.

Atherstone ARC have an Informal Evening at The Bull, Witherley, commencing 8pm on March 28, April 11 is VHF Then and Now as well as The RSGB VHF Awards by G5UM and the 28th is Club Night/Night on the Air. All meeting unless otherwise stated, are held in the Physics Laboratory, Atherstone Upper School, Long Melford, 2nd and 4th Monday at 7.30pm. Any further information available from John Arrowsmith G4WA on Atherstone 713670.

Vale of Evesham RAC have their Formal Evenings at 7.30pm every 1st Thursday in The Round of Gras, Badeyse and Informal Evenings every 3rd Thursday in The Gardeners Arms, Charlton. April 7 is a talk on Packet Radio by GSAMD/G4JKD and a Ragchew Evening follows on the 21st. More from G4UXC on Evesham 831508.

The Reading & District ARC have a Junk Sale scheduled for March 29. The club meets on alternate Wednesday evenings in the White Horse, Emmer Green, Reading. Any further information available from Mike Antony G4GHM on Reading 774042.

Paddinton College ARC meet at 7pm every Wednesday, in the Paddington College, Paddington Green, London W2. Don Pye G4JN on Paddington 3847 can tell you more.

A Junk Sale is planned at the York ARC meeting on April 15. Meetings continue each Friday at 7.30pm in the United Services Clubroom, 61 Micklefield, York. Any further information available from Kevin Cass G3WVO at 4 Heworth Village, York.

VHF Then and Now by G5UM is scheduled for those of you at the Nene Valley RC on April 27. The club meets every Wednesday evening at 8pm in the Prince Of Wales Public House, Well Street, Finedon. More from Paul Blyes G6UWS on Wellington 71189.

Down in Belfast City Centre, members of the City of Belfast YMCA RC are gearing up for a recruitment drive, emphasis on youth. Want to know more? You can get in touch with Paul McCartney c/o City YMCA General Office, Wellington Place, leaving contact address or phone number.

**GRASSROOTS**

Whitchurch Folk House, East Dundry Road, Whitchurch every Wednesday. March 30 is RSGB Films and Videos by GOAWX, April 6 is Practice Morse Tests Under Exam Conditions, the 13th is a Top Band Activity evening, the 20th is a 144MHz c.w. Activity evening and the 27th is an ATV Activity evening. More details from Verulam G4ZRY on Whitchurch 834282.

The Verulam ARC have an Activity Evening on April 12 and G3OVF will be giving a talk entitled "RSGB into the 21st Century on the 26th. They meet at 7.30pm every 2nd and 4th Tuesdays, in the RAF Association HQ, New Kent Road, off Malborough Road, St Albans. If you would like to know more about the club then contact Hilary G4JKS on St Albans 593181.

On March 31, North Wakesfield Radio Club have their Monthly Meeting, April 7 is Cavity Waveformers in 3 Easy Lessons by G3JME, the 14th is On the Air G4NOK, a Visit to Leeds Poly Computer Rooms for all those interested in computers and the 21st is a Road Redress. More from Peter Brown G0HOH on Marton 632370.

Colchester RAS have a talk entitled "Military Signals Equipment by Major J. L. Davies of the 19 Infantry Brigade HQ on April 14 and Shortwaves & Beams by J. Stanley Wood on the 28th.
The NRD-525 from JRC

It must be self-evident that the products from Japan Radio Company are somewhat special, standing as they do at a slightly aloof distance from the more commonly encountered receivers and transceivers. I had to suggest an analogy for this particular appeal. I would say that owning JRC equipment is akin to owning a top quality car, because they both combine discreet performance with an understated ability to completely satisfy the owner.

When one looks at the company profile of JRC, it is hardly surprising that they can produce these high quality products because communications is their business, and with a 1987 sales turnover of £625 Million, they are not exactly beginners at the game — in fact they started in business in 1915, and now rank as number 37 in the top 100 Japanese companies, behind such giants as Toshiba, Matsushita, and Sanrio.

Why am I telling you all this? Simply to give you some idea of what makes the NRD-525 the most sought after receiver in the listener market today. Those who can afford to buy the NRD-525 do so without hesitation; those who can only dream about having the best, dream about the NRD-525. Every review by the most expert and respected authorities in the world all come to the same conclusion: that the NRD-525 is the receiver they would all choose to own and use.

The NRD-525 is in fact the third in a series of JRC communications receivers which began with the NRD-505. This set new standards when it was introduced, and there are many NRD-505s in use with professional receiving stations all over the world. The basic mechanical design of the NRD-505 was a series of plug-in printed circuit boards connecting to a “mother board” in the main chassis. This method of construction is undoubtedly a superb way of building equipment, but it is also very expensive, and it came as no surprise to find that the successor to the 505 was built using more or less conventional single boards.

This was the NRD-515, and despite the simplification of its design, it again set new standards for fully synthesised receivers and became a much admired receiver. Now we have the NRD-525, in which JRC have returned to their original concept of plug-in boards, with the result that the NRD-525 is a sheer delight to see when you take off the cover and the performance and features are way ahead of anything comparable.

You can see from the photograph of the front panel that the NRD-525 is well endowed with control knobs, but not one of them is a “gimmick”. As Rainer Lichte says in his definitive book on “Receivers-Chance or Choice”:

“None of the knobs and buttons are superfluous, they all have a dedicated function. Indeed, those functions are what one needs in todays crowded bands and in the years to come.”

In fact Rainer Lichte spends nearly eight pages describing the NRD-525 in glowing terms, and it is quite impossible for me to describe such a receiver in a few words of advertising. I am preparing an NRD-525 information pack and if you care to send 50p to cover postage etc. I shall return the information pack together with copy of our “Listener's Guide” and sundry other good reading.

I am convinced that the NRD-525 will give any owner a real glow of satisfaction, and after spending the last 30 years in the communications business, I think I may know what I am talking about. See if you agree with me.

Finally: why should you buy your NRD from Lowe Electronics? No especial reason apart from the fact that we are the JRC appointed distributors, we have the longest and most respected background of technical expertise in the business, and we have a reputation for knowing our products and how to care for them and our customers. You may possibly find that you can buy your NRD-525 a bit cheaper from less respected sources, but ask yourself this:—

“If the technical manual for the receiver is 152 pages long, and no less than 30 of those pages are devoted to circuit diagrams, dare you risk buying from anyone but Lowe Electronics?”

Happy listening, and I look forward to talking with you about the finest receiver you could buy — the NRD-525.

John Wilson.

NRD-525 £1195 inc VAT

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

LOWE ELECTRONICS LIMITED
Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482
Shops in GLASGOW Telephone 041-945 2626, DARLINGTON Telephone 0325 486121, CAMBRIDGE Telephone 0223 311230, CARDIFF Telephone 0222 464154, LONDON Telephone 01-429 3256, BOURNEMOUTH Telephone 0202 577760
Of course I refer to Guglielmo Marconi, Nobel Prize Winner, Pioneer of Wireless Communication and founder of rich and powerful companies! Scientific fame and a taste for good living were to give Marconi acquaintances which ranged from Popes to Presidents, Kings, film stars and many of the glamorous women of the time. The attentions paid to him by many attractive women were often the subject of excited public gossip, as were his advances in wireless telegraphy.

Distillery

To begin at the beginning, this startling series of events was set in motion when a Scottish businessman, called Jameson left his native Scotland and went to Ireland where he built his own distillery. At the time of the potato famines and cruel poverty which existed in Ireland, Jameson was developing his business.

Some years later the Jameson's had a daughter Annie, their business had prospered and they had many influential friends. As Annie grew older she developed an interest in music and became an accomplished singer. She desired to go to Covent Garden and pursue a stage career.

Serious Doubts

Annie's father however, had serious doubts and suggested that Annie pursued her studies abroad before making any final decisions. A career on the stage, even performing Operas by Verdi and Wagner, was hardly a fitting occupation for a Victorian Gentle Lady!

In 1863 Annie went to Italy to commence her studies at the Bolgna Conservatoire. She would stay with trusted business friends of Jameson who would ensure that the proprieties fitting a Victorian Lady were observed. Annie at this time was twenty years old and extremely beautiful.

The round of parties and social functions continued in Italy as they had in Ireland. At one of these functions Annie met Giuseppe Marconi, a widower some 17 years her senior. They fell in love. Annie returned home and expressed her desire to marry Giuseppe. To the Jamesons, their daughter's choice was disastrous; too old, foreign, second hand!

Secrets Letters

Throughout the early spring of 1864 secret letters were exchanged between Annie and Giuseppe. Annie was now aged 21, and elopement was planned and executed. On 26 April 1864 Annie Jameson, spinster, married Giuseppe Marconi, a widower. He was 38 years old, his bride 21.

Ten years later Guglielmo Marconi was born.

What happened next? How the young Marconi pursued his famous career and nearly ruined Lloyd George just prior to World War I is another story!

Suffice it to say, Marconi was a practitioner, a man of insight, an inveterate experimenter who took an interesting phenomena and turned it into a communication medium of world shrinking proportions.

He was in truth the first amateur!
AIRBAND

Godfrey Manning G4GLM

This month Godfrey takes us on a typical flight in a light aircraft around the local airfield. Also discussed are Eureka, h.f. listening and landing at Hong Kong.

(Poulton-le-Fylde, Lancashire) mentions New York Volmet on 1.327MHz and R.AF Volmet on 4.722MHz and would like to know from where this latter is transmitted. The British Airways h.f. company frequencies, according to Ray Conachey (Evesham, Worcestershire) are 5,538, 6,566, 8,921, 10,072 and 13,333MHz.

Paul adds that the callsign Ascot indicates an RAF transport and Clipper is used by Pan American. I am grateful to

Nick Ashby (Wembley, Middlesex) for drawing my attention to that important source of frequencies and information, the Aerod Europe & Middle East Supplement. This new edition contains the old volumes 1 and 2 in a single handy book and can be bought from Aerod Customer Services, Building 254, P.O. Box 10, London Heathrow Airport, Hounslow, Middlesex TW6 2JIA Tel 01-5620796. The first time that you order any charts from Aerod, ask for the accompanying Legend Booklet which is currently free of charge.

Changes to non-directional beacons (n.d.b.s) are mentioned by Alan Jarvis (Cardiff). Radnor (RNR: di-dah-dit, dah-dit, di-dah-dit, 404.5kHz) replaces Knighton (KNI: dah-dit-dah, dah-dit, di-dit, 404.5kHz and there is a new beacon (BMH: dah-di-dit-dit, dah-dah-dit, di-di-di, 393kHz) at Bombardier which is in addition to the existing Hurin (HRN: di-di-dit-dit, dah-dit, di-di-dit, 394kHz). BMH is the locator outer marker (l.o.m.) for the Runway 08 instrument landing system (i.l.s) and HRN is the 26 l.o.m. I have never found a list which, when the Morse identity of a beacon is known, gives the name of its location, does anyone out there know of such a thing? For general interest, Alan recommends the CAA video tape recording The Crowded Sky which is available from the music sections of larger public libraries.

Your Experience

Paul Whiteley seems interested in the conditions required by a flying career and wonders why this is a predominantly male occupation. The proportion of female commercial pilots is lower than that of female private flyers, so the ladies are under-represented in the professional world. The reason for this I can not understand and I am not convinced that either sex has the upper hand with regard to flying ability. I am glad to see that at least one airline has had all-female crews flying recently so let’s hope that this formerly male preserve now becomes more balanced. Don’t assume that lady aircrew are confined to First Officers, either, Paul!

Dave Edwards (Boksburg, S Africa) flew Harvards, T-33s, Vampires, Meteors, Hunters, Jet Provosts, Chipmunks, Beavers and Bulldogs in the R.A.F. Thirty years ago there was a common fighter frequency. One day a pair of American aircraft were in formation; one called the other, “Hank, bail out, you’re on fire!” Now you can imagine how many other American pilots there were called Hank; apparently at least two more of them bailed out of perfectly serviceable aircraft!

On a trip across the North Sea, Dave (then a junior pilot) was leading his section as an exercise; he emulated his Flight Commander’s earlier technique of calling “TxEI Tower for a bearing please.” There was no reply as this Tower is in fact, a lighthouse — he had fallen for the Flight Commander’s trick, with everyone on frequency listening! Dave points out that the new B777 receiver is very cheap. Looking at the advert, it doesn’t appear to be a scanner and it might even have only a conventional tuning scale in which case precise channel selection will not be easy.

If any reader has one, perhaps they’d let me know how it performs!

Follow-Ups

To those of you who wrote in to provide extra information on topics that first appeared in previous “Airbands,” thanks. I’m glad that this column is able to stimulate interest and discussion. The calibration of the i.s. requires very powerful lights to be fitted to the test aircraft. On the ground the telescope instrument picks up the infra-red reflections from the lights and reflects this beam against a rotating mirror. Also provided is a standard light source so arranged that equal reflections occur when the aircraft is flying the required approach path and accuracy is within 5 seconds of arc! See February’s “Airband.”

The RAF produce useful Flight Information Publications such as the British Isles and North Atlantic En Route Supplement and the Flight Information Handbook as well as radio navigation charts. These are sold to the public by 1 AIDU (RAF), R.AF Northolt, West End Road, Risuplip, Middlesex HA4 6NG. Please include a stamped reply envelope when inquiring about prices. The postcard was misprinted in the January “Airband.”

Flight data and cockpit voice recorders were described in the March issue. To decide if any type of aircraft needs to carry recorders, the purpose of flight, date of issue of type certificate, type of engines, and weight need to be considered. The Air Navigation Order (U.K. Law) stipulations depend on all of these and are complex; and they are about to change anyway! The rules could certainly put business and cargo aircraft as well as some
AIRBAND

helicopters into the mandatory category for carrying recorders; it’s not just passenger airlines. Consult a current version of the Air Navigation Order for details on any specific case.

"What is Eureka?" was the question in January’s edition. I can’t assist W. Blanchard (Dorking, Surrey) who asks ("A Word in Edgeways," February) whether or not it is still used, but Bob Sayers (Redditch, Worcestershire) tells me that the Wem, Shropshire example is the Shawbury Eureka with callsign SY (di-di-dit, dah-dah-dah) on channel F5. Eureka is a ground-based transponder and is interrogated by Rebecca, its airborne partner. Rebecca transmits on one of the channels A to H (chosen according to which beacon is being addressed) and this stimulates Eureka’s reply on the appropriate channel from 1 to 8. Hence the Rebecca channel settings of F5 to use the Shawbury facility. From the reply, the pilot is given the straight-line range to the transponder (rather like modern d.m.e.) and the direction of the beacon relative to the aircraft’s heading. This latter is displayed as a blob on a cathode ray tube, with the beacon to the right of heading, for example, the blob is biased to the right of the display. Eureka works at up to 200nm and allowance is made for simultaneous multi-access by up to 75 aircraft. The airborne equipment uses a pair of two-element vertically-polarised Yagi antennas, either on the nose or the wings. Here is the full list of frequencies:

<table>
<thead>
<tr>
<th>Aircraft transmits</th>
<th>Ground Station transmits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
<td>MHz</td>
</tr>
<tr>
<td>A</td>
<td>214</td>
</tr>
<tr>
<td>B</td>
<td>218</td>
</tr>
<tr>
<td>C</td>
<td>222</td>
</tr>
<tr>
<td>D</td>
<td>226</td>
</tr>
<tr>
<td>E</td>
<td>230</td>
</tr>
<tr>
<td>F</td>
<td>234</td>
</tr>
<tr>
<td>G</td>
<td>Spare</td>
</tr>
<tr>
<td>H</td>
<td>Spare</td>
</tr>
</tbody>
</table>

Note that the ident is sent in Morse every 30 seconds. The history is summarised by S. J. Harvey (Rochford, Essex) in the last war the system was used for dropping troops and supplies using just one channel (Rebecca 214MHz transmit, 219MHz receive) but later units provided a choice of 214, 219, 224, 229 and 234MHz. Other contributors to this information are Chris Kirby (Oxford), Chris Gall and Tony Bernascione (Middlesbrough).

Tony also offers to help readers with aeronautical problems and can be contacted at the School of Information Engineering, Teeside Polytechnic, Borough Road, Middlesbrough, Cleveland TS1 3BA, Tel: (0642) 218121 ext 4146. Tony adds that the precise location of the Great Dunfell relay station (March “Airband”) is 19km east of Penrith, Cumbria, at Milburn Forest. He also thinks that n.d.b.s. would be a useful guide to m.f. propagation and can even be DXed!

Altimeters were discussed in February. An altimeter intended for use in cars is made by Time Instrument Manufacturers Ltd., Acctim House, 297-1001 High Road, Finchley, London N12 8OX and was discovered by Chris Durkin (Ormskirk, Lancashire). Chris would like to know the flight plan / nav log routeings from London to Australia for flights such as British Airways BA9 and BA171. Send your answers to me and I’ll write a section on flight plans.

You Write

"Are you a pilot?" asks Stefano Malaspina 16MOS (Fermo, Italy). No, I regret that I’m not. Like many readers, I’m just an enthusiast but I am building up a museum collection of instruments and other aircraft parts entirely as a hobby. If you wish to visit, phone me on 01-596 5113 to arrange this. My only flying experience is limited to simulators and instrument trainers. Of course, if anyone out there has some further experience to offer, it would be gratefully received by your columnist as well as adding to his knowledge for the greater benefit of the readership! I think that the nicest approach that I’ve tried is Hong Kong, there where there are mountains in the way of Runway 13. Airlines don’t let crew go there without plenty of prior training! The approach is made easierly towards a flashing red light on top of a mountain (all other bright flashing lights are prohibited by Hong Kong law). On catching sight of a giant chequerboard, the aircraft is turned right to follow a curved row of strobes. There is little time to bring the wings level prior to landing at the end of this turn! If you want to know what it looks like, see page 260 of Flying the Big Jets by Stanley Stewart (published by Airlife). Ray Conachey knows just what it’s like for real: he flew there recently as a passenger and could read street signs and shop names during the low approach! Because of the curved course, I.t.s. is not possible but instead there is an instrument guidance system which directs aircraft to the chequerboard in poor visibility. The distance reading is relative to the threshold but beyond the chequerboard the aircraft must be turned right, i.e. away from the i.g.s. localiser.

"Takes you back a bit" says Roy Taylor (Wembley, Middlesex) about the

Godfrey steers a left turn in a Lockheed C-130 Hercules Mk 1 simulator. Altitude 1750 feet, airspeed 179 knots, heading 100°, using 25° of bank with gear and flaps up. (Photo: Christine Miynek.)
historical information that he obtained concerning RAF Kidbrooke, s.w. London. In the 1920s the supply of RAF wireless apparatus fised depended on its intended purpose: some airship equipment actually came from the Royal Navy.

John Sanderson (Mansfield, Nottinghamshire) do you fly? Your letterhead is embossed with a high-wing tail-dragger marked "Fly for Fun." John's nearest airport, East Midlands, is 30 nautical miles away so he lives well clear of the surrounding controlled and special rules airspace.

Circuit Bashing

As so much has appeared in this magazine about instrument flying and airliners I thought that this month's glossary feature should look at the light aircraft scene. Having obtained that hard-earned private pilot's licence (p.p.i.) the basic means of navigation is by visual reference to the ground and this is, not surprisingly, governed by visual flight rules (v.f.r.). This does, of course, assume that cloud and visibility do not restrict the pilot's view of the ground i.e. that the flight remains within visual meteorological conditions (v.m.c.). Great reliance is placed on the topographical air charts, available in quarter or half-million scales. The hardest part of visual navigation is to spot the ground immediately beneath the aircraft; those are not H.O.1004 in the floor (except in the Pitts Special).

Flying around the local airfield is restricted to circuits so let's examine the typical radio procedures for this. Imagine a flight in G-ASVM, which we announce to the controller as "Golf Alpha Sierra Whiskey Mike." Thereafter the call sign is abbreviated to G-ASWM or "Golf Whiskey Mike" or even "Whiskey Mike" assuming that there aren't any other "WMs around at the time. Asking for a radio check "on No. 1" will elicit a report of the signal from the No. 1 radio set, using a six-point readability scale (5 is good, 0 is unreadable). Next the current weather and runway details are stated by the controller and read back by the pilot as an accuracy check. Included will be the altimeter settings (QFE causes the altimeter to read zero when on the ground at the aerodrome, QNH causes the aerodrome elevation above sea level to be indicated whilst on the ground, and regional QNH is the setting used by all aircraft flying cross-country in the nationally-defined altimeter setting region). Surface wind is given as direction in degrees from whence it comes, and as speed in knots. The active runway has a two-digit number from 01 to 36; in fact this will be the runway heading in tens of degrees. The circuit consists of either left-or-right-hand turns. So the controller now tells us: "Whiskey Mike, the Quebec Foxtrot Echo is 996, Quebec November Zero three, surface wind 270° 08 knots, Runway 26, left-hand circuit." For circuit flying, not all of the altimeter settings will be needed.

Taxi clearance is now requested. The runway is a dangerous place with fast-moving aircraft landing or taking off so specific clearance is needed to "enter and backtrack." Having entered the runway, to backtrack means to taxi towards the threshold by travelling in the reverse direction to that used during the take-off roll. This is necessary where the taxiway joins onto the runway at some place other than the threshold. Having arrived at the threshold it may be necessary to "line up and hold" until take-off clearance is given.

An airborne report might follow, and the aircraft climbs ahead until the first turn is reached. In a simple circuit, all turns are 90°.

In our case, we'll turn left onto the crosswind leg; look both ways for conflicting traffic (remember that this is v.f.r.), then put a little left pressure on the control column (ailerons). Once a left bank is established at about rate 1 (this would take two minutes to complete a full circle) return the control column to nearly centre. Height may be lost in the turn unless we're careful to exert a little back-pressure on the control column (elevator). For a smoothly balanced turn that doesn't throw the passengers around inside the cabin a touch on the rudder might be needed. There's a sideslip indicator which is a ball running along a fluid-filled tube that's slightly curved like a flattened letter U. If the ball slips to one side of the tube then that means the rudder pedal has to be depressed: "step on the ball," as they say. Watching the heading, or looking for a landmark, roll out of the turn just before the correct direction is reached.

Put the control column to the right, wait for the horizon to become level outside the window and then centre the ailerons again. Release the back-pressure and centre the elevator at the same time, remembering to check that the altitude hasn't changed and that the airspace ahead is still clear. Are you beginning to get the feel of the controls?

Another left turn takes us onto the longest leg of the circuit – the downwind leg. We took off into wind, and are now doubling back on ourselves parallel to, and a little distance from, the runway which is now visible over to the left. On passing abeam the threshold the following radio call is made: "Whiskey Mike, Downwind." The controller tells us his requirements: report later on, clear land, whatever. The next turn brings us onto base leg and the start of the descent. The last turn lines us up for landing and we call "finals" on the radio. This may be amended to long or short finals as the case may be. The controller's answer may be that we are "clear land" (and the wind might be confirmed too), or that we are to "continue" while another aircraft vacates the runway. We might be behind another aircraft so we are "Number 2 for landing" and if the runway is the correct one landing will not be possible at all so the message would be "Whiskey Mike, go-around." and we would then climb out and do another circuit. Rarely, it will be necessary to "orbit," a tight circle being flown to delay the landing whilst another aircraft clears the runway.

The Boeing 747 Cockpit

In the December 1987 issue the article on "Selfsails" (page 191) included a photograph of the left-hand edge of the first officer's panel of Boeing 747-156 N134TW (19968) of Trans World Airlines. The registration is apparent from the same placard (centre of picture) that bears the SelCal code AB-HK. Below this is another placard giving climbing and descent speeds in knots and, for greater altitudes, decimal fractions of a Mach number. The speeds increase with headwind and weight and are indicated airspeeds which seem slow compared to true airspeed. The left of the picture is dominated by the undercarriage handle (gear is down in the photograph) and immediately above this you will note that there is a warning limiting the speed at which the gear can be retracted. Below the SelCal placard is a clock/timer and to the right of this is the airspeed indicator (a.s.i.). this particular a.s.i. also has a read-out of Mach number (almost cut off by the top of the picture). The striped pointer indicates the maximum allowable airspeed for the current conditions, in the photo, the airspeed is zero. The remaining instrument is a combined radio-magnetic indicator (r.m.i) and distance measuring equipment (d.m.e) display. Two d.m.e beacons can give three-digit readings on the seven-segment displays at the top of the instrument (both are showing 399 nautical miles). The compass card shows a heading 170° and the two pointer indicate the relative direction of each of two beacons. These pointers are showing the same bearing, 000°, which is an n.d.b. abeam the left of the aircraft (notice the two selector switches at the bottom of the instrument are both set to the n.d.b. rather than the v.o.r. position).

Join a Club, Go to an Air Show

Newly improved facilities are boasted by the Luton Branch of Air-Britain. Contact Chris Alton by telephoning (07073) 38336 (evenings).

Two air events have come to my attention. On June 18 there is the Halton Air Show (near Aylesbury, Buckinghamshire) and last year's G62HAS Special Event Station has been run in conjunction with this. The Popular Flying Association fly-in at Cranfield, Bedfordshire, will take place on 1, 2 and 3 July. If you are organising an event that's of interest to readers of this column, drop me a line at the editorial address and I'll mention it here.

Make it a belated New Year's resolution to go to an air show and/or join a club. Perhaps I'll see you there? I certainly hope to see you reading this column again next month!
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, 5.0, 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 recall frequencies that were in use. The scanning speed is adjustable and the 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 recall frequencies that were in use.

IC-R71E, General coverage receiver.

The ICOM IC-R71E 100KHz to 30MHz general coverage receiver features keyboard frequency entry and infrared 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 infrared controller, CK70 DC adaptor for 12 volt operation, mobile mounting bracket, CW filters and a high stability crystal filter.
THE HISTORY OF ROBERTS RADIO
Published by Roberts Radio Co. Ltd.
Available from: Bob Burt, Roberts Dynatron & Co. Ltd., Molesey
Avenue, West Molesey, Surrey KT8 0RL.
154 x 219mm, 45 pages hardcover. Price £5.95
ISBN 0 9512590 0 8

The royal radio-makers, named after the East End boy who co-founded the firm, are publishing their history after 55 years in the business.

Roberts Radio hold three Royal warrants and are a British survivor of the radio industry battered by the Far East competition. They started business in 1923, partly financed by the sale of a motorbike, and Harrods (yes, the Harrods) became their first customer.

Over the years they have been asked to supply radios for special events, like the Queen's Royal Tour in 1953, equipped expeditions on their journeys into no-man's land and supplied sets to prisons and the blind.

The book has plenty of illustrations, including a mink coated radio circa 1959! The history of the company is charted carefully and makes interesting reading. In these days of few British radio manufacturers, it is reassuring to read books like this — it only to remind ourselves that British radio equipment still exists.

SHORT WAVE RADIO LISTENER'S HANDBOOK The complete guide to s.w.l.ing
by Arthur Miller
Published by Patrick Stephens Ltd
Available from Short Wave magazine Book Service
159 x 215mm, 207 pages. Price £6.99 plus 75p P&P
ISBN 0 85059 883 4

Short wave radio is a remarkable hobby. It can be pursued twenty-four hours per day every day of the year, both indoors and outside the home and whatever the state of the weather. It is entertaining, educational and can be very exciting. It is not restricted to any age group and appeals to both men and women alike. Having said that, why isn’t it the most popular hobby?

There are, it seems, two main factors which explain the situation. First, many people who become listeners are comparatively young — often still at school — and have many other interests and pressures to occupy their time. Unless they are reasonably successful at the outset, they move onto other things. Secondly, and probably most important, basic information about short wave listening is not as readily available as it might be. There are several books dealing with the technical side of radio which sometimes aim to encourage readers to become radio amateurs, but these almost invariably assume that some background knowledge of the hobby has already been gained.

This book is dedicated to newcomers to short wave listening and people who would like to become involved but do not know where to start. What this book aims to do is to explain the need for suitable equipment, describe the short wave radio frequency ranges and indicate the types of transmissions which may be heard and how to verify them. It also deals with contests and awards, since the hobby is often highly competitive.

GUIDE TO FORMER UTILITY TRANSMISSIONS 3rd Edition
by Klingensuss
Published by Klingensuss Publications
Available from the Short Wave Magazine Book Service
170 x 240mm, 126 pages. Price £8.00 plus 75p P&P
ISBN 3 924509 43 3

This manual is built on receptions of utility stations from the sixties until the recent past. Listed are the frequency in kHz, callsign, name of the station and ITU country/geographical symbol and the types of modulation used. Both old and new callsign allocations or location names may be listed for several stations, this depends on the callsign or location name used during the last monitored operation on the respective frequency.

Prior to 1963, virtually all overseas radiotelegraph and radiotelephone stations have disappeared from the bands. The technical details of these circuits have been deleted from official files and they are only reactivated if the satellite channel breaks down. On the other hand, frequencies used years and decades ago for overseas radiotelegraph and radio telephone traffic nowadays carry modern electronic communication. Thus, "historical" frequencies and callsigns lists can be a valuable source of information for the identification of "new" and "unknown" stations.
AN INTRODUCTION TO WEATHER SATELLITES & THEIR RECEPTION  
by M. Mansfield G6AWD  
Published by Radio Publications Inc.  
170 x 240mm, 494 pages. Price £19.00 plus 75p P&P  
ISBN 3-924509-88-3  
This annually updated 494 page book covers the reception of all types of utility station between v.f.m. and 30MHz. For those of you who want even more up-to-date information there is a supplement service available which gives you an update in April and the following August! The range of information included in this book is truly amazing making it the short wave listener’s “bible”.  
The first chapter deals with frequency allocations and covers the entire spectrum from d.c. to 150MHz. As well as the usual tabular representation of the spectrum, extracts from the international radio regulations are published which give the full technical definition of each allocation.  
The main frequency list, which addresses can be found at the back of the booklet too.

GUIDE TO UTILITY STATIONS — SIXTH EDITION  
by Joerg Klingfuss  
Published by Klingfuss Publications  
Available from Short Wave Magazine Book Service  
170 x 240mm, 494 pages. Price £19.00 plus 75p P&P  
ISBN 3-924509-88-3  
This annually updated 494 page book covers the reception of all types of utility station between v.f.m. and 30MHz. For those of you who want even more up-to-date information there is a supplement service available which gives you an update in April and the following August! The range of information included in this book is truly amazing making it the short wave listener’s “bible”.  
The first chapter deals with frequency allocations and covers the entire spectrum from d.c. to 150MHz. As well as the usual tabular representation of the spectrum, extracts from the international radio regulations are published which give the full technical definition of each allocation.  
The main frequency list, which addresses can be found at the back of the booklet too.

BE better short wave reception 5th Edition  
by William I. Orr W6SAI & Stuart D. Cowan W2LX  
Published by Radio Publications Inc.  
Available from Short Wave Magazine Book Service  
130 x 207mm. 160 pages. Price £5.50 plus 75p P&P  
ISBN 0 933616 05 8  
A new world of thrills awaits the armchair explorer who tunes in the radio signals that lie beyond the dial of a standard broadcast receiver. The familiar entertainment programs vanish, replaced by thousands of strange, interesting signals from all over the world.  
The hobby of radio eavesdropping is increasing popular in today’s world of science, space travel and startling electronics progress. As with other hobbies, knowledge is essential to further the advance of the enthusiast.  
This book is more than simply a guide to international broadcasting and the stations you hear. It gives you information on the electromagnetic spectrum from long wave to microwaves.

Save over £3 with this package deal!

Only £13.00 inc. post and packing.  
Antennas are one of the most important parts of a listener’s station. Our special book package this month saves you over £3.00 on our normal SWM Book Service price and will give you a lot of practical ideas on antennas.

Just ask for SWM Book Pack 1. Send your order to PW Publishing Ltd., FREEPOST, Enecfo House, The Quay, Poole, Dorset BH15 1PP. You can also telephone your order in the normal way using Access or Visa (0202) 678568.
**NEW MONTHLY RADIO MONITORING PUBLICATION**

**MONITORING TIMES** is the famous US radio monthly publication, and easily the best guide for expanding your radio listening horizons. **MONITORING TIMES** is the publication dedicated to providing full-spectrum coverage of both broadcasting and utilities communications around the globe.

From VLF to microwave, from satellites to submarines, **MONITORING TIMES** takes you where the listening action is in over 70 pages. Their extensive reporting network consistently scoops the industry with breaking news stories. The last issues have included how to tune into the ships in the Gulf and listen into all the action, radio astronomy, tropical DXing, Greenpeace's and the Swiss army's radio communications, and much, much more.

**INTERBOOKS** will be distributing it monthly in the UK, and subscription discount details are given in the magazine.

**Price:** Only £1.85 in UK, or £2.45 for Eire and overseas

**ORDER YOUR COPY TODAY**

**INTERBOOKS, S488, Stanley, Perth PH1 4QQ, Scotland. Tel: 0738 828575**

---

**ALL SONY PRODUCTS UK SUPPLIED**

**SONY AIR 7**

- OUTFIT-AM-FM
- 144-174MHz
- 108-136MHz
- 150kHz-219kHz

- **PRICE:** £349

---

**COMMUNICATION SATELLITES**

**NEW**

**GREATLY EXPANDED THIRD EDITION**

Communication Satellites has rocketed to an international reputation as THE source of information regarding orbiting active satellites.

Chapters cover spy and surveillance, US and Russian manned space missions, military tactical and scientific satellites, oceanography and weather satellites, navigational and communications satellites, private and direct broadcasting satellites; if it is in orbit, Communication Satellites tells you all about it!

This ultimate directory of space communications includes chapters on channelization band plans, transponder identification, international satellites, even a history of earth satellite development. SPECIAL BONUS! An exhaustive frequency cross reference allows you to quickly identify the source of unknown transmissions from space. Ground tracking networks are also listed.

Illustrations and tables are included for better understanding of space technology. Special chapters provide insights into satellite operation, much of which has never been revealed to the public before in the 255 pages (A4) of such an informative book.

Whether you are a casual or serious listener to the spectrum, this book is for you!

**Price:** £13.25 + £1.25 p&p in UK

Overseas post Eire, Europe and seasmall £2; airmail worldwide £6.75

Ask for our FREE CATALOGUE of all radio books
First of all the surprise move into the scanning market by Kenwood (formerly Trio) with the introduction of the RZ1. I am not sure which market Kenwood are aiming at with this model. However, it may well be a good move in the long run, bringing scanning receivers into the high street hi-fi shops.

Having said that don’t be too put off as the receiver has a host of interesting features to offer, and is reviewed elsewhere in this issue.

Regency Electronics have recently launched a new model in the US. Called the TS-2 TurboScan it covers all the usual American bands but disappointingly only a.m. on the v.h.f. aircraft band, as do so many US models. The major innovation in the design of this receiver is its speed. The scan rate is claimed to be at least three times faster than any thing else currently on the market. As this is its main selling feature expect other manufacturers to follow.

Uniden Bearcat have launched a new hand-held scanner — the 50XL. The main drawback is that it only offers reception of f.m. However, it does have one very attractive feature — the price. At just under $100 this may be the first from several companies offering cheap, but good quality, hand-held scanning receivers.

AOR appear to have run into problems with two of their projects. Development of the proposed AR2003 seems to have been suspended as a result of increasing development costs and lack of encouragement from the American distributors, who were shown early prototypes. The receiver was intended to cover from 500kHz-1GHz and included a tuning knob as well as all the standard features. Attempts to produce a pocket-sized version of the AR2002 have also run into problems, with excessive current consumption limiting battery life. AOR have compromised by adding a 600-950MHz range to conventional scanner circuitry to produce the AR800. This looks similar in style to the Regency HX860E and is selling in the US for $269.

Along the same lines another far-eastern company is producing a receiver covering 150kHz-500MHz with 850-910MHz thrown in. Looking somewhat like the Sony ICF2001 series and costing around $400 the actual performance is said to be poor, but it does at least give a pointer to future trends.

Gazing into the crystal ball, Icom are expected to produce a follow-up to the R7000 scanning receiver. The main feature of this could be a front panel, panoramic display not unlike that being offered on the new IC-781 v.h.f. transceiver. However production still seems some way off, and the price is anticipated to be rather high.

AOR Computer Interface

Continuing on the theme of new items, Aircastle Products have announced a stand-alone computer interface for use with the AR2002 scanning receiver (and Regency variants). This connects to the rear of the receiver by means of a multicore ribbon cable, the only other requirements being a 9-12V d.c. supply and any computer with an RS232 interface and software terminal package. The interface is intelligent using a 250 microprocessor and 32k of memory. This means that the unit can be left to get on with pre-programmed tasks whilst the computer is used for other jobs. The main features include variable scan rates — up to 150 channels per second, 900 memories with user-assignable comments, more than one set of frequency search limits, real time clock, logging of channel usage, extended frequency range — 100kHz-625MHz and 741-1420MHz may be possible with reduced sensitivity, extended frequency tuning steps, A/D converter for signal strength display, Centronics printer port and squelch output for tape recorder. The price is around £170. Contact Aircastle Products (0202) 561088 for further details.

Scanners II

We all gasped in awe at Scanners — the book by Peter Rouse. Now coming soon to a book shop near you, the SWM Book Service already has it in stock, is Scanners II, the sequel.

You may remember we left our hero, mild-mannered reporter Peter, just on the verge of discovering long-lost, forbidden frequencies — will he take that final step? Now read on . . .

Yes, here is the book to spend that remaining Christmas present money on — what do you mean, you already have! Peter covers many new topics in his second book, which has a more international flavour. Items include a section describing add-on goodies for scanners, a selection of modifications and common faults on the more popular receivers, some interesting points on receiving long-distance stations on the lower v.h.f. bands, with a list of frequencies to check, a section on computer control of receivers and, if this isn’t enough, he also includes several useful reference sections listing international allocations and call signs. Just the job for those evenings when it’s too cold to spin the receiver dial — recommended reading.

Discons

Amongst the items I found particularly interesting in Peter’s book were his comments on discone antennas. I am very sceptical of most manufacturer’s claims for the frequency coverage of this type of antenna, with perhaps one or two exceptions. From measurements I have made on both commercial and home-built discones I would say that the maximum frequency range, whilst still maintaining something like a 50ohm match to the feeder, is 2 octaves. That is to say if the discone is designed to have a lower
frequency limit of say 70MHz then the upper frequency limit will be 70 x 2 x 2 or 280MHz. This equates to the specification of discones produced for military use, published in reference books such as James Military Communications. In order to achieve coverage from 30MHz to 1GHz, three separate sized discones are required, each slightly overlapping in range.

One way around this problem is a technique used by Icom/Welz in the design of their super-wideband discone. This is achieved by limiting the lower design frequency of the basic discone elements to around 125MHz, automatically setting the upper frequency limit to around 500MHz. In order to provide extended coverage at the low frequency end, a base-loaded whip, tuned to about 50MHz is added to the top of the antenna. At the high frequency end, the design of the connecting "hub" is altered to include a short, vertical section between the disc and the cone. This provides a wideband unity gain characteristic over the remaining part of the spectrum.

The only drawback in using this technique is that without careful design various sections can interact, with signals being received by more than one active portion of the antenna. This is fine providing that the signals combine in phase with each other, as the signal is boosted in strength. If, however, the phase relationship is less than ideal, the signal level is reduced, producing notches at certain points in the antenna's frequency coverage.

Judging from the comments I have received Icom/Welz seem to have got it right, with few noticeable dips across the range. I would be very wary, however, of just adding a vertical whip section to an normal discone, as the chances are that it may well degrade the existing performance. I wonder if any readers have found the optimum antenna yet, let me know your findings.

Hidden Transmissions?

Reader Peter Turner of Ipswich has brought to my attention the use of so-called s.c.a. or Subsidiary Communications Authorisation transmissions, and asks if any services in Britain use such a system.

Let me first explain what s.c.a. is. In the U.S., the Federal Communications Commission (FCC) — the equivalent of the DTI — permit f.m. broadcast stations to transmit other services in addition to their existing programme material. These extra services are added to the transmitter by superimposing the extra material onto a high frequency subcarrier, well above the normal range of human hearing. This makes it undetectable unless a special adaptor is fitted to the receiver. These are usually sold or rented, by the company providing the service, to the end user. The types of service offered vary but typical ones include the distribution of background music to shops and stores, financial data, paging services, remote telemetry and control of broadcast equipment.

If we look at the audio spectrum of a typical stereo f.m. radio broadcast (Fig. 1) we can see that the mono programme material occupies the band of frequencies from the lower limit of human audibility at around 30Hz to the upper limit at 15kHz. The next signal we come across is the stereo pilot tone at 19kHz, this is used by the receiver to indicate the presence of a stereo transmission and to act as a reference signal for the recovery of the stereo information which occupies the band from 23-53kHz.

The stereo information itself is a form of s.c.a. as it is superimposed on a subcarrier at 38kHz. However, before transmission the 38kHz reference carrier is removed, as this is later regenerated in the receiver stereo decoder from the 19kHz pilot tone (2 x 19kHz = 38kHz).

Note that because of this technique the stereo information takes twice the bandwidth of the mono component, so in order to prevent the transmitted signal from occupying too much of the precious radio spectrum the stereo information is only transmitted at half the level of the mono component. If we wished to we could insert more subcarriers at frequencies above 53kHz, providing that we only transmitted them at a level which would not interfere with existing services, or be of such a high frequency that it would cause the signal to spread onto adjacent transmissions.

Returning to Peter's question — Yes! A form of s.c.a. is used in the UK. Most high-power BBC f.m. transmitters, and several ILR ones, are being equipped with a system called r.d.s. (Radio Data System). This is a digital transmission which will carry information about the station you are tuned to, and will also permit the receiver to automatically return itself to the strongest signal carrying the same programme (see the article by Peter Shore in last December's SWM). In order to do this the digital signal is carried on a 57kHz subcarrier. I believe that the two ILR stations in London also carry some form of encoded data transmission intended to give a radio telex type of service for the city, although exact details are not known.

As far as I am aware no music or speech is distributed in this way, but I could be wrong!

You may like to try this experiment. Tune to a strong f.m. broadcast station. Wait until the programme being transmitted is very quiet (Radio 3 is ideal for this purpose). Tune to the centre frequency — say it happens to be 90.7MHz, now with your scanning receiver tune 55 or 60kHz higher (or lower) in frequency, i.e. 90.755MHz. Switch to a.m. and, if you are lucky, you may hear a high pitched warbling hiss. This is the r.d.s. subcarrier. If you have a receiver which can receive s.s.b. try tuning away from the centre frequency, at first you will just hear the mush of the mono information, but at around 19kHz high of the centre frequency, you may just detect the stereo pilot tone — the programme has to be very quiet to hear it. Keep on going up and you will start to tune through the stereo information; approaching 57kHz high you may detect the digital modulation on the r.d.s. subcarrier. Keep on going up and you could detect other subcarriers. The top frequency limit being in the region of 100kHz high of the centre frequency.

One point to mention is that peaks of noise appear at multiples of frequencies occurring in the normal programme material so don't confuse this with any extra services. Using this technique I have found one extra subcarrier on Radio 2 at around 76kHz, which I believe may be some sort of BBC national network switching system, but perhaps someone out there knows the truth. I would be interested to hear any of your findings.

As usual all letters to PO Box 1000, Eastleigh, Hants S05 5HB. Please enclose an s.a.e. if you require items returning. Until next month, good listening.

Fig. 1

---

**SCANNING**

---

- **Mono** (L + R)
- **Stereo** (L - R)
- **Stereo** (L + R)
- **Stereo** (L - R)
- **RDS**
- **Suppressed carrier**
- **Modulating Frequency**

---

**Modulation (%)**

- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

---

**Frequency**

- 30Hz
- 15kHz
- 23kHz
- 38kHz
- 40kHz
- 53kHz
- 57kHz
- 76kHz
- 100kHz

---

Short Wave Magazine April 1988
THE NEW KENWOOD RZ1 — FROM RAYCOM

YES YOU'VE GUESSED! WE HAVE EXTENDED THE COVERAGE TO 950 MHZ! AND MODIFIED THE VIDEO UNIT FOR PAL 6MHz I.F. COLOUR OUTPUT. THIS MEANS BY CONNECTING A BLACK & WHITE OR COLOUR MONITOR YOU ALSO HAVE A SCANNING TV RECEIVER! SO IF YOU DO NOT WANT TO MISS OUT ORDER YOUR UNIT FROM US NOW!

ONLY AVAILABLE FROM RAYCOM AT £499.00 INC DELIVERY

WE DO NOT THINK THIS MODEL IS WORTH PURCHASING WITHOUT THESE FEATURES FITTED!

ORDERING INFORMATION

ALL PRODUCTS WE ADVERTISE ARE NORMAL STOCK ITEMS OUR NEW MAIL ORDER DEPARTMENT CAN NOW DESPATCH MANY LINES SAME DAY. BUT PLEASE ALLOW UP TO 14 DAYS DELIVERY FOR CARTRIDGE METHOD. IF ORDERING BY MAIL PLEASE INCLUDE CARTRIDGE AND STATE YOUR DAYTIME TELEPHONE NUMBER. ALL PRODUCTS OVER £75.00 CARRY FREE POSTAGE BUT PLEASE ALLOW TIME FOR PERSONAL CHECKS TO CLEAR. PLEASE CALL BEFORE ORDERING AND FOR MORE DETAILS.

PLEASE TEL: 021 544 6767

THE POPULAR UBC 100XL HANDHELD NOW HAS A PRINTED CIRCUIT BOARD IN THE HANDHELD. YOU WILL ALSO NOTICE THAT WE NOW HAVE The NEW MODEL HANDHELD WITH A NARROWER CASE. THIS MODEL IS AVAILABLE AT THE SAME PRICE BUT PLEASE ALLOW UP TO 14 DAYS.

THE BIG SAVING IS IN THE HANDHELD AS WITH OTHER MODELS. THIS REORDERED MODEL IS ALSO AVAILABLE AT THE SAME PRICE.

RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARDS OR CHEQUES IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT UP TO £150.00 SUBJECT TO STATUS. RAYCOM ARE LICENSED CREDIT BROKERS. APR 23.8%. SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS.

NEW HELPLINE 0836 282228 (until 9pm Daily)

THE NEW KENWOOD RZ1 — FROM RAYCOM

THE NEW KENWOOD RZ1 — FROM RAYCOM

YES YOU'VE GUESSED! WE HAVE EXTENDED THE COVERAGE TO 950 MHZ! AND MODIFIED THE VIDEO UNIT FOR PAL 6MHz I.F. COLOUR OUTPUT. THIS MEANS BY CONNECTING A BLACK & WHITE OR COLOUR MONITOR YOU ALSO HAVE A SCANNING TV RECEIVER! SO IF YOU DO NOT WANT TO MISS OUT ORDER YOUR UNIT FROM US NOW!

ONLY AVAILABLE FROM RAYCOM AT £499.00 INC DELIVERY

WE DO NOT THINK THIS MODEL IS WORTH PURCHASING WITHOUT THESE FEATURES FITTED!

ORDERING INFORMATION

ALL PRODUCTS WE ADVERTISE ARE NORMAL STOCK ITEMS OUR NEW MAIL ORDER DEPARTMENT CAN NOW DESPATCH MANY LINES SAME DAY. BUT PLEASE ALLOW UP TO 14 DAYS DELIVERY FOR CARTRIDGE METHOD. IF ORDERING BY MAIL PLEASE INCLUDE CARTRIDGE AND STATE YOUR DAYTIME TELEPHONE NUMBER. ALL PRODUCTS OVER £75.00 CARRY FREE POSTAGE BUT PLEASE ALLOW TIME FOR PERSONAL CHECKS TO CLEAR. PLEASE CALL BEFORE ORDERING AND FOR MORE DETAILS.

PLEASE TEL: 021 544 6767

THE POPULAR UBC 100XL HANDHELD NOW HAS A PRINTED CIRCUIT BOARD IN THE HANDHELD. YOU WILL ALSO NOTICE THAT WE NOW HAVE The NEW MODEL HANDHELD WITH A NARROWER CASE. THIS MODEL IS AVAILABLE AT THE SAME PRICE BUT PLEASE ALLOW UP TO 14 DAYS.

THE BIG SAVING IS IN THE HANDHELD AS WITH OTHER MODELS. THIS REORDERED MODEL IS ALSO AVAILABLE AT THE SAME PRICE.

RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARDS OR CHEQUES IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT UP TO £150.00 SUBJECT TO STATUS. RAYCOM ARE LICENSED CREDIT BROKERS. APR 23.8%. SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS.

NEW HELPLINE 0836 282228 (until 9pm Daily)

THE NEW KENWOOD RZ1 — FROM RAYCOM

THE NEW KENWOOD RZ1 — FROM RAYCOM

YES YOU'VE GUESSED! WE HAVE EXTENDED THE COVERAGE TO 950 MHZ! AND MODIFIED THE VIDEO UNIT FOR PAL 6MHz I.F. COLOUR OUTPUT. THIS MEANS BY CONNECTING A BLACK & WHITE OR COLOUR MONITOR YOU ALSO HAVE A SCANNING TV RECEIVER! SO IF YOU DO NOT WANT TO MISS OUT ORDER YOUR UNIT FROM US NOW!

ONLY AVAILABLE FROM RAYCOM AT £499.00 INC DELIVERY

WE DO NOT THINK THIS MODEL IS WORTH PURCHASING WITHOUT THESE FEATURES FITTED!

ORDERING INFORMATION

ALL PRODUCTS WE ADVERTISE ARE NORMAL STOCK ITEMS OUR NEW MAIL ORDER DEPARTMENT CAN NOW DESPATCH MANY LINES SAME DAY. BUT PLEASE ALLOW UP TO 14 DAYS DELIVERY FOR CARTRIDGE METHOD. IF ORDERING BY MAIL PLEASE INCLUDE CARTRIDGE AND STATE YOUR DAYTIME TELEPHONE NUMBER. ALL PRODUCTS OVER £75.00 CARRY FREE POSTAGE BUT PLEASE ALLOW TIME FOR PERSONAL CHECKS TO CLEAR. PLEASE CALL BEFORE ORDERING AND FOR MORE DETAILS.

PLEASE TEL: 021 544 6767

THE POPULAR UBC 100XL HANDHELD NOW HAS A PRINTED CIRCUIT BOARD IN THE HANDHELD. YOU WILL ALSO NOTICE THAT WE NOW HAVE The NEW MODEL HANDHELD WITH A NARROWER CASE. THIS MODEL IS AVAILABLE AT THE SAME PRICE BUT PLEASE ALLOW UP TO 14 DAYS.

THE BIG SAVING IS IN THE HANDHELD AS WITH OTHER MODELS. THIS REORDERED MODEL IS ALSO AVAILABLE AT THE SAME PRICE.

RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARDS OR CHEQUES IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT UP TO £150.00 SUBJECT TO STATUS. RAYCOM ARE LICENSED CREDIT BROKERS. APR 23.8%. SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS.

NEW HELPLINE 0836 282228 (until 9pm Daily)

THE NEW KENWOOD RZ1 — FROM RAYCOM

THE NEW KENWOOD RZ1 — FROM RAYCOM

YES YOU'VE GUESSED! WE HAVE EXTENDED THE COVERAGE TO 950 MHZ! AND MODIFIED THE VIDEO UNIT FOR PAL 6MHz I.F. COLOUR OUTPUT. THIS MEANS BY CONNECTING A BLACK & WHITE OR COLOUR MONITOR YOU ALSO HAVE A SCANNING TV RECEIVER! SO IF YOU DO NOT WANT TO MISS OUT ORDER YOUR UNIT FROM US NOW!

THE NEW KENWOOD RZ1 — FROM RAYCOM

ONLY AVAILABLE FROM RAYCOM AT £499.00 INC DELIVERY

WE DO NOT THINK THIS MODEL IS WORTH PURCHASING WITHOUT THESE FEATURES FITTED!

ORDERING INFORMATION

ALL PRODUCTS WE ADVERTISE ARE NORMAL STOCK ITEMS OUR NEW MAIL ORDER DEPARTMENT CAN NOW DESPATCH MANY LINES SAME DAY. BUT PLEASE ALLOW UP TO 14 DAYS DELIVERY FOR CARTRIDGE METHOD. IF ORDERING BY MAIL PLEASE INCLUDE CARTRIDGE AND STATE YOUR DAYTIME TELEPHONE NUMBER. ALL PRODUCTS OVER £75.00 CARRY FREE POSTAGE BUT PLEASE ALLOW TIME FOR PERSONAL CHECKS TO CLEAR. PLEASE CALL BEFORE ORDERING AND FOR MORE DETAILS.

PLEASE TEL: 021 544 6767

THE POPULAR UBC 100XL HANDHELD NOW HAS A PRINTED CIRCUIT BOARD IN THE HANDHELD. YOU WILL ALSO NOTICE THAT WE NOW HAVE The NEW MODEL HANDHELD WITH A NARROWER CASE. THIS MODEL IS AVAILABLE AT THE SAME PRICE BUT PLEASE ALLOW UP TO 14 DAYS.

THE BIG SAVING IS IN THE HANDHELD AS WITH OTHER MODELS. THIS REORDERED MODEL IS ALSO AVAILABLE AT THE SAME PRICE.

RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARDS OR CHEQUES IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT UP TO £150.00 SUBJECT TO STATUS. RAYCOM ARE LICENSED CREDIT BROKERS. APR 23.8%. SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS.

NEW HELPLINE 0836 282228 (until 9pm Daily)

THE NEW KENWOOD RZ1 — FROM RAYCOM

THE NEW KENWOOD RZ1 — FROM RAYCOM

YES YOU'VE GUESSED! WE HAVE EXTENDED THE COVERAGE TO 950 MHZ! AND MODIFIED THE VIDEO UNIT FOR PAL 6MHz I.F. COLOUR OUTPUT. THIS MEANS BY CONNECTING A BLACK & WHITE OR COLOUR MONITOR YOU ALSO HAVE A SCANNING TV RECEIVER! SO IF YOU DO NOT WANT TO MISS OUT ORDER YOUR UNIT FROM US NOW!

ONLY AVAILABLE FROM RAYCOM AT £499.00 INC DELIVERY

WE DO NOT THINK THIS MODEL IS WORTH PURCHASING WITHOUT THESE FEATURES FITTED!

ORDERING INFORMATION

ALL PRODUCTS WE ADVERTISE ARE NORMAL STOCK ITEMS OUR NEW MAIL ORDER DEPARTMENT CAN NOW DESPATCH MANY LINES SAME DAY. BUT PLEASE ALLOW UP TO 14 DAYS DELIVERY FOR CARTRIDGE METHOD. IF ORDERING BY MAIL PLEASE INCLUDE CARTRIDGE AND STATE YOUR DAYTIME TELEPHONE NUMBER. ALL PRODUCTS OVER £75.00 CARRY FREE POSTAGE BUT PLEASE ALLOW TIME FOR PERSONAL CHECKS TO CLEAR. PLEASE CALL BEFORE ORDERING AND FOR MORE DETAILS.

PLEASE TEL: 021 544 6767

THE POPULAR UBC 100XL HANDHELD NOW HAS A PRINTED CIRCUIT BOARD IN THE HANDHELD. YOU WILL ALSO NOTICE THAT WE NOW HAVE The NEW MODEL HANDHELD WITH A NARROWER CASE. THIS MODEL IS AVAILABLE AT THE SAME PRICE BUT PLEASE ALLOW UP TO 14 DAYS.

THE BIG SAVING IS IN THE HANDHELD AS WITH OTHER MODELS. THIS REORDERED MODEL IS ALSO AVAILABLE AT THE SAME PRICE.

RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARDS OR CHEQUES IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT UP TO £150.00 SUBJECT TO STATUS. RAYCOM ARE LICENSED CREDIT BROKERS. APR 23.8%. SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS.

NEW HELPLINE 0836 282228 (until 9pm Daily)
THE HAMGEAR PMX PRESELECTOR

The PMX is an antenna tuning unit combined with an RF amplifier, covering from 1.7 to 34MHz. The ATU section will match into your receiver all those odd lengths of wire whether indoors or out, making the most effective use of the antenna. The amplifier section takes the ATU signal and boosts it to the amount necessary to give you a better readable signal. Some receivers, normally used with no ATU and the odd wire ant, are literally transformed by the PMX; with others the improvement is more subtle but still quite definite. All in all the net result is better copy of the DX.

Some outstanding results have been reported by customers and some of our early units are still in use after 24 years.

There are four pages of free information available on the PMX, one devoted to 8 antenna experiments using the PMX, non-technical and well illustrated. The PMX can be supplied unpowered (you provide 12v DC) or mains powered, it can also be supplied with a built-in 1MHz, 100 kHz, 10kHz calibrator, invaluable to spot check those DX stations — the next best thing to a digital dial.

Unpowered PMX……………………………………£99.00
Mains Powered PMX………………………………£75.00
Mains powered PMX with calibrator……………£97.00

All prices include postage and packing.

HAMGEAR ELECTRONICS
125 Wroxham Road, Norwich NR7 8AD.
Tel: Norwich (0603) 405611.

C.M. HOWES

COMMUNICATIONS

NEW! 2M and 6M CONVERTER KITS

If you have a receiver that covers the 20M amateur band, you can use it to monitor the 2 and 6 Meter bands by adding the new HOWES CV220 and CV620 frequency converter kits to your station. Suitable for use with both our DcRx20 receiver kit, these new converters can also be used with any general coverage communications receiver (no modifications to the receiver are involved, they simply connect externally to the antenna socket).

An excellent constructional project could combine these two new kits, together with one of our DcRx20 SSB/CW receiver kits. This will give a great little monitor receiver covering three of the DX chasers most favoured bands, a really cost effective way of enjoying the “weak signal mode” DX on 2 and 6 meters, together with the most popular HF DX band.

CV220 or CV620 kit: £17.50  Assembled PCB module: £23.90

HOWES FINISHED EQUIPMENT RANGE

HC266 2M to 6M transverter, 10W RF output with ALC, VSWR protection and very low harmonics. Case specially manufactured to high standards by computer controlled machine tools. 1 to 5W drive level standard; 5 to 10W drive available as a no cost option. Operators handbook includes block and schematic diagrams. HC246 4M output version may be available by the time you read this. Price including post and VAT: £179.90, normally available off the shelf from us, and from selected retailers.

HOWES KIT RANGE includes:

DeRx20, DeRx40, DeRx80, DeRx160 SSB/CW Receivers
CTX40, CTX80 GRP CW Transmitters for 40 and 80M
MTX20 10W CW TX for 20M
CVF40, CVF80 VFOs for above transmitters
HC220, HC280 2M to HF transverters, 10W output
CS14 Dual bandwidth SSB/CW filter for DeRx
ASL5 Dual bandwidth filter for “black boxes”
TRF3 Shortwave Broadcast receiver
CTU20 HF bands ATU for receiving or 30W TX
SW830 SWR-Relative power indicator, 160 to 2M
CM2 Quality microphone with VOGAD
AP2 Automatic Speech Processor
STZ Sine-wave side-tone/practice oscillator
XMI Crystal Calibrator with 8 marker intervals

All HOWES KITS include a high quality glass-fibre PCB with screen printed parts locations, full instructions and all board mounted components. Tuning capacitors to suit our receivers and VFOs (except 160M) are available at £1.50 extra (DeRx needs two, TRF3 and CVF need one).

A copy of our free catalogue and information sheets on any products you are interested in available for an SAE.

Please add 90p P&P for kit orders.

UK delivery is normally within 7 days.

73 from Dave G4KOH, Technical Manager.

HELPING TO BUILD YOUR STATION

Eydon, Daventry,
Northants NN11 6PT
( mail order only )
Phone: 0327 60178

Hamgear Electronics
125 Wroxham Road, Norwich NR7 8AD.
Kenwood RZ-1 Receiver

John Waite

Are you contemplating a new scanner? If so then this exciting new offering from Kenwood could be just what you’re looking for. John Waite puts the RZ-1 through its paces with a full report.

The RZ-1 is a very versatile wide range scanner featuring a frequency coverage of 500kHz to 905MHz. The reception modes available are a.m., narrow f.m. and wide f.m. One feature of particular note is that the RZ-1 is dimensioned to fit into a standard car radio mounting aperture thus enabling either mobile or base station working. Other important features include automatic antenna selection and 100 programmable memories.

The supplied 34 page A5 manual was very well written and covered the use of RZ-1 in eight chapters. A scanning receiver of this type is bound to be quite complicated to use, but the manual handled the subject very well by making extensive use of diagrams and charts. One of the main features of the RZ-1 is memory operation and the manual dedicated ten pages to this subject. The final chapters dealt with maintenance hints and some further advice on the type of antennas to use for both mobile and base station use.

Connections

The RZ-1 has been designed to be very simple to connect. The power requirement is 13.8V d.c., which can be taken directly from the car supply for mobile use or a 1 amp, mains driven, power supply for base station use. The power lead is protected by an in-line 1 amp fuse.

There are two cable mounted antenna sockets, the first of which is designed to be used with the standard car antenna. The second socket is a SO-239 type which should be connected to a wide-band antenna covering the required frequency range.

Although the RZ-1 has an internal speaker, a 3.5mm jack socket has been included on the rear panel for the connection of an external speaker. The final connection on the rear panel is a pair of phono sockets which provide a low level audio output for connection to an external amplifier. Two sockets are used, as the RZ-1 includes a stereo decoder for the reception of wide-band f.m. stereo broadcast signals.

Operation

Considering the wide range of features in the RZ-1 the operation has been made surprisingly simple. The simplest controls being the rotary squelch and combined volume/on off switch which were fitted with 10mm diameter knobs. The only other rotary control was the main tuning which comprised a 24mm diameter knob with 24 steps per revolution. All the remaining functions were selected using front panel push buttons.

When the RZ-1 is powered-up it starts from the last used frequency and mode which is a useful feature in itself. For simple manual tuning you merely have to rotate the main tuning control to change to the desired frequency. With a frequency range of 500kHz to 905MHz, manual tuning from one end of the band to the other could take a long time! Fortunately you can jump to any frequency within the RZ-1's range by entering a frequency using the ten buttons labelled 1 to 0 immediately below the main display. This operation is simplicity itself as all you do is press the ENTER button on the right hand side of the display and then enter the required frequency one digit at a time. Once the frequency has been entered a second press of the ENTER button changes the receivers v.f.o. to the frequency and returns control to the main tuning knob. One other good point about this facility is that you don’t have to enter trailing zeros, for example if you want to select 145.0MHz you just enter 145, press the ENTER key and the trailing zeros are automatically inserted.

Having selected the required frequency the next problem is to select the mode. There are three basic modes in the RZ-1 namely a.m., narrow band f.m. and wide band f.m. The mode is very easily selected by pressing the MODE button on the front panel. This button forces the receiver to step on to the next reception mode which is clearly indicated on the main display. In addition to the basic three modes there is an AUTO mode in which the RZ-1 selects the mode and v.f.o. frequency settings according to the frequency in use. This is a very good idea and can save a lot of time when tuning around.

Once tuned to a signal the relative strength of that signal is displayed using a very clear bargraph on the main display. The first segment of the display is larger than the others and is used on f.m. to indicate when the squelch has been lifted.

It is very useful to be able to alter the tuning rate to cope with different bands and modes etc. and the RZ-1 is well equipped with four tuning rates. The actual rates being 5kHz, 12.5kHz, 20kHz and 25kHz per step of the tuning control and should prove adequate for the frequency coverage of the receiver. If you want to manually scan a frequency band then in addition to the main tuning control there are two buttons on the front panel one marked with an up arrow and the other with a down arrow. These buttons step the v.f.o. frequency either up or down using the same steps as the main tuning control. Also, if one of these buttons is held operated the frequency will continuously step in the indicated direction. I found this to be quite a useful way of changing frequency quickly.

The usefulness of a modern scanning receiver is often determined by its memories and on this score the RZ-1 fares very well. There are a total of 100 memories provided which can each store not only the frequency and mode but also a seven character message!
Do you need a base station scanner? If so the Uniden Bearcat UBC 175XL reviewed Dec. issue Short Wave Magazine could be just what you've been waiting for.

**SUPER WIDEBAND OMNIDIRECTIONAL ANTENNA DISCONE £99.95 + £3 P&P**
A discone is a broadband antenna that is ideal for use with a scanner as it usually give good reception from 50 to 500MHz.

**Rotators**

- K1KRC 139.00
- K1KRO 149.95
- K1KROC 189.00
- K1R6CRC 219.00
- K1038 17.43

**FRG 9600 £68.00**

**THE GRAY**

- MULTIBAND DIPOLE FULL SIZE 4/6 SIZE 80-10 MTRS 40-10 MTRS £14.25
- £18.80 P&P + £1.80 P&P

**THIS KIT CONTAINS AN ATTRACTIVE END FED LONG WIRE COMPLETE EGI INSULATOR AND HOPE LANYARD PLUS FULL INSTRUCTIONS WITH SO239 CONNECTOR.**

**S.W.L. DX RECEIVING ANTENNA**

- PRICE...... £10.50
- CAR. £1.90

**£179.00 inc. P.P.**

---

**GAREX**

**THE SCANNER SPECIALISTS**

25th ANNIVERSARY YEAR

**JIL SX-400**

**THE PROFESSIONAL SCANNER**

- Basic coverage 25-520MHz
- AM, NFM & WFM
- Expandable from 100kHz to 1.4GHz with SSB and CW
- Computer interface options
- IF output terminals
- Specifications set by professionals

**£649**

**REVCOS RS-3000**

**THE COMPACT SCANNER**

- Size only 6" x 2" x 8"
- Covers: 25-320MHz, 60-90MHz, 118-180MHz, 380-512MHz
- AM & NFM all bands
- Liquid crystal display
- 50 memories
- Scan, search, priority

**£199**

**JIL SX-200N**

**THE SUPERIOR SCANNER**

- The choice of the professionals
- Proven reliability
- Covers: 25-68MHz, 108-180MHz, 380-514MHz
- AM & NFM all bands
- Positive action keyboard
- 16 memories
- 12V dc & 240V ac

**£325**

**£487**

**£279**

**DON'T FORGET THE ANTENNA!**

All receivers need a good antenna. The BRITISH-MADE REVCOS is used throughout the world by discerning scanner owners. Covers 50-500MHz; extremely well made & excellent value at £31.95.

For those who will appreciate the improved performance we offer the REVCOS RADAC dipole with transmitting capability from 20-500MHz at £69.95.

**BROADBAND PREAMPLIFIERS**

- REVC200S semi-realtime model, with special non-linearity.
- DC-1GHz min, 13B gain
- PAS instrument or back-off version for 12V DC operation
- £49.95
- £35.50

**£199.00 inc. P.P.**

---

GAREX ELECTRONICS

Main Distributor of REVCOS Products. Prices include VAT & P&P. Ask for details of our interest free credit.

---

**UPPINGTON**

Radio Communications Amateur P.M.R. Marine

---

**Short Wave Magazine April 1988**
Entering a frequency into a memory is very simple and requires pressing the M button whilst tuned to the required frequency followed by selection of the memory channel and a second press of the M button. Selection of the memory channel can be achieved either by turning the main tuning control until the chosen memory channel number is shown on the display or by direct entry using the ten keys below the main display.

Text Store
One of the really useful features of the RZ-1 is the ability to store text along with the frequency. This facility is available for all the memory channels and the text is entered from the v.f.o. mode whilst storing the frequency. The full alphanumeric character set is available and entry is achieved in a rather novel way. Once the frequency has been entered the M key is pressed whereupon the display will blank except for the left hand character which will flash. The character to fill that space is selected by rotating the main tuning control which has the effect of scrolling through the character set. When the required character is displayed a single press of the UP arrow key will cause the second character to flash and selection of that character is performed in the same way as the first. When the complete message is displayed a single press of the M button stores the message with the frequency.

Symbols
One other additional item that can be stored with the frequency is one of six picture symbols which can be displayed along the bottom of the main display. The picture symbols include a portable radio, television and an aircraft. These symbols are quite useful as a quick indicator of the service being monitored.

In addition to straight-forward storage of single frequencies the RZ-1 can store up to ten frequency bands which is very useful. In order to store a frequency band two memories are required and only certain memories have this facility. They are the ten memories ending in 0 and also those ending with the digit 9. The first memories are used to store the lower band limit whilst the second, ending in 9, store the higher limit. Once popular bands have been stored, frequency and mode changing becomes very quick allowing the user to cover large portions of the spectrum with ease.

The changeover from memory to v.f.o. operation is very quick as it only requires a single press of the V.F.O./M. button to toggle between the two modes. Another feature which is very handy is that any memory frequency can be transferred to the v.f.o. with a single press of the M button without affecting the contents of the memory. This is particularly useful when checking adjacent frequencies for activity.

The RZ-1 naturally includes a scan function to enable best use to be made of the extensive memories. The scanning range has four options enabling a scan of either the whole frequency range, all memories, memory groups or one of the programmable bands. The all-band scan is precisely what it says in that the whole frequency range from 500kHz to 905MHz is continuously scanned!

The scan of all memories is very versatile as you can lock-out any frequencies that you want to avoid and thus create a customised scan. When scanning memory groups, the 100 memories are divided into ten groups of ten and scanning can be carried out over any one group. As with the full memory scan any single memory channels can be locked out if required. Finally the programmable band scan enables the automatic scanning of a frequency band stored in a pair of memories.

A particularly good feature when scanning with the RZ-1 is that the scan mode can be set to suit the type of signal to be hunted. The most common scanning mode is called CARRIER which stops the scan as soon as a carrier is detected, if the carrier disappears then the scan re-starts. The second mode is known as SEEK and differs from CARRIER in that the scan does not re-start if the carrier disappears. The seek mode is particularly useful for finding new stations.

The third mode, TIME, stops when a signal is detected but re-starts after six seconds regardless of whether or not the signal is still present and is very good for monitoring a selection of active frequencies.

The final scan mode is only effective for narrow f.m. operation and stops the scan whenever a modulated carrier is detected. I found this mode to be particularly useful when searching a band containing unmodulated carriers.

Circuit Description
The entire frequency spectrum between 500kHz and 905MHz is asking a lot of a receiver and the techniques used in the RZ-1 are quite interesting.

In order to make the frequency range more manageable the band is divided in two with one front end for 500kHz to 60MHz and another for 60MHz to 905MHz. To cope with the high signal strengths found on the h.f. bands one of six band-pass filters are automatically switched into circuit according to the frequency in use. The h.f. signal is then fed to the f.e.t. first mixer via a two-stage bipolar r.f. amplifier. The resultant 45.75MHz first i.f. is then filtered before passing to another mixer for conversion to a 10.7MHz second i.f.

The band 60MHz to 905MHz is passed to a v.h.f./u.h.f. tuner module for r.f. amplification and mixing to produce the 45.75MHz first i.f. To cope with the
differing bandwidth requirements of narrow band f.m. and wide f.m. the 45.75MHz i.f. splits in two, with one path joining with the f.h. path for conversion to 10.7MHz and narrow filtering whilst the other is converted to 10.7MHz by a different mixer.

The narrow band 10.7MHz i.f. is then filtered by a monolithic crystal filter before being passed to separate detectors for a.m. and f.m. The wideband 10.7MHz signal is passed to an extra stage of amplification before it is filtered and fed to a dedicated demodulator and stereo decoder.

The recovered audio from all the demodulators is automatically selected according to the mode in use and fed to an audio power amplifier module for amplification to approximately two watts.

One additional feature which is available on American versions is a video demodulator. This takes the 45.75MHz first i.f. which after some filtering and amplification is then applied to a video demodulator integrated circuit and presented as composite video on a socket on the rear panel.

**SPECIFICATION**

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>500kHz to 905MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Steps</td>
<td>5kHz, 12.5kHz, 20kHz, 25kHz</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>a.m. 10dB S/N 5µV (0.78 to 5.µV)</td>
</tr>
<tr>
<td></td>
<td>n.b. f.m. 12dB SINAD 500kHz-60MHz &lt;6µV (1 1µV)</td>
</tr>
<tr>
<td></td>
<td>60MHz-90MHz &lt;3µV (0.9µV)</td>
</tr>
<tr>
<td></td>
<td>Wideband f.m. 50MHz-90MHz &lt;3µV (0.9µV)</td>
</tr>
<tr>
<td></td>
<td>Squelch sensitivity n.b. f.m. &lt;0.1µV (0.003µV)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory Channels</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power</td>
<td>Speaker 2 watts (2.7) across</td>
</tr>
<tr>
<td>Stereo Separation</td>
<td>30dB at 1kHz</td>
</tr>
<tr>
<td>Modes</td>
<td>A3E (a.m.)</td>
</tr>
<tr>
<td></td>
<td>F3E (f.m. narrow and wide)</td>
</tr>
<tr>
<td></td>
<td>C3F (TV NTSC) USA version only</td>
</tr>
<tr>
<td>Antenna Impedance</td>
<td>50 to 300Ω (50Ω nominal) unbalanced</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>11 to 16 volts d.c. at 1 amp</td>
</tr>
<tr>
<td>Dimensions</td>
<td>180mm wide, 50mm high, 176mm deep</td>
</tr>
<tr>
<td>Weight</td>
<td>1.5kg</td>
</tr>
</tbody>
</table>

The figures in italics are the results measured in the SWM test laboratory.

---

**Performance**

The RZ-1 proved to be a very popular and user friendly receiver throughout the review period.

An examination of the measured results will reveal that the RZ-1 exceeded its specification on all counts which is a good start. The measured sensitivity was very much better than the specification suggested though there were large variations. The 10dB S/N sensitivity on a.m. varied from a best of 0.78µV at 4MHz to the worst case of 5.1µV at 400MHz. On n.b.f.m. the picture was very similar with the best 12dB SINAD sensitivity of 0.16µV at 60MHz to the worst of 1.06µV at 32MHz. This type of variation is only to be expected in a receiver of this type and all credit is due to the manufacturers for quoting realistic figures as opposed to the rather optimistic figures used by some companies.

The audio quality on a.m. was rather disappointing with a measured minimum total harmonic distortion of 10% which is far too high. This may have been a feature of the review model so I would recommend that you listen before you buy. Another feature which impaired the a.m. performance was the poor audio frequency response which peaked at 200Hz and cut off sharply above 3kHz. This type of response combined with the high distortion made some a.m. signals almost totally unintelligible.

The f.m. quality was a totally different story with n.b.f.m. producing very crisp and clear audio which was good enough to rival most amateur transceivers. When used for broadcast f.m. the RZ-1 really excelled producing commendably low distortion levels and a well balanced sound. My only gripe being that the emphasis was 75µS instead of the correct 50µS for UK f.m. broadcasts. The provision of phono sockets on the rear for the audio output was a nice touch which allowed the RZ-1 to be easily connected to an in-car entertainment system if required.

The operation of the memories proved to be very easy and all the facilities could be memorised quite quickly, saving the bother of having to refer to the manual in order to use the memories.

I found the facility to store text in the memories to be very helpful as you instantly know what you are tuned to without having to convert from a frequency.

On the whole all the frequency setting options were very well designed and it would be difficult to suggest improvements.

The use of two antenna sockets was rather clever and especially good when used in a mobile environment. When fitted in a car the standard car antenna is connected to ANTENNA ONE whilst a wideband antenna is connected to ANTENNA TWO. Once the antenna selector switch has been set to AUTO then the receiver logic automatically selects the correct antenna for the band in use.

**Summary**

The RZ-1 is a very well thought out wideband scanning receiver. Kenwood have obviously put a tremendous amount of thought into the panel layout and general ergonomics. The result being a very compact and easy to use receiver packed with useful facilities. I am concerned by the a.m. performance, but this may of course have been a problem exclusive to the review model.

Overall then a smashing little radio with a performance which far exceeds its small size.

My thanks to Lowe Electronics for the loan of the review model.
The UK’s Scanner Specialists

Black Jaguar MkII
Pocket Scanner

Switchable AM/FM.
Covers CB plus the following frequencies: 26-30MHz, 60-88MHz, 115-179MHz, 210-260MHz, 410-512MHz.

£235

Beacat 100 XL
Hand Held
Scanner with 16 channels memory scan covering 66-88 MHz, 118-174 MHz, 405-512 MHz.

£189.99

Beacat 70 XLT
New pocket size scanner with 20 memories. Covers 66-88 MHz, 136-174 MHz, 405-512 MHz.

£199.99

Beacat BC 50 XL
Handheld scanning receiver with 10 memories. Covers 66-88MHz, 136-174MHz, 406-512MHz.

£99.99

SSE Discone
RX Antenna
70-500 MHz
With 3 Elements

£24.95

.send for our bumper catalogues of amateur, CB, scanning eqpt.
ONLY £2 (Includes a £2 voucher)

Use your credit card for immediate despatch

Hotline (0705) 662145
REPORT FROM THE POLDER

Jonathan Marks

In 1927, The Netherlands became one of the first countries to recognise the power of the short wave broadcasting medium. Early experiments via station PCJJ in Eindhoven were convincing enough to make a solid investment in the future. But the short wave dial has certainly changed these last 60 years.

In order to maintain and improve the flow of information from broadcaster to listener, technology has had to adapt too. These days it’s quite common to read in broadcasting or short wave listener magazines that a new transmitter site is going on the air. Radio Nederland Wereldomroep’s solution, though, has some rather unusual aspects to it.

Two Million Amongst Fourteen Million

You can’t put a short wave transmitter site just anywhere! Not only are the antenna masts up to 120m high, but they need to radiate concentrated beams of energy into the air. Finding a nice secluded spot in The Netherlands, a small country with 14 million people, was a very difficult task.

In 1937, the Dutch made broadcasting history, when they constructed a wooden rotateable directional short wave antenna. It was at a place called Huizen (pronounced How-zen), a few kilometres north-east from the studios in Hilversum. This huge construction would swing round to point the antenna in different directions. Today, an inscription in an apartment block, the “PHONI flats” marks the spot where the antenna once stood.

In the 1950’s, short wave broadcasting from The Netherlands moved to the centre of the country, to the village of Lopik in the province of Utrecht. There was room for future expansion in those days, but not now. As the Lopik facilities began to show their age, the search started for a new place to put the short wave transmitters. In fact, the solution was to start construction within a few kilometres, as the crow flies, of the old Huizen antenna site. Four 500kW transmitters were ordered, plus one 100kW reserve transmitter. But not only is the transmitting centre new, so is the land it’s built on.

A New Lake

The 28 May 1932 saw the birth of a new lake in The Netherlands, with a size of 1200km². Completion of the so called “Afsluitdijk”, a dike some 30km long, meant part of the former Zuiderzee was no longer open to the wild North Sea. It was given the name "Ijsselmeer". Plans didn’t stop there, for so began an ambitious draining scheme to create new areas of land previously covered by the sea. The largest of these, Flevoland, was pumped dry in two stages between 1950 and 1968. Today it’s already an established area for arable crops, and now also for short wave broadcasting.

Radio Nederland Wereldomroep’s “Flevó” transmitting centre is also an ambitious project in its own right. To be efficient, a short wave broadcasting station needs efficient directional antennas, which, for the lower short wave broadcasting bands such as the 6 MHz band (49m), entails very large structures. Since Flevó is 4m below sea level, the water table is quite high and the ground is also rather soft. New techniques have had to be found to anchor the antenna masts securely, since the totally flat Polder means everything is exposed to the full force of wintry weather.

Up in the Air

Flevó is equipped with one “omni-directional” antenna used to serve nearby target areas in Europe. This radiates energy in all directions. The days of being able to serve listeners all over the world with one frequency are over. Now “directional” antennas are far more important, especially to serve distant target areas. So these antennas concentrate the energy into a relatively narrow beam. This not only gives a stronger signal in the chosen target area, but it means that interference to other stations, serving different parts of the world on the same frequency, is reduced to a minimum. This in turn contributes to less overcrowding of the short wave spectrum.

On the Ground

The transmitter design also contains some new concepts. Since short wave broadcasting began, a system known as Amplitude Modulation, a.m., has been used to get the signal from transmitter to receiver. The a.m. signal involves two components:

1. The “carrier” which puts the signal on a certain part of the short wave dial, and is needed by the short wave receiver as a sort of “reference point”.
2. The modulation, which is actually the speech and music information the broadcaster wants to put across.

Flevó on an autumn day.
The problem is that more than 50 per cent of transmitter energy is put into the carrier part of the signal, which in fact contains no programme information at all. Ways around this are planned for the future, with more efficient forms of transmitting techniques, but most require that the listener buy a new type of radio. This isn’t practical yet. But modern transmitter design enables the use of a more efficient form of a.m., known as Dynamic Amplitude Modulation (d.a.m.). With normal a.m. in widespread use today, the level of the carrier remains at a constant level. In the d.a.m. technique, the carrier power moves in step with the modulation. So, during a loud piece of music the carrier power is turned up, but when the music gets softer, the carrier power is turned down. This is done electronically, and can mean anything up to 25% energy saving or more! This is achieved without a noticeable quality reduction of the signal at the listener’s end. The use of d.a.m. can be noted on the signal strength meter of a short wave radio, the needle moving in step with the programme being listened to.

This d.a.m. technique, together with other energy saving designs incorporated into the transmitters, means that while the total power output of Flevo is 5 times that of Lopik, the power bill has only risen by about 2.5 times for the same hours of usage. The transmitters are cooled by both water and air systems. Three hundred litres of water per minute pass through each sender, and the excess hot air is used to heat the building. There were plans to sell excess heat to nearby market gardeners, but because the level of the excess energy is not constant, no buyers were found.

Computer Technology

Computer technology is also used to the maximum. Changing frequencies at the old Lopik transmitter facilities was quite an ordeal. Moving from one metre band to another often entailed physically moving and tuning quite a number of parts of the transmitter. It’s a credit to the transmitter crews that they managed to do this with the required precision in the short time available between programmes. Modern multi-band transmitters have eliminated the need for this type of manual labour. But engineering skill is now focused instead on maintaining a highly complex computer controlled switching system. New programme and frequency schedules are entered into a computer terminal at Radio Nederland Wereldomroep, where it’s possible to monitor what’s happening some 16km away.

Royal Opening

On 19 May 1987, Prince Claus of The Netherlands officially opened the new Flevo transmitting centre, ending the two year testing period. Reports from listeners show the station to be very much more effective than the old Lopik station in distant target areas. Elements of the design are being applied by the contractor, AEG, to other new facilities currently under construction in Europe.

Whilst computer programs exist to calculate how a chosen antenna design should perform in theory, a lot of natural or man-made factors (like the type of soil, nearby metal antenna towers, etc.) also have to be considered in practice. So having hung the antennas between the supporting towers, the Dutch PTT hired a helicopter equipped with special measuring apparatus, and switched the transmitter on with reduced power (20kW). By flying in a circle with a radius of 2km from the antennas, it was then possible to plot the radiation patterns of each antenna. At a height of 50m, the beam direction is measured to within 2°, together with the beam width, and elevation. Some alterations were made to the structure as a result of these measurements, one antenna being moved to another part of the star. Final antenna patterns were plotted last November.

The exact direction an antenna will beam to depends mainly on its physical orientation on the ground. The “star” shape of the Flevo antenna complex means that all directions of the compass between 050° and 230° can be reached. It’s also possible to electrically change the beam direction of some antennas. If an antenna normally beams due east (equivalent to 090°) it can be adjusted to operate at 065°, 075°, 105° and 125° as well. Changing the direction more than this would lead to undesirable energy loss in unwanted directions.

Efficiency

No antenna can be 100 per cent efficient. As well as beaming energy in the desired direction, some signal will also go in the opposite direction. This is termed “back radiation”. If, for example, 50kW is beamed one way, as much as 50kW is often sent 180° the other way. By design and careful measurements at Flevo, this back radiation has been reduced to a minimum. The ratio of radiated energy at the front of the antenna, against the power measured at the back, is now as high as 20:1. This means that only around 5kW are radiated into the opposite unwanted direction.

All these factors are important in ensuring that the energy isn’t wasted. Flevo is believed to be the first short wave station where such intense antenna diagram measurements have been done from the air, before the transmitter site enters service.

With such high powers being used, the feeder lines to the antenna have had to be covered. At previous transmitting sites these were simply bare wires on poles, but since they offer a potentially lethal hazard to birds, extra precautions were taken with the new project. These feeders are now constructed of coaxial cable, which means that high voltage areas are screened.

The sticker celebrating 40 years of Radio Nederland.
AIRCRAFT ON HF RADIO

Andy Thomas

Many spectators at British airports have small hand-held v.h.f. airband radios which they use to listen to airliners and air traffic control. Despite the dubious legal position, it is generally accepted that such listening is harmless and without any evil intent. Listening is enhanced by an understanding of how the system works, indeed books on v.h.f. radio procedures are readily available.

This brief introduction to the use of h.f. radio by aircraft is offered in the same spirit. It should be made clear, however, that nothing in this article should be construed as inciting an unlawful act, or condoning an immoral one. All the information summarised below is in the public domain, albeit scattered around various sources; it is not exhaustive – there is far more in the h.f. spectrum than is mentioned here.

The prime source for this information is the International Telecommunications Union (ITU), a UN organisation based in Geneva. There are two main documents published by the ITU, available in English, French, and Chinese. They are: the Radio Regulations, which apply worldwide and the International Frequency List, which lists all registered spot frequencies.

Commercial Aviation

Commercial aircraft have two main uses for h.f. radio which are of interest to the short wave listener: voice communications on s.s.b. (upper sideband) and the selective calling (Selcal) facility. This latter is a two-tone call unique to a particular aircraft and used by a ground station to call an aircraft in flight. These communications take place on spot h.f. frequencies allocated to particular ground stations. Some of the frequencies used by our “local” station, Shawwick Oceanic, on North Atlantic (NAT) routes are given at the end of this article. All these frequencies are within the bands specified in Radio Regulations.

Generally, airliners use these channels to report their position, flight plan and estimated time of arrival at the destination. The aircraft will give its call sign and position, often described just by a word which refers to a particular position on route. (For example, “DESILL” is at 41°N, 15°W.) A flight plan may give a number of these positions in sequence with the expected time at each one, all times are given in GMT. Other messages may include changes to the original flight plan filed before take off or en route.

These communications will be most familiar to the airport v.h.f. buffs, but coverage on h.f. is, of course, far greater. From London, expect to be able to receive Gander, New York, Tripoli, Addis Ababa, Bombay, N’djamena and even Luaskal, depending on DX conditions. Weather stations for aircraft (VOLMET) can also be heard from as far away as Moscow, Novosibirsk or Singapore. Verification by QSL is said to be rare.

Often aircraft give destinations in the International Civil Aviation Organisation (ICAO) four-letter code. Code “E/G/Letter/latter” identifies a British location, EGLL being Heathrow and EGDL RAF Lyneham, for example. The “E/D/latter/latter” sequence identifies West German locations, EDAF being the US base at Rhein Main. All these identifiers are listed in the RAF Flight Information handbook on sale from No.1 ADU, RAF Northolt.

Military Aviation

The ITU Radio Regulations also defines the frequency bands where military h.f. radio systems would be expected. They are summarised in the Guide to Utility Stations by Klingenfuss, available from the Short Wave Magazine Book Service. These bands are: 3025-3155kHz, 3900-3950kHz, 4700-4750kHz, 5650-5730kHz, 6665-6765kHz, 8965-9040kHz, 11175-11275kHz, 13200-13260kHz and 15010-15100kHz. Within these bands, not only are spot frequencies identified in the International Frequency List but they are also published by the RAF and the US Air Force. No. 1 ADU, RAF Northolt and Defence Mapping Agency, Aerospace Center, St. Louis, Missouri can provide catalogues of publications which include these frequencies, on request.

The main RAF h.f. communications system is the Strike Command Integrated Communications System (STCICS). This is based at Upavon in wiltshire, with a relay at Gibraltar. Other stations are at Cyprus and Mount Pleasant (Falklands). The voice call signs are: ARCHITECT, GIBALTAR, CYPRUS, HAVEN and VIPER, respectively. Table 2(b) gives the STCICS h.f. frequencies as published by the RAF in their En-Route Supplements.

All RAF aircraft en route from the UK call ARCHITECT, giving their call sign. This varies from “ASCOT/number/number/number/number” for transport aircraft to a five-element alphabet-letter-number for fighter aircraft. The letters are changed daily, and used mainly by fighter aircraft. According to pilots at the various air shows and open days, it is possible to work out the type of aircraft from its call sign. An aircraft call sign ASCOT 4/number/number/number is a Hercules C1 based at RAF Lyneham. The call sign U1T34 was, that day, a tornado from 229 Operational Conversion Unit, the even number denoting an instructor; and a letter/letter/letter/number/number call sign indicates a helicopter.

Aircraft using the ASCOT series often use a Selcal that is unique to the particular aeroplane. By logging the aircraft’s departure and arrival points and comparing them with observations made by air spotters, individual aircraft can be identified. So an aircraft with a call sign ASCOT 4/number/number/number testing Selcal “AH-GL” on the runway at Lyneham would probably be RAF Hercules C1 serial no. XV178.

The Royal Navy also use STCICS, both for its own aircraft and for voice communications with its ships. Naval Jetstream aircraft based at RNS Clyde dressed in Cornwall have an additional three numbers painted on the side of the fuselage. In communication with ARCHITECT, Jetstream ZE438 from 750 Naval Air Squadron, number 576, would use the call sign “Navv 576”. Ship call signs are of the number/number/letter/letter variety.

Another RAF system uses h.f. to relay air defence data between ground and air-based control centres. These include RAF Sector Operation Centres (S.O.C.S) at Benbecula, Buchan, Boulim, Neatishead and Portreath; NATO E3A AWACS aircraft; and RN ships. Often NATO aircraft use the call sign “Magic number/number” for their flights from Geilenkirchen in West Germany to RAF Waddington. Patrols use tactical call signs.

The h.f. frequencies used by the RAF are published in the International Frequency List and are reported in DX club magazines such as the Utility DX column of the Danish Short Wave Club International Magazine. The S.O.C.S relay the “Recognised Air Picture” by a number of data links, most of which, like NATO’s LINK 10 and LINK 11, are unavailable to the home short wave listener. But they also occasionally transmit the information in clear voice on upper sideband. Some frequencies are given in fc.

The RAF Fighter Control School exhibition at the Mildenhall Open Day last year showed the basic map reference system used in these transmissions. It is called GEOREF and converts positions in latitude and longitude into a code of 4 letters and 4 numbers, the 8 characters defining the location square. The basic GEOREF grid for the British Isles, with a typical plot is shown in Fig. 1: aircraft friendly “1234” at 59’N, 2’W, MKCP 0000. Other information includes the effective aircraft’s height and speed. It is fascinating to plot the movements of an air defence exercise as it happens.

The US Air Force uses a similar system to STCICS known as the Global Command and Control System (G.C.C.S.). The nearest bases are Croughton in England, Lajes in the Azores and Incirlik in

Short Wave Magazine April 1986

28
AIRCRAFT ON HF RADIO

Turkey. Diego Garcia, Ascension and McDill in the USA can be heard under good conditions. Usually the participating aircraft are the transports of Military Airlift Command, giving details by “phone patch” of loads to particular destinations. Their callsigns are usually “MAC” followed by the five digits of the aircraft serial, or tail number. Frequencies used by CROUGHTON AIRWAYS are given later.

Another system based in Britain is used by the US Air Force Europe (USAFE, pronounced you-safe-eel). At RAF Alconbury near Cambridge there is a large h.f. antenna farm, which formed the car park on one recent Open Day! Clearly visible were h.f. dipole and monopoles. One F-111 pilot at the Mildenhall Open Day last year explained that he used the Alconbury system to relay information about his mission and target to “JAZZ Ops” (RAF Lakenheath) via a phone patch. The information he would give was mission number, time on target (t.o.t.), verbal description of target, success of mission and weather on target. Although the weather code is classified, the most common was “0081X” which basically means the target is clearly visible.

The pilot added that he had a personal callsign, which was a 5-letter pronounceable word identifying his squadron and two numbers identifying him.

Even Presidential communications are carried on h.f. Using callsigns AIR FORCE ONE (or TWO) Presidential (Vice-Presidential) missions are in contact with Andrews Air Force Base near Washington, using relays all over the world. It is said that Nancy Reagan and George Shultz have been heard on this system, so it is definitely worth a listen when next in Europe!

None of these systems carry personal information. British Telecom do operate an aeronautical h.f. service from Porishead Radio but this is part of the telephone system, as is its maritime equivalent. Various European airports provide a service for personal calls; however, eavesdropping on personal messages is thoroughly reprehensible.

But there is no difference between the h.f. systems described here and the v.h.f. systems monitored at airports. Don’t break the law, but enjoy your h.f. listening to its maximum!

Fig. 1

Useful Addresses

(1) International Telecommunications Union, Place des Nations, CH-1211 Geneva, Switzerland.
(2) Joerg Klingenfuss, Panoramastrasse B1, Hagelloch, D-7400 Tuebingen, Federal Republic of Germany.
(3) No. 1 ADU, RAF Northolt, West End Road, Ruislip, Middlesex HA4 6NG.
(4) Defense Mapping Agency, Aerospace Center, 3200 South 2nd St., St Louis, Missouri 63118-3359, USA.
(6) Short Wave Magazine Book Service, Enesco House, The Quay, Poole, Dorset BH15 1PP. Tel: (0202) 678556.
(7) Danish Short Wave Club International, Tavlager 31, DK-2670 Greve Strand, Denmark.
(8) West London Aviation Group, PO Box 622, Slough, Berks. SL2 5UZ. (aviation enthusiasts’ club).

Useful Frequencies

(All frequencies in MHz)

(a) Shawwicke Oceanic frequencies: Different frequencies are assigned to different routes across the Atlantic. Broadly speaking, the sequence below reflects routes nearer the equator than the Pole.

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-1900 GMT</td>
<td>VIPER</td>
</tr>
<tr>
<td>2400-2300 GMT</td>
<td>C/1</td>
</tr>
<tr>
<td>11.234</td>
<td>24/00</td>
</tr>
<tr>
<td>23.000</td>
<td>11.176</td>
</tr>
<tr>
<td>0600-1700 GMT</td>
<td>18.018</td>
</tr>
<tr>
<td>1700-0600 GMT</td>
<td>09.032</td>
</tr>
<tr>
<td>2000-0800 GMT</td>
<td>04.742</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
<tr>
<td>0600-1700 GMT</td>
<td>18.018</td>
</tr>
<tr>
<td>1700-0600 GMT</td>
<td>09.032</td>
</tr>
<tr>
<td>2000-0800 GMT</td>
<td>04.742</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
</tbody>
</table>

(b) RAF Strike Command Integrated Communications System:

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.742</td>
<td>23.000</td>
</tr>
<tr>
<td>03.879 02.984</td>
<td>04.742</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
<tr>
<td>0600-1700 GMT</td>
<td>18.018</td>
</tr>
<tr>
<td>1700-0600 GMT</td>
<td>09.032</td>
</tr>
<tr>
<td>2000-0800 GMT</td>
<td>04.742</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
</tbody>
</table>

(c) RAF Air Defence frequencies: 3.120

13.214 6.750 11.176
12.013 11.182
24.508 08.000 07.675
7.651 6.733 6.740 6.765

(d) CROUGHTON AIRWAYS

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Call Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-2000 GMT</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
<tr>
<td>0600-1700 GMT</td>
<td>18.018</td>
</tr>
<tr>
<td>1700-0600 GMT</td>
<td>09.032</td>
</tr>
<tr>
<td>2000-0800 GMT</td>
<td>04.742</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
<tr>
<td>0600-1700 GMT</td>
<td>18.018</td>
</tr>
<tr>
<td>1700-0600 GMT</td>
<td>09.032</td>
</tr>
<tr>
<td>2000-0800 GMT</td>
<td>04.742</td>
</tr>
<tr>
<td>0800-2000 GMT</td>
<td>02.984</td>
</tr>
<tr>
<td>17.946</td>
<td>05.729</td>
</tr>
<tr>
<td>0800-2100 GMT</td>
<td>03.879</td>
</tr>
<tr>
<td>23.000</td>
<td>02.342</td>
</tr>
</tbody>
</table>

**YOUR ONE STOP LISTENER SERVICE!**

**HUGE STOCKS—BEST PRICES—GOOD BACKUP—FREE SECURICOR**

**YOU NAME IT—WE'VE GOT IT!**

---

**SONY AIR-7 HAND HELD**

AM/FM 108-176MHz + LW/WFM/AFM

UNBEATABLE VALUE

The new SONY AIR-7 HAND HELD receiver is a top example of what a small but powerful receiver can be.

£247 FREE SECURICOR

---

**SONY ICF7600DS PORTABLE COMMUNICATIONS**

Not a toy, but a serious communication receiver.

150kHz-30MHz AM/SSB/PLL plus FM 26-136MHz

Highly recommended. This portable receiver has it all.

£169 FREE SECURICOR

New SW-1 in stock £249

---

**SPECIAL OFFER ON ABOVE!**

Complete ICF 2010D system comprising receiver, AN-1 active aerial and UHF aerial. 52.00 inc VAT.

£378.00 inc del.

AN-1 Active aerial separately £49 + £2 carton

---

**GLOBAL AT1000 AERIAL TUNER**

The AT1000 is a receiver aerial tuner designed to give you maximum performance from your receiver. Covering the frequency range 150kHz to 30MHz it enables all the modern receivers produced in recent years. Ideal for those wanting to improve aerials or balanced aerials.

£69.00 POST FREE

---

**HEF OCEANIC AIRBAND COMMUNICATIONS**

Published December 1988.

£6.95 + £1.50 post & ppc

---

**NEW 1988 EDITION COMPLETE VHF/UHF FREQUENCY GUIDE 26-2250MHz £5.95 + £1.50 post & ppc**

---

**NEW 1988 EDITION UK LISTENERS CONFIDENTIAL FREQUENCY LIST 1.6-30MHz £6.95 + £1.00 ppc**

---

**THE SECRETS OF LEARNING MORSE CODE £4.95 post 90p**

Here’s a book that takes the problem of learning Morse coding by the scruff of the neck and exposes the myths and mysteries that surrounds this most valuable ability. The author, Mark Francis, takes you simply but thoroughly through the whole learning process and shows that with his method you will quickly be able to read Morse and enjoy your new found skill.

£7.95 inc VAT

---

**NEW SONY PRO-80 RECEIVER**

AM/FM/SSB

115KHz-223MHz

£329.00 Carriage Free

---

**SCANNING AERIALS**

CLP 5130 Beam

£82.50 post plus £3.00

CLP 5130 50MHz 1300MHz version coming soon.

---

**LISHER ANTENNAS**

10130 Discote 25-1300MHz

£82.00 (3.0)

£52.50 (5.0)

Receive £230.00 50 MHz

Slim Jim 2m vertical

£8.95 (2.0)

GSV 88 10m dipole 102" £16.95 (1.50)

GSV 44 6m dipole 51" £13.95 (1.50)

Royal Blue Monopole 2-30MHz £29.95 (2.5)

£49.00 (2.50)

Son of 5130 HVT vertical £45.00 (2.0)

Djalong O370 Active antenna £69.00 (2.50)

£69.00 (2.50)

AT1000 ATU 150kHz-30MHz £69.00 (2.50)

£69.00 (2.50)

CX3 3 way coax switch £5.95 (1.50)

£9.95 (2.50)

Airband Groundplane 118-138MHz £19.95 (2.50)

£29.50 (2.50)

£6.95 (0.75)

£6.95 (1.50)

£4.95 (0.75)

£4.95 (0.75)

£6.95 (0.75)

£6.95 (0.75)

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00

£169.00
USA-USSR

We kick off with an update to last year’s story on the Reagan/Gorbachev summit in Washington DC. It seems the meeting also brought out media issues in discussions between Charles Wick, director of the United States Information Agency, and his Soviet government counterpart Alexander Yakovlev. At that time Mr Wick explained to SWM that although the meeting was quite positive and may lead to further discussions in late February or March between media chiefs of both countries, some issues such as jamming of Radio Free Europe remain too sensitive. Until the start of this year, programmes in Polish from RFE based in Munich West Germany, the VOA in Washington and the BBC in London were subjected to deliberate interference in the target area. But as Bill Mahoney, deputy director of public affairs for Radio Free Europe, explained to us, the jamming now seems to have stopped. Those observations by Radio Free Europe are confirmed by engineers working in Britain.

Later this year the USIA will launch a television service to East Germany. The radio station RIAS in West Berlin is to start broadcasting TV programmes as well as the radio material.

Finally, the United States Congress has decided to halt the expansion of the “Worldnet” satellite television service run by the US Information Agency. A Senate house conference committee allocated $30 million dollars for Worldnet in 1988, some $14 million less than Worldnet had asked for. But it went further saying that Worldnet must spend half a million dollars to determine the audience for the service in Western Europe. If it turns out that the daily audience to the TV magazine programmes is less than 2 million a day, funds will be cut off in October.

KUSW

As we predicted, transmissions of the new short wave station in Utah USA did materialise, they’ve been playing quite a lot of Beatles records. The schedule is 1600-1900 on 15.225, 1902-2200 17.715, and 2200-0000 15.580MHz. Signals in West Europe are weak at present, though they may improve as the nights get shorter. The antenna is actually beamed towards Ontario Canada, thought you would think a city like that had enough rock music already.

Radar System Testing

The magazine Aviation Week and Space Technology has reported that: a section of the US over-the-horizon backscatter s.w. radar system has finally became operational. A powerful complex consisting of several 100 kilowatt short wave transmitters has been constructed at a place called Moscow, in the State of Maine in the north-east of the US.
**STEPSHENS-JAMES LTD.**

47 WARRINGTON ROAD, LEIGH, LANCs. WN7 3EA

Telephone (0942) 676790

Turn at the Greyhound Motel on the A590 (East Lancs. Road)

**14 HOUR MAIL ORDER SERVICE**

**ANTENNA RANGE**

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuwood Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TS908 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS405 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS102 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS800 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS500 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS300 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS100 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
<tr>
<td>TS50 409.000 MHz Transceiver</td>
<td>£996.00</td>
<td></td>
</tr>
</tbody>
</table>

**Butternut**

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFEVX 8 Band Vertical Antenna</td>
<td>£119.00</td>
<td></td>
</tr>
<tr>
<td>H1 V0 8/40/40/40 metre Vertical</td>
<td>£124.00</td>
<td></td>
</tr>
<tr>
<td>A1 V24 HEV 1712 1/2 Adm end in kit.</td>
<td>£42.00</td>
<td></td>
</tr>
<tr>
<td>20MRK HP2V 20Kit.</td>
<td>£33.39</td>
<td></td>
</tr>
</tbody>
</table>

**Hy-Gain**

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH3MK 2 Element Tridibeam</td>
<td>£576.00</td>
<td></td>
</tr>
<tr>
<td>Explor 4 Element Tridibeam</td>
<td>£449.00</td>
<td></td>
</tr>
<tr>
<td>TH2MK 3 Element Tridibeam</td>
<td>£349.00</td>
<td></td>
</tr>
<tr>
<td>18AVT 6 Band Vertical</td>
<td>£148.00</td>
<td></td>
</tr>
</tbody>
</table>

**Jayebeam**

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKV Minivas Tridibeam</td>
<td>£327.00</td>
<td></td>
</tr>
<tr>
<td>TB3MK3 3 Element Tridibeam</td>
<td>£316.00</td>
<td></td>
</tr>
<tr>
<td>TB2MK 2 Element Tridibeam</td>
<td>£212.75</td>
<td></td>
</tr>
<tr>
<td>TB1 MK1 3rd Tridibeam dipole</td>
<td>£105.80</td>
<td></td>
</tr>
<tr>
<td>VR2MK 2 Element Vertical</td>
<td>£80.00</td>
<td></td>
</tr>
<tr>
<td>DB4 6 GR6 6 Element Beam</td>
<td>£117.87</td>
<td></td>
</tr>
<tr>
<td>4V16m 4 Element Beam</td>
<td>£45.66</td>
<td></td>
</tr>
<tr>
<td>4V16m 5 Element Beam</td>
<td>£45.66</td>
<td></td>
</tr>
<tr>
<td>LW2S 2 Element mln</td>
<td>£23.97</td>
<td></td>
</tr>
<tr>
<td>LW3S 2 Element binary</td>
<td>£32.15</td>
<td></td>
</tr>
<tr>
<td>SFB1 1/2 Element s</td>
<td>£36.00</td>
<td></td>
</tr>
<tr>
<td>BIG1 2 Element Cross</td>
<td>£36.00</td>
<td></td>
</tr>
</tbody>
</table>

**World Radio TMR760**

**OFFICIAL SONY DEALER**

**OUR PREVIOUS PRICE WAS RIDICULOUS!**

**WHILST STOCKS LAST**

**£99.99**

**FULL AFTER SALES SERVICE**

**CALL IN FOR DEMONSTRATION! YES! WE DO KNOW HOW IT WORKS!**

**THIS IS A CRAZY PRICE, SO RUSH US YOUR ORDER TO AVOID DISAPPOINTMENT.**

**DIGITAL FREQUENCY DISPLAY**

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.S.U. 400 MW OPTIONAL EXTRA</td>
<td>£10</td>
<td></td>
</tr>
</tbody>
</table>

**FREE RECENT WRITER HANDBOOK WITH ANY RADIO PURCHASED, YOU JUST PAY £2 HANDLING AND POST.**

**JOHNSTONS SHORTWAVE RADIO**

43 FRIAR ST, WORCESTER WR2 1NA 0905 - 25740

**Lancashire & the North West's Leading Retailer in Amateur Radio. 20 Years Serving the Amateur by Amateurs Specialising Only in Amateur Radio Equipment.**

**SHOP HOURS 9:30 TO 5:00pm Mon. Fri. 4:30pm Sat.**

**OUR SETS ARE SO SENSITIVE THEY CRY WHEN THEY HEAR "THE SOUND OF MUSIC."**
FEBC on Aruba?

There have been interesting stories in several short wave listener publications that Aruba was to get its own short wave transmitter. A religious station, Radio Victoria was to be given a 100kW unit from the American Far East Broadcasting Company. Wearing Jack Brook, who coordinates technical matters for FEBC, he is based in Redwood City California, and he was surprised at the story. They had loaned one of their personnel to help run the station, but, as for the reported technical expansion he told us no transmitters have been ordered.

Bermuda Off

Another non-starter seems to be the plans for a 500kW medium wave station on the island of Bermuda. Two American broadcasting consultants submitted a plan earlier this year to start a station aimed at the eastern part of the United States, using a channel around 1.620MHz. It would promote tourism to the islands amongst the wealthier, more senior members of the American community. A few weeks back one of the consultants, Ed Shober, was told by Bermudan Minister of Communications, Mr Collis, that their construction request has been refused. It was felt the high power transmitter might cause interference problems to machinery in the nearby harbour area. Environmentalists also protested on the grounds that the large mast would be an eyesore.

The Signals from Delhi

A change of scenery now as we move to a small piece of farm land just opposite the Savit theatre in Greater Kailash II, South Delhi. This is the home of the Indian National Physical Laboratory’s time signal station with the callsign ATA. It operates on 85, 105 and 155MHz, but so does a Chinese time signal station in Lintong, that is in Xian province. As a result, the Chinese signals are completely overpowering reception of the Indian time standard in much of the country. The Delhi time signal station is constantly used by the Indian armed forces. All India Radio and university research groups as a accurate time reference. Earlier this year, an order for new 30 kilowatt transmitters was placed with the British Marconi company. One of the senders has now arrived, and it’s said that this should be operational by March.

Cable One

Cable One is a commercial radio channel which beams its signal up to the European communications satellite ECS-1. Interested cable companies then need special equipment to receive the signal from space and put it onto their cable system. Contrary to earlier reports Cable One didn’t start up on January 1. Cable general of Radio Austria International has succeeded in getting a 10 per cent increase for the station’s budget in 1988 bringing the figure to £5 million. He’s announced his intention to start Arabic broadcasts during this year, and in the longer term even programmes in Russian.

EDXC Meeting in Antwerp

May 1988 may seem like ages away, but the organisers of the non-commercial 1988 EDXC conference in Antwerp Belgium are hoping to persuade you to put it into your diary now. A lavish banquet and an excellent agenda strike you from the advanced promo sheet sent to us. The short wave ‘listeners’ club in Antwerp, Belgium has decided to host the 22nd annual conference of the European DX Council in Belgium’s second largest city. Well known broadcaster David Monson is also helping with the organisation. Lectures include presentations on BBC international satellite developments, radio data systems in Europe, Voice of America Audience Research and the World Radio TV Handbook prize quiz.

The Crest Hotel in Antwerp is already booked as the venue. It is very easy to find on the outskirts of the city and yet is just a short distance off the old city centre. The organisers are well aware that most participants will have to pay for the conference out of their own pocket.

They have succeeded in getting an all-in price (meals, accommodation, all trips, and the banquet) which works out about £154 per person. Those who want to find their own accommodation can choose package B i.e. everything else except the hotel for about £36.

The dates are from Friday afternoon May 20 to Monday afternoon May 23. For more information drop a line to EDXC 88, Rue Jules Lejeune 37, B-1000 Brussels, Belgium. Closing date for applications is Friday April 1. In contrast to some of the recent EDXC Conferences which have got rather stuck in with the same topics, this event looks to be different.

35>
**STARTING OUT**

Brian Oddy G3FEX

Brian Oddy continues with the more advanced type of receiver and covers stability and how it is achieved. He then goes on to explain frequency synthesis and the Wadley Loop system.

**Frequency Synthesis**

If the heterodyne v.f.o. principle is adopted in a general coverage (g.c.) RX the high cost of the numerous crystals required will detract from the advantage of the system, so it is best avoided. A much better approach for a g.c. double-conversion superhet would be to employ a process called *frequency synthesis*, whereby all the injection frequencies required for the first mixer are derived from the output of a single high-stability crystal controlled reference oscillator operating at 1MHz. The injection frequency for the second mixer could be obtained from a relatively low frequency v.f.o. with a tuning range of 1MHz.

In one type of frequency synthesis an ingenious triple mixing drift cancellation circuit, known as a Wadley Loop, is used with a v.f.o. operating at v.h.f. to "select" a desired harmonic from the output of a high stability crystal controlled reference oscillator — see Fig. 2.

The output from the reference oscillator (fr) is coupled into a harmonic generator (h.g.) so as to provide copious amounts of harmonically related signals (n x fr = f1) it is also coupled into a buffer amplifier to provide isolation before it enters mixer two as f4. The output from the v.f.o. (f2) is injected into both mixer 1 and mixer 3. When the v.f.o. is set to a suitable frequency (f2) it will mix with a harmonic from the h.g. (n x fr = f1) in mixer one, to produce an output frequency (f3 = f2 -

---

**The System**

- **Fig. 1** illustrates a v.h.f. heterodyne v.f.o. circuit that produces an output frequency I$_f$3 = f2 - [frequencies altogether]. The secret is to use the second of the double-conversion techniques described last month, whereby a wide band of incoming signals is initially converted to a lower frequency narrow band first by i.f. by mixing them with the output from a crystal controlled oscillator. The second mixer and variable local oscillator can then operate at relatively low frequencies over a limited tuning range to select a desired signal and convert it to the second fixed i.f. for further processing.

- **Fig. 2** shows a Wadley Loop circuit. The reference oscillator (fr) is coupled into a harmonic generator (h.g.) so as to provide copious amounts of harmonically related signals (n x fr = f1) it is also coupled into a buffer amplifier to provide isolation before it enters mixer two as f4. The output from the v.f.o. (f2) is injected into both mixer 1 and mixer 3. When the v.f.o. is set to a suitable frequency (f2) it will mix with a harmonic from the h.g. (n x fr = f1) in mixer one, to produce an output frequency (f3 = f2 -
f1) corresponding to that of the sharply tuned i.f. amplifier, i.f. 1. The output from i.f. 1 enters mixer 2 and mixes with the output from the buffer amplifier (f4) to produce a difference frequency (f5 = f3 - f4). It then passes through a band-pass tuned i.f. amplifier, i.f. 2, into mixer 3 where it is again mixed with the output of the v.f.o. (f2) for 2 reasons: first, to arrive at the final frequency required, f6, and second, to enable the inherent drift in the v.f.o. to be cancelled out.

In fact the v.f.o. is independent of the output frequency, as can be seen from the following:

\[ f3 = f2 - f1 \]

\[ f5 = f3 - f4 = f2 - f1 - f4 \]

\[ f6 = f2 - f5 = f2 - f1 - f4 \]

Therefore \( f6 = f1 + f4 \)

Since the v.f.o. frequency (f2) is absent from the expression for the final frequency (f6), the inherent drift in the v.f.o. will have no effect upon f6.

To illustrate the role of the v.f.o. in the circuit, consider a practical example in which the following conditions apply:

The reference oscillator frequency (f1) = 1 MHz.

The output of the h.g. = \( n \times f_r = 11 \).

The buffer amplifier output (f4) = 1 MHz.

That i.f. 1 is sharply peaked on f3 = 30 MHz.

The tuning of i.f. 2 is centred on f5 = 29 MHz.

**Question:** What will be the output frequency (f6) if the v.f.o. frequency (f2) is set to 50 MHz?

At the first mixer f2 - f1 = f3,

so 50 - 1 = 30, therefore f1 = 20 MHz.

(In other words the v.f.o. will in effect "select" the 20th harmonic of the reference oscillator to produce f3.)

At the second mixer f3 - f4 = f5,

so 30 - 1 = 29 MHz, i.e. i.f. 2.

At the 3rd mixer f2 - f5 = f6,

so the output frequency (f6) = 50 - 29 = 21 MHz.

By substituting the appropriate figures it will be seen that if the v.f.o. frequency is changed to 49 MHz the 19th harmonic from the h.g. will be selected and the output frequency will be 20 MHz. If the v.f.o. frequency is increased to 51 MHz the output frequency will become 22 MHz.

Note however that if the v.f.o. drifts to, say, 51.250 MHz the output frequency remains at 22 MHz, thus:

At the first mixer f2 - f1 = f3,

so 51.250 - 1 = 50.250.

At the 2nd mixer f3 - f4 = f5,

so 30.250 - 1 = 29.250.

At the 3rd mixer f2 - f5 = f6,

so the output frequency (f6) = 50 - 29 = 21 MHz.

The only effect of v.f.o. drift will be a reduction in the output level of f6 due to the sharply tuned nature of i.f. 1. In a practical system a lamp or meter is used to indicate when the system is locked up to the reference; there will be an absence of signal output when the system is unlocked.

It is possible to expand on this system by removing the output buffer amplifier, f4, to mixer two and injecting instead the output from additional triple mixing circuits. These may be locked to the same reference oscillator via frequency dividers so as to provide small additional steps in the output frequency, e.g., with a 1 MHz reference they may be in steps of 100 kHz or 10 kHz, etc.

The general principles of the Wadley Loop have been used in a number of well-known receivers including the Racial RA - 17 and Yaesu models FRG - 7 and FRG - 7000; however the advent of digital electronics has resulted in this type of circuit being generally replaced by phase locked loop techniques, which involve a standard reference oscillator and a voltage controlled oscillator to provide a fully synthesised local oscillator signal. These will be considered next month.

---

**BANDSCAN**

**Skiing Expedition**

A skiing expedition with a difference is being planned for the first week in March. A scientific expedition consisting of four Canadians and between seven and ten Russians will attempt to cross the North Pole. Starting at Cape Arktichsky on the Severnaya Zemlya Islands in the very north of the Soviet Union they'll take about 100 days to reach their destination of Cape Columbia on Ellesmere Island in Northern Canada.

The scientists are not only testing out their skiing ability in the extreme cold, they'll be making regular stops to conduct geomagnetic, glacial and meteorological observations. According to team leader Dr. Dimitri Shparg, they're aim is to join two continents with a ski track. They're carrying all their supplies in backpacks weighing up to 41 kilos each... they're not using sleds or dogs to help them on the 1730 kilometre journey. Supply planes will drop the food and equipment up to six times *en route*, but otherwise it's a study of mankind against the elements.

Two private organisations in Canada and the USSR have jointly raised the money to fund the project. Now the communications connection, the project leader is not only an experienced polar explorer, he's also a radio amateur operator. So contact from the skiing group to the outside world will be via the short wave amateur radio bands. Short wave listeners with a radio capable of single-sideband reception will be able to listen out for the support stations for project Nordisk Comm as it's being termed. This mission is a truly international project. In order to determine where the skiers are the skiers will make use of the SARSAT search and rescue satellites operated by the United States, Canada and several other nations. These satellites team up with their Russian counterparts called COSPAS to complete the "locating" part of the project.

These signals will be sent to the University of Surrey in England. The University of Surrey currently command one of the Amateur Radio Satellites called YOSAT OSCAR 11. If you tune a v.h.f. receiver to 145.250 MHz in the f.m. mode then every 100 minutes or so you should be able to receive the satellite in plain English. In March the talking computer will be set to announce the actual location of the ski-expedition.

A special postcard commemorating your reception of the Digitalaker will be available to you from the Canadian Amateur Radio Relay League. Information on this and how you can access weekly Transpolar Skitrek progress reports is also included in the information packet. For your information packet write to Richard C. Ensight

AMSAT Science Education Advisor

421 N. Military

Dearborn, MI 48124 USA

---

**STARTING OUT**

**Motion Picture Musings**

There's a sudden rush of radio-related films and videos around again. A Scottish band called Wet, Wet, Wet recently released a video called Sweet Little Mystery. Shot in The Gambia, the videoclip begins with pictures taken at the commercial radio station Radio Syd. That operation began life from a ship as a Swedish off-shore broadcaster, moving later to Banjul where its very active today.

The film biography of Ritchie Valens has been out for some months in North America and Europe. *La Bamba* as the film is titled contains a scene at Los Angeles rock station KFWB on 93.5kHz. This certainly a popular music station in its day, and widely heard across North America.

*Broadcast News* is the title of a new James Brooks film released a couple of weeks ago. It's a romantic comedy set in a Washington network news bureau, complete with budget cuts, crisis news broadcasts. A few of our contacts in North America have already seen the film and say that it deserves the rave reviews it has being getting.

The final film with radio connection has so far only been released in some parts of North America. Its called *Good Morning, Vietnam*, and stars Robert Williams as a disc jockey on a radio station designed to serve the Americans living in Saigon back in 1966.
How often over the years has someone said to me, "I’ve listened every evening for months on Band X for country Y and not a sniff of it have I heard. Why?"

Let’s itemise the requirements:
1. There must be propagation between the transmitter and the receiver (this may not be noticeable if no-one is active).
2. There must be a station operational at the desired place.
3. The station must be in use at the time when you are listening.
4. He must be transmitting on the same band and mode as the one on which you are listening.
5. The receiver set-up must be capable of hearing the distant station.
6. The receiver operator must be able to pick the signal out of the QRM.

On the negative side, the directivity of the antennas at each end should not be mutually antagonistic.

The only ones that the s.w.l. can do anything about are items 5 and 6. The rest are well and truly out of his hands. So, what does all this really MEAN, in practical terms and is there any hope? Well, at the correct time of day, the simple direct-conversion receiver or one-valver has as much chance as the £1500 + "superduper special" in the hands of equally skilled operators; and that neither has any chance of hearing, say, a distant country when the one and only amateur is tucked up in bed!

The only time this gets significantly upset is a major contest weekend, say the ARRL DX contest, or CW WW. Then you find normal operators coming on for the full 48 hours (or, where rules call for it, 36 of the 48), and taking their sleep at times when, to them, the bands aren’t so productive. Hence, in a contest weekend, expect to hear odd signals at odd times. For example, the 28MHz band often shows surprising life on a contest weekend, for no better reason than that a few operators have tried a speculative CQ call for the sake of a few multipliers, have been heard and attracted others on to the band. Out of contest time, everyone listens, no-one transmits and “the band was dead!”

Letters
First, I must refer to the business of the year-end listings. If you are in the Annual List, you put your existing log aside and start again. However, when you are ready to transfer to the All-Time list, you dig out the old log and add those not duplicated in the 1988 list to the All-Time Post War HPX Ladder.

### All-Time Post War HPX Ladder

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Hughes (Hannington)</td>
<td>3263</td>
</tr>
<tr>
<td>E. M. Gauzzi (Malta)</td>
<td>3206</td>
</tr>
<tr>
<td>E. W. Robinson (Falsetow)</td>
<td>2983</td>
</tr>
<tr>
<td>M. Robson (Gillingham)</td>
<td>2103</td>
</tr>
<tr>
<td>M. Rodgers (Bolton)</td>
<td>1927</td>
</tr>
<tr>
<td>R. Shicklow (Rozel)</td>
<td>1990</td>
</tr>
<tr>
<td>N. Henty (Northam)</td>
<td>1615</td>
</tr>
<tr>
<td>B. Patchett (Sheffield)</td>
<td>1207</td>
</tr>
<tr>
<td>C. E. Veley (Jersey)</td>
<td>1165</td>
</tr>
<tr>
<td>A. Woodcock (Denmark)</td>
<td>1027</td>
</tr>
<tr>
<td>B. E. Woodcock (Leeds 17)</td>
<td>1200</td>
</tr>
<tr>
<td>A. P. Lincoln (Aldershot)</td>
<td>1218</td>
</tr>
<tr>
<td>R. G. Williams (Borehamwood)</td>
<td>1218</td>
</tr>
<tr>
<td>S. Burgess (Stockport)</td>
<td>776</td>
</tr>
<tr>
<td>S. McEneary (Hereford)</td>
<td>693</td>
</tr>
<tr>
<td>R. Tanswell (Iver)</td>
<td>621</td>
</tr>
<tr>
<td>P. McAllen (Southampton)</td>
<td>528</td>
</tr>
<tr>
<td>R. Gawain (Preston)</td>
<td>510</td>
</tr>
</tbody>
</table>

### CW Only

<table>
<thead>
<tr>
<th>Name</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Scott (Iveauik)</td>
<td>1869</td>
</tr>
<tr>
<td>N. Mulvey (Edmonton)</td>
<td>4241</td>
</tr>
<tr>
<td>P. J. Barnes (Blackpool)</td>
<td>548</td>
</tr>
<tr>
<td>M. Rodgers (Bolton)</td>
<td>347</td>
</tr>
<tr>
<td>C. E. Veley (Jersey, C.I.)</td>
<td>342</td>
</tr>
</tbody>
</table>

### RTTY Only

<table>
<thead>
<tr>
<th>Name</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. J. Prior (Lichfield)</td>
<td>546</td>
</tr>
<tr>
<td>A. P. Lincoln (Aldershot)</td>
<td>561</td>
</tr>
<tr>
<td>C. E. Veley (Jersey, C.I.)</td>
<td>500</td>
</tr>
<tr>
<td>N. Henty (Northam)</td>
<td>334</td>
</tr>
<tr>
<td>R. Tanswell (Iver)</td>
<td>301</td>
</tr>
<tr>
<td>M. Rodgers (Harwich)</td>
<td>270</td>
</tr>
</tbody>
</table>

Starting score, 500 for Phone, 200 for CW or RTTY. Entries in accordance with HPX Rules.

### Annual HPX Ladder

<table>
<thead>
<tr>
<th>Name</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. J. Sales (Lancaster)</td>
<td>450</td>
</tr>
<tr>
<td>A. Hall (Lichington)</td>
<td>410</td>
</tr>
<tr>
<td>N. K. Yule (Bengeo)</td>
<td>354</td>
</tr>
<tr>
<td>C. E. Veley (Jersey)</td>
<td>361</td>
</tr>
<tr>
<td>S. Hill (Pun Talo)</td>
<td>336</td>
</tr>
<tr>
<td>D. McGillicuddy (Limerick)</td>
<td>302</td>
</tr>
<tr>
<td>S. Isles (Liverpool 17)</td>
<td>275</td>
</tr>
<tr>
<td>G. Gilpin (Farnham)</td>
<td>223</td>
</tr>
</tbody>
</table>

This is the last showing of the 1987 Annual Table, to December 31, 1987. The first listings of 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 1987

<table>
<thead>
<tr>
<th>Name</th>
<th>Prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. M. Gauzzi (Malta)</td>
<td>1029</td>
</tr>
</tbody>
</table>

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, make your All-Time total. This answers the question from N. K. Yule (Bengeo). He has been playing around with his antenna farm, improving the insulation and comments that he wishes he had a beam with which to avoid the East Coast US in the afternoons. Actually, if you look at a Great Circle Map, you will observe that west covers the USA plus long-path Pacific VK and ZL, while east covers Europe, Asia and the short 5Z8. VK2L North doesn’t offer a lot, while south means Africa where the only significant degree of activity is from ZS, or southerly parts of S. America. A reversible fixed beam covering E-W directions would be of considerable interest and still give the odd African or S. American.

E. W. Robinson (Falsetow) agrees with D. A. Whitaker’s comments in January about a beam start for HPX each year to give everyone a fair run, so far he is the only one to have commented. Perhaps I will rejig the whole HPX set-up yet! In his usual long letter, Ted mentions the 1Q9YH Sicilian and CHSAJ3 Russian stations. Although he stuck around the frequency for quite a long time hoping, he was quite unable to hear a mention of just what these special call was ABOUT! I do hope that local and national societies make operators recall what the station is about, even in the midst of a pile-up.

B. E. Woodcock (Leeds 17) struggles on despite the local QRM, yet still manages to hear the good DX. This time they include ZL9BCD, VK8LM, VK908I and VK9NS amongst the 130 offered for the ladder.

D. McGillicuddy (Limerick) wonders about the deadlines for the HPX lists. This is the same as the one for your letters and is always given somewhere in “On the HF Bands”, usually in a prominent “box”. These dates are the last date for your letters to arrive though. Dave has managed to fit a Delta Loop for 7MHz, a dipole for 14MHz and a long wire into a garden some ten metres square. Sounds a bit like my garden three antennas, a sailing cruiser and a lot of roses in an area 7.5 x 6 metres!

Next, S. Myers (Liverpool 9) is at the tender age of 15. Steven has a list of 1988 prefixes, plus another covering the pre-1988 ones. Looking at them I notice he doesn’t miss much DX, wonder if we have here a DX amateur in the making?

### Filing Systems

This is a question that is exercising G. Gilpin (Farnham) considerably. He has noticed that the bands have changed over recent years but the labour involved in keeping records hasn’t. Several systems have been tried and all have worked, but alas all have been very time-consuming. I agree, my own thoughts on this would automatically turn to a home computer and printer; with a suitable program one would just key in a prefix when heard and if it were new the machine would hold it, if not, reject it. There are various programs for various machines that do this, but my own feeling would be to try and set up a program for whatever machine you happen to own. The only serious problem you would need to watch for is mutual QRM. For example, I use Amstrad 8512 and 9512 machines here and the latter has a disk-drive that kicks up enough rumpus at 145MHz when running as to mean switching one or other off. Anyone with useful ideas might like to contact Derek Gilbert, 2 Bailey’s Cottages, Bentley, Farnham, Surrey GU10 5JW.

**SEEN & HEARD**

**AMATEUR BANDS ROUND-UP**

Justin Cooper

PO Box 4, Newtown SY16 1ZZ

---

Short Wave Magazine April 1988
I start this month with a very simple request from Norman Hartford who asks what does SITOR, AMTOR and SSTV sound like? Probably the best way to handle this is to pick out some frequencies known to transmit the required modes. First of all the frequencies are very low, so the AMTOR and AMTOR-SFFS sound are very similar to each other. The most appropriate description of AMTOR/SITOR is a repetitive chirp-sound, a good place to find AMTOR is between 14.070MHz and 14.080MHz in the evening.

SSTV is rather more difficult to describe but thankfully quite easy to find. The best place to look is again in the 14MHz amateur band and signals can generally be found close to 14.23MHz.

Norman has also included a very comprehensive report of RTTY stations heard during the past month. I have incorporated these reports into my main list later in the column. To receive Utility stations Normans uses a Matsui MR-4098 receiver with a Maplin antenna tuning unit. The software used is the popular TX-3 package from Technical Software. Thanks for a very interesting report.

Ivor Cooper has written with his usual comprehensive report, the most interesting station being Chatham Radio (WCC). This American SITOR station transmits news and sports reports around at about midnight most weekends. The transmission uses 100 baud ARQ with a shift of 170MHz on 8.715MHz.

One other good station for world news is BZP 57 Xinhau Beijing in China. English transmissions have been logged at 0030, 1750 and 1926UTC on 7.525MHz and 7.887MHz. The transmission mode is standard 50 baud RTTY with a 425Hz shift.

One of my other regular contributors has supplied a very interesting list of stations not shown in the popular frequency lists. Some of these, although heard, have not been positively identified so if you receive either the callsign or even a schedule then please write and let me know. I have highlighted a selection of these frequencies with bold print in my main frequency list.

This column can boast a truly international spread of contributors thanks to a lengthy report sent in by Jan Niewenhuis from the Netherlands. Jan is obviously very enthusiastic about Utility station logging as he has included all manner of useful information. The first item concerns Bankop Meteo which transmits meteorological information using 50 baud RTTY. The station frequency, callsign and power is shown here: 17.525MHz HSW61 with 20kW. 10.298MHz HSW62 with 5kW. 10.169MHz HSW63 with 5kW. 7.395MHz HSW64 with 5kW.

Another useful station is the Czecoslovakian NSC64, which transmits news in English according to the following schedule: 0630-0730 17.525MHz and 18.985MHz; 0800-0845 18.985MHz; 0920-1000 17.525MHz and 18.985MHz; 1030-1130 17.525MHz and 18.985MHz; 1200-1245 18.985MHz; 1320-1400 13.6475MHz and 17.525MHz; 1500-1600 18.985MHz; 1630-1745 17.525MHz and 9.363MHz.
The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.

For those of you interested in DX I have received some interesting station details of the New Zealand station Wellington Weather.

This station known as Auckland Meteo is located in Auckland and uses the callsign ZKL. The transmitter is produced by Aerocom and runs 5kW into a Marconi conical monopole to give an omni-directional radiation pattern. The frequencies used are 5.8066 MHz, 9.458 6 MHz, 13.6501 MHz.

The transmitted charts are prepared by computer using information supplied by the New Zealand, and Fiji Meteorological Services. This information is primarily intended for use by ships in the South Pacific Ocean and Tasman Sea.

The FAX charts are broadcast 24 hours a day using an IOC of 576 and 30 r.p.m. The only breakdown in FAX transmission occurs during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1300-1415, 1800-1830 and 2045-2145 UTC. For those of you who would like a full picture of these broadcasts at 0445 and 1645 UTC.

The FAX log for this month reveals several DX stations and all the stations shown here use the standard 120 r.p.m. and an IOC of 576.
As promised in our February column, from our regular reader and satellite enthusiast Gordon Train of Keswick now comes the details of the improvements that he has made to his Cirkit weather satellite receiver, as developed by R. Lydon on 20 December 1987, which he recommends to users of this popular system. Many of these Cirkit kits are in use worldwide, by many weather satellite watchers. In the Caribbean they have been incorporated in hurricane early warning systems, and without question provide excellent service. However, improved sensitivity and better signal to noise ratios can be accomplished by minor alterations to the front end stages Q1 and Q2. As provided, the gate 2 voltages on Q1 and Q2 are 1.1 and 1.5 volts respectively. Gordon recommends that the voltage be increased from the Nippon Electric Company for the 3SK38 device states that at this level the amplifier provides a signal to noise ratio of 6.5dB and a noise figure of 6dB! Increasing the Gate 2 voltage in the range 4-6 volts raised the stage gain by up to 16dB, and lowers the noise figure to under 4dB immediately, improving sensitivity as bourn out by the experimental data. If a 12 volt supply voltage is used, the Gate 2 voltage can be increased to 5-6 volts by merely changing both R2 and R7 from the existing to a new value of 35kohms, this giving a very noticeable improvement without introducing instability, on the proviso that the receiver is boxed.

Additional improvements, though somewhat less dramatic, can be made by removing the damage to the resistors across L1, L2, L3, L4 and L5, as without them, at the satellite frequencies the front end bandwidth is still found to be adequate. To improve the definition of the supply lines, R4, R9, R14, R16, R26 and R28 were each lifted off at one end, and ferrite bead chokes, each consisting of a few turns on a single bead, were placed in series. The exact number of turns and wire size were found to be unimportant. In the users case, the resistors were retained so as to enable current measurements.

Gordon concludes, "... Increased gain will in some installations avoid the need for a separate pre-amplifier, and whilst it may be that the sensitivity was limited in the interests of stability and lower cross modulation, experience has shown how these changes can be made to the original design with safety".

He proves the point that he makes by sending in two excellent experiments, one of the many pictures taken by his system, as the prints Fig. 1 and Fig. 2, which were snaps taken of his TV screen. The superb clarity of the Mediterranean, Adriatic and Aegean Sea, with the many islands, Tunisia, Italy, Yugoslavia, Albania and Greece all depicted, extending to Western Turkey and the eastern Black Sea coast of Bulgaria, as seen from NOAA-9 in August 1987 can be seen in Fig. 1. A photograph showing southern England and northern France (Fig. 2), was taken from NOAA-9 on Good Friday, 1987, using maximum resolution and an optimum 256 levels, to show the land details that are available on a clear day using the system.

Weathersats Info

Those enthusiasts with a 300 or 1200 baud modem and a telephone now have an updated weather satellite information service available by dialling the NOAA-9 bulletin board to the USA Area Code 214, 394-7438. The source is available to all callers 24 hours per day, and has the full regularly updated information on all satellites being tracked giving tracking programs, passes, crossings, telemetry decoding, frequencies, etc.

New NOAA
NOAA-N, postponed from the intended 5 November launch (very apt for rocket launch) or dare I even say “APT” now is planned to fly in mid-April to become NOAA-11. It will take some time before commissioning into active service, so we can expect pictures from both NOAA-9 on 137.620MHz and NOAA-10 on 137.500MHz for some time to come. Both of these satellites continue to transmit their 40kHz wideband f.m. signals and infra red lighting pictures from 850km up, with NOAA-9 in the mid-afternoon (nominally 3pm) and NOAA-10 in the early morning (nominally 7.30am), at good strength.

Shuttle Programme

Whilst the U.S.S.R. space programme race ahead, now also including a new "shuttle" type of orbiter, the USA is still stuck with the vestibules of problems resulting in the last launch tragic failure of 28 January 1987. Following reports of nozzle problems during the various firings on the now re-designed solid fuel booster rockets, it would now appear to be at least August 4 this year before the flight programme is due to resume, to attempt to launch a IDRS satellite and accomplish some additional experiments during the planned 4 day mission.

The flight crew for the 27th mission has been announced as Commander Roy Gibson, Pilot Guy Gardner, and mission specialists Dick Mullane, Jeremy Ross and Will Shepherd, none of whom hold amateur radio callsigns.

The STS-28 Columbia flight due later this year is a top-secret military mission, and for this reason no actual date is released. This venture will have Brewster Shaw as commander, Richard Richards as pilot and a crew consisting of James Adamson, Mark Brown and David Leestma.

Joint space co-operation between ESA and NASA for a joint space station has up to now been made impossible by the USA insistence upon military use, as the ESA constitution recognises the space treaty, and hence dedicates research to civil use only.

Waiting in the wings are WAASIR and WOORE, who have plans for future shuttle amateur radio operations, as packet radio and wide band amateur TV respectively. It could be at least another year before we hear (or see) another W5FL/WORE type amateur shuttle mission. Meanwhile, the USSR amateurs have an amateur transceiver ready to go for MIR, but no amateur radio licensees can be identified as yet in the future crews for the Soviet space station. A good chance of having a fully automatic packet radio mailbox station aboard MIR exists, and plans are now being made toward bringing this to fruition. This could take the form of a combined amateur radio and VITA PACKSAT, developed and built by AMSAT to relay essential medical, agricultural, environmental and climatic information between aid agencies and developing countries.

Project Nordski Comm

This joint Canadian-Russian via the North Pole ski-trip is an international all amateur-radio event, with s.s.b., c.w. and packet radio being used at h.f., RS-10/11 for direct transponder and store and forward communications, and the UoSAT spacecraft for transmitting the COSPAR/SARSA™ navigational information by its 145.825MHz digi-talker as it performs its polar pass. The trip, commencing from Cape Arctiques on the Severnaya Zemlya islands in early March, will take some 90 to 100 days for the 1730km trip, to reach Cape Columbia on Elefthera Island in Northern Canada. In addition to the U.K.3KP built expedition equipment, Icom are providing hand-held 145MHz band transceivers for the skiers and N72L is donating the packet radio requirements.
Listeners will be able to follow the progress of the expedition by listening to the RS and UoSAT satellites, and a special pack for education is available from Richard Ensign, AMSAT Science Education Adviser NBWU, of 421 North Military, Dearborn, Michigan 48124, USA. Telephone USA 1-313-278-0900 during the school day, or 1-313-274-1718 during USA evenings and weekends. The pack will contain maps, bases, passes, frequencies, and all you need to track the event. Special callsigns, expected to be EK0 prefixes, will be in use, and QSLs for those hearing the expedition and its base camps on ice-islands will be available from the Central Radio Club of the USSR, PO Box 88, Moscow, USSR.

During a tropospheric-opening, signals may well be heard in the UK from a number of stations between 87 and 104 MHz. Stations such as those in Austria, Belgium, France, East and West Germany, Holland, Ireland, Portugal, Scandinavia and Switzerland are possible.

A good example is West Germany, which can provide a glut of signals from such networks as Bayerischer Rundfunk, Hessischer Rundfunk, Norddeutscher Rundfunk, Radio Bremen, Saarländischer Rundfunk, Sender Freies Berlin, Sueddeutscher Rundfunk, Südwestfunk, Westdeutscher Rundfunk and the American (AFN), British (BFN) and Canadian (CFN) Forces Networks. Information about transmitter locations and precise frequency details can be found in the World Radio TV Handbook, available from the Short Wave Magazine Book Service, price £17.95 plus P&P. See page 50 for details.

**Equipment**

When weather conditions look right, I usually carry a Plustron TVRSD in the car which enables me to check Band II for DX each time I stop. To add more weight to these checks it is important to know the prevailing atmospheric pressure and the height above sea level. Therefore, to get this information I installed an ex-RAF altimeter, Fig. 1, in the glove compartment of my car. This instrument, built for WWII aircraft, indicates the atmospheric pressure in millbars in the lower window and the height a.s.l. on the main scale.

Briefly, because altimeters like this are sophisticated barometers and the height reading is relative to the prevailing atmospheric pressure and vice-versa, one of these two variables must be known so that the meter can be set before starting out. Conveniently for me, the OS stamped their bench-mark for 193t a.s.l. on my garden wall. So, before leaving home, I set the height to this level and then leave the instrument to look after itself throughout the journey. While this adjustment is being made, the knob at the bottom of the dial, the pressure is automatically being shown in the window. When the photograph, was taken, outside my QTH, the readings were 994 mb at almost 200 ft.

**Reports**

Around 1400 on January 31, amid a lot of aircraft flutter, Simon Hamer heard programmes from Belgium (BRIT-2) on 98.6 MHz, France (Musique, Culture and Inter) on 88.7, 98.3 and 99.6 MHz respectively and Holland (NOS-2) on 88 MHz. He also logged BBC Radio 4 from the Channel Islands on January 31.

**Phase III-c Launch**

The future OSCAR-13 spacecraft has been delayed by continuing problems in the ESA Ariane launch vehicles third stage, the failure of which was responsible for the loss of Phase III-a, and the collision from which resulted in damage to Phase III-b, now OSCAR-10. The new satellite is well insured, and launch date is now set, with a reasonable degree of probability, for the window between April 30 and May 4.

A world wide launch coverage of the event is planned by Ralph Wolli WORKP, AMSAT’s communications manager, with broadcasts starting from some one hour before lift off until deployment, with direct lines from the launch site. 14.282 MHz should be open direct to the states, ARL frequencies will be used, and a line to the University of Surrey will result in AMSAT-UK’s coverage on 3.780 MHz. Full details of the plan, recommended to listeners as an exciting event in the spaceflight programme, will be appearing when announced in the Practical Wireless “Amateur Satellites” column.

The barometer was far from steady between January 16 and February 15 and only above 30.0 in (1015 mb) for short periods. This gave little chance of a prolonged tropospheric opening. A typical example of this occurred with the pressure rose sharply from a low of 29.6 in (1002 mb) at 2300 on February 11 to 30.1 in (1019 mb) at midnight on the 12th. By 0400 on the 13th, it was falling again and around 1100, I found many inter-station “warbles” in Band II plus a number of French stations, which were strongest at 88.7 MHz and 97.5 MHz.

Many complex factors have to combine in the troposphere before the v.h.f. bands open up, but a tune through the band as soon as the pressure is high, if only for a few hours, can be very rewarding and break the monotony of an otherwise dead period.

On one such occasion, around midnight, Tim Shirley (Bristol) heard programmes from the BBC in the Dover area. Although such events may seem insignificant at the time they are always worth reporting if only to confirm another readers findings.

In Zandvoort, Ed Wieringa uses a 3-element antenna for Band II and during most of the late November openings he listened to BBC Radio 1, “in stereo without a rustle” on 104.8 MHz.

Don’t forget to let me have your Band II reports, big or small, before the deadline date and I will use what I can.

**TELEVISION**

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

"In June and the first week in July 1986, conditions for TV DXing were amazing and, for the first time in eight years, I logged Divis (N. Ireland) on Ch. 24 at a time when Sandy Heath (East Anglia) and Rumster Forest (Scotland) were weakened." wrote Ed Wieringa from Zandvoort. A good bit of DXing Ed, a fine example of the strange and unpredictable propagation which often occurs during a tropospheric opening. I always welcome such snippets from past events because they are especially interesting and helpful to our new readers. The 1988 Sporadic-E season will soon be upon us, so now is a good time for newcomers to check up on some of the captions, logos and test-cards which they can expect to find in Band I. They can appear at anytime, during the hours of daylight, from late April to early September. These months are the extreme limits however, experience shows that the best and most prolonged openings occur in June and July.
EX-WD COMMUNICATIONS RECEIVERS

We now have stocks of ex ministry receivers checked & serviced in our own workshops.

RACAL PA17, PA17L, 1 to 30MHz, R210.2 to 16MHz.

EDDYSTONE 730/4 500kHz - 32MHz

Ring for prices & stocks.

Test equipment & Components — send for lists

Large SAE please or 20p stamps.

Wanted: WW2 Radio AR11, B2, R1155, R1475 etc.

W.H.Y.

AJH ELECTRONICS (G8AQN)

151a BILTON ROAD, RUGBY, WARKS CV22 7AS

Tel: Rugby (0788) 76473, Eve (0788) 71066

S.E.M. — UNIT C, UNION MILLS, ISLE OF MAN

Tel: Marown (0624) 851277

S.E.M. VHF CONVERTER

Plugs into your VHF receiver aerial socket to give you coverage from 118 to 146MHz. Tun your receiver from 2 to 30 MHz £49.90. Ex-Stock.

S.E.M. H.F. CONVERTER

Plugs into your VHF scanner aerial socket and converts its range to cover 10kHz to 60kHz. Gives you full LF, MF, HF, VHF, UHF coverage £49.90 from stock.

VERY WIDE BAND PRE-AMPS.

3MHz to 500kHz, 9dB gain, 1.5dB N.F. and unprecedented performance. Basic Pre-Amp £32.00. Switched through when £43.70 from stock.

QRM ELIMINATOR

A unique design, which has revolutionised interference suppression. Connects in your aerial lead and phases out interference before it gets to your receiver. Any sort of QRM, it can be next to your rx (your computer?) or several miles away, 1.5-30MHz £68.90. Ex-Stock.

If you require more information on our products, ring or write.

Prices include VAT and delivery.

C.W.O. or CREDIT CARD by phone.

REG WARD & CO. LTD.

1 Western Parade, West Street, Axminster, Devon, EX13 5NY.

Telephone: Axminster (0297) 34918

FRG 8800 £639.00

Super-HF/ VHF receiver

or VHF- or UHF-only. £1100.00

Direct readout with 8-bit

CPU (function control, 21 button keypad), a VFO frequency selection. Full general coverage

10MHz-29 30MHz. AM, FM, SSB (SSB-only), CW. 12 memories with back up 100, 120, 230, 340, plus 12V c. operation (optional). Clock and timer etc off control — fast/slow tune dial lock — computer control socket: FRG8800 VHF-CONVERTIBLE £100.00

118-174MHz direct read-out — plug in. FR/LFM £49.00 (wide band FM unit).

FRG600 £525.00

All-mode scanning receiver providing features never offered before, covering 50 (through 955 kHz continuously, with 100 keyboard-programmable memory channels).

This is an innovative all-mode SSB, CW, AM, FM receiver that covers 150kHz-30MHz. With an optional VC-10 VHF converter, unit coverage of the 118-174MHz frequency range is possible. New microprocessor controlled operating features and an "UP" conversion PLL circuit assure maximum flexibility and ease of operation.

LOWE HF-125 £375.00

Coverage is continuous from 30Hz to 30MHz and operating modes are AM, USB, LSB and CW with an optional FM and synchronous AM board. A comprehensive range of bandwidth filters are standard. 2.5, 4.7 or 10kHz. There is a 400Hz audio filter for CW reception. Controls are very simple and the frequency tuned is displayed on a large back-lit liquid crystal display. Power requirements are 12V d.c. of around 25mA and internal NiCd batteries give around 10 hours portable operation. The lithium battery gives back-up for the 30 memories for some ten years.

IC-R7000 VHF/UHF £957.00

Continuous coverage receiver. 25MHz-2000MHz CW/SSB/AM/RTTY/FM (optional). Direct frequency entry, 32 memories. Scanning, remote control and 12 volt d.c. option.

IC-R71E HF Receiver £825.00

100kHz-30MHz

CW/SSB/AM/RTTY/FM (optional). Direct frequency entry, 32 memories. Scanning, Remote control and 12 volt d.c. option.

WORLD SHORT-WAVE BROADCAST FREQUENCY LIST

We have been instructed to dispense of these at below cost price! This book is professionally bound in A4 size and contains a complete list of the world’s broadcast stations with frequencies and time schedules. It went to press just over 18 months ago and so is still basically up to date. Much additional information is contained within its pages and the publication represents a bargain at our price.

Published price: £4.95.

Our price (inc post) £2.00!

BANKRUPT STOCK

Spa Publishing Ltd

18-20 Main Road, Hockley, Essex. SS5 4QS

VISA & ACCESS ORDERS 0702 206835
ON SALE NOW . . .

Reviewed
THE ALINCO
ALX-2E
2m Handheld

FREE INSIDE
World HF Amateur
Beacon Map

Also
Build a VHF Monitor Receiver
from Modules
And
A Digital Dial

. . . AT YOUR NEWSAGENT
SEEN & HEARD

Chs. E3 and 4; Sweden (TV1 Sverige) Fig. 2, on Chs. E2, 3 and 4; several Norwegian regionals such as Melhus Fig. 3, also on E2, 3 and 4; Yugoslavia (RTV-1) Fig. 4 on E3 and the USSR Fig. 5, on Chs. R1 and 2. The first four test-cards were received by Noel Smythe (Caerphilly), Fig. 5, came from Garry Smith (Derby) and Sweden’s test card labelled Kanal 1, Fig. 6, was logged in colour by Bob Brooks (Great Sutton) in 1987. Bob also caught a logo from Iceland, Fig. 7 and a caption from Sweden, Fig. 8. Lt. Col. Rana Roy sent a couple of Russian captions, Fig. 9 and 10, that he received last August 9 at his QTH in India.

I regret to announce that one of my regular contributors Len Eastman, a well known television enthusiast from Bristol, passed away in January. Over the years he received and recorded numerous pictures, from a variety of countries, during Sporadic-E openings and frequently sent along photographs of his work. Typical of these is a cartoon from Poland (Fig. 11) and a “lottery” from Spain, Fig. 12, which he captured during the 1984 and 1987 Sporadic-E seasons. I still have some of Len’s pictures which I plan to use, to his memory, in the future. I extend our deepest sympathy to his family and to his multitude of friends at this sad time.

Band I

"Lots of meteor ‘pings’ from Band I stations all over Europe on January 3 and 4.,” wrote Ian Galpin (Poole). He also logged similar activity around 1100 on the 7th and between 1430 and 1500 on the 31st. At 1427 on the 16th, lan logged a one minute burst of picture on Ch. R1 and reported a minor Sporadic-E opening, mainly towards Poland, at midday on the 28th.

Although Simon Hamer (New Radnor) received many ‘pings’ of pictures at 2220 on February 10, they were too quick for a positive identification. However, either via m.s. or brief outbreaks of Sporadic-E, Simon logged pictures or test-cards from Poland (TVP) and Norway (Norge Televerket) on January 19; Italy (RAI) and news (BPEMR) from the USSR on the 20th; Czechoslovakia (RS-KH) and Denmark (DR) on the 26th; Germany (Grunten), Poland and Spain (TVE-2) on February 2; Czechoslovakia (CST), Italy, Poland, Ireland (RT-E-1), with clock caption for news at 1800 in a single “ping”) and Switzerland (+PTT-SRG-1) on the 3rd; Denmark, Finland (YLE TV1) and Sweden (SVT) on the 8th and Iceland (RUV Island) on the 10th.

In Belper, Edwina and Tony Mancini received test-cards from Sweden on January 28 and Czechoslovakia on February 4; programme captions from Sweden on January 21 and February 9 and news from Spain on January 14.

Tropospheric

For u.h.f. reception at his QTH in Aldershot, Peter Lincoln uses a Tandy 14 bay unit antenna, horizontally mounted on a rotator some 10m a.g.l. and feeds the signal to his Grundig P40-125GB, Hitachi K-2300 or Panasonic TC-
NEW FROM YOKO
MODEL F6/I
VHF/UHF SYSTEM
B/G/I/L Operation
£ 95.00

Yes, the ubiquitous Yoko 5" black & white TV for reliable VHF/UHF TV/DXing is back — but in an improved version. Model F6 incorporates not only SYSTEM I (5MHz sound for UK/Eire/South Africa) but SYSTEM B/G (5.5MHz sound for Europe, Middle East, Australasia and other parts) AND SYSTEM L FRENCH (6.5MHz sound). The 5.5MHz sound switching is automatic within the receiver, the 5.5MHz and positive/negative video switch is situated at the rear of the television.

It's restyled too, featuring a sleek black monitor look and with rotary drum continuous band tuning. A telescopic whip antenna is situated at the rear, together with a 78 ohm coastal input socket.

Versatile 3 way powering for AC Mains, internal batteries or an external 12v DC source (lead supplied), its ideal for the home, mobile, camping/caravaning or that 'DX-pedition' to the local mountain (and we'll supply the aerial if needed!) Completely compatible for use in the UK and throughout the Continent including (including FRANCE). It's just the answer for a compact — 4.75 x 5.35 x 8.6 (deep) inches — high gain and comprehensive TV-DX installation and at a reasonable price.

Stocks of this new receiver have just arrived from the Far East, so don't delay, order today and maximise your logos.

YOKO model F6 multistandard VHF/UHF 5" screen television (SYSTEM B/G/I/L) £95.00. Carryage UK £4.95, elsewhere POA.

Aerial Techniques, the company that knows the TV-DXing hobby carry a comprehensive range of aerial equipment for every type of installation — and with a huge range of filters, amplifiers, cable rotators, mast and supporting hardware. Send for our Illustrated Catalogue at 75p, if it doesn't list what you want, then we can obtain it quickly.

All prices inclusive of VAT

Delivery normally 7-10 days.

ACCESS & VISA Mail and Telephone orders welcome.

AERIAL TECHNIQUES
11 Kent Road, Parkstone,
Poole, Dorset BH12 2EH. Tel: 0202 732222

COMMUNICATION DECODERS

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/AMTOR (SITOR/VESPER/AMTOR), RECX, 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-AMTOR 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 processing of ARQ-AMTOR signals (Typical: 1-5 seconds).
- Special narrow-band quadrature discriminator for all usual LF shifts of 50-1000Hz 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.

The baud modulation rate measurements facility is a complete new innovation in a unit of this price range. Knowledge of the baud rate permits reference to special codes, specific radio services, etc., and makes it possible to shed light upon a radio teletype signal. The display is provided on the screen or printer linked to it to 1100 baud (e.g. 96.245 bauds) with quartz accuracy and within a measuring range of approx. 30 to 250 bauds.

AFR-2000 All Mode CW/RTTY Decoder

The technology of models AFR-2000 and AFR-2010 meets the highest demands. Their exceptional value for money will not be so easy to obtain in the near future. By choosing one of these units, you will be deciding in favour of the latest receiver on the market — enabling you to receive more and do less setting! Teletype reception has never been so easy!
Co-ordinated Universal Time (UTC) is the time system used by International Broadcasters, so the times quoted in their broadcast schedules and in this LMS series are always in UTC. For all practical purposes UTC is the same as Greenwich Mean Time (GMT).

During the summer period however, British Summer Time (BST) comes into effect in the UK, this is one hour ahead of UTC/GMT. The change over to BST takes place this year on Monday 28 March. Reports from DXers should now bear in mind this one hour difference when referring to broadcast schedules, LMS or making log entries. Perhaps the best way to avoid confusion is to place a small clock near to your receiver and set it to always display UTC, ideally a 24-hour clock should be used, since UTC is a 24-hour system.

DX Report

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

Long Wave DX

The second part of the new I.w. band plan came into effect on February 1. This required the broadcasters who were operating on frequencies between 200 and 236 to move lower in frequency by 2kHz, bringing them into line with the stations operating at 9kHz intervals between 153 and 189. Since that time, the BBC I.w. transmitters at Droitwich, Burghhead and Westerglen have been operating on their new frequency of 198 and reports from listeners indicate that reception is generally good throughout the UK.

The I.w. chart this month details some of the new frequencies now in use, they were confirmed by the logs from stations that have been operating in the past. The loggers have reported to confirm that the transmitters in Leningrad (USSR) and Warsaw (Poland) which hitherto operated on 200 have been moved to 198. The chart also includes 218 because, at the time of going to print, Radio Monte-Carlo (Monaco) has yet to comply with the plan. Their 1400kW Roumoulle transmitter is still operating on 218 and it is beating with the signal on 216 from the 200kW transmitter in Oslo (Norway), causing a strong 2kHz heterodyne whistle here.

Up in Edinburgh, Robert Taylor has been checking the band both during daylight and at night and he has noticed heterodyne whales at 216 and 234. He says that apart from the BBC transmission on 198 which rates as SIG 555, I.w. reception is quite poor in his area. It seems that I.w. reception is rather better in Newcastle-upon-Tyne, as Neil Wheatley managed to log quite a number of stations, see chart. He used a Sangane ATS-B03 receiver, which he says is practically the same as the Sasho SW-8000.

Bill Eyre has been putting his new Trio R5000 receiver to good use in Stockport on the I.w. band. He has found that the heterodyne between 216 and 218 was so bad at night that reception was almost impossible. A tip for DXers who, like Bill, have receivers which cater for single sideband (s.s.b.) reception it to switch to lower sideband (l.s.b.) when receiving Oslo on 216 and to upper sideband (u.s.b.) when listening to Roumoulle on 218. Carefully adjust the receiver tuning so that speech and music sound normal, the 2kHz heterodyne whistle will then be inaudible because it will be rejected by the s.s.b. filter within the receiver. That technique can be used to advantage on all the broadcast bands when adjacent channel interference arises.

For those DXers with an a.m. only receiver, the best way of reducing both adjacent channel and co-channel interference on the I.w. and m.w. bands may be to employ a directional antenna. If you use a loop or a ferrite rod antenna ahead of the set, the unwanted signal may then be "nullled-out".

A 55-turn 0.25m by 0.25m loop was used ahead of an I.f. converter and a Trio R600 receiver by David Edwardson in Wallsend to compact much of his log for the chart. Ron Pearce has been putting the directional properties of his new Steepleton MBR7 receiver to good use on the I.w. band in Bungay. Darran Taplin of Tunbridge Wells also has a MBR7 receiver, however he finds his trusty Vega 205 portable very good on the I.w. band, so he used it to prepare his list for the chart.

Writing from Newcastle-upon-Tyne, Paul Hawkwood says he encountered the problem of station identification when checking the band with his Sony 760DS0 portable, consequently his full log contained a number of unidentified station entries. Relatively few station announcements are given by the I.w. broadcasters and those that are given are often in languages other than English, so perhaps it would be a good idea to mention this point when sending a report to any I.w. broadcaster.

MW Transatlantic DX

The reception conditions prevailing on the m.w. band at night have enabled DXers to log some interesting transatlantic signals during the month. Reporting from New Rednor, Simon Hamer says he found the best DX became audible well after

---

**SEEN & HEARD**

**Reports for June '88 issue by April 19 please**

**LONG MEDIUM & SHORT**

Brian Oddy G3FX
Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS
midnight, so he had to restrict his listening mainly to the weekends. The stations on this impressive list were all logged from 0200 onwards. They give a good indication of the DX which may be heard if one is prepared to listen well into the early hours of the morning!

Using a Yaesu FRG-7 receiver with a 25m random wire antenna and an a.t.u. in Grimsby, Jim Wellets switched the band for DX during several nights between 0100 and 0420. Among the stations he logged was XEKOX in Las Cruces, Mexico on 750, the reception of this station has not been mentioned before in this series and is subject to confirmation by QSL. Jim picked up an interesting broadcast from CKOC in Hamilton, Ontario at 1150 at 0400, it referred to Grimsby, Ontario which is some 43km from Hamilton and also mentioned Grimsby, UK. No doubt the 3km 24MHz reception to receive a QSL detailing their signal as SIO 222 in Grimsby, UK.

Listening in Bristol, Tim Shirley added Spur Tree, Jamaica 770 to his listening. He also found transatlantic DX at 0500. During the month Tim Loged several stations which have not been mentioned before in this series, namely ZI Bassetterne, St. Kitts 564 at 0300; Kingston, St. Vincent 705 at 0130; WYDE Birmingham, AL 850 at 0630 and WCFL Chicago, IL 1000 at 0436, all subject to confirmation by QSL. Tim also mentioned hearing WOWY in Oak Hill, WV on 860 at 2130 in his report. This is interesting because their 10kW transmitter only radiates between local sunrise and local sunset, so it seems that their signals just managed to bridge the Atlantic before closedown. Tim is now awaiting their QSL. He recently received a QSL to confirm his reception on 1220 on KDKA in Pittsburgh, PA.

David Edwardson was less fortunate this month, he only managed to log VOCM and CJVO once, see chart.

Other MW DX

Many ground wave signals reach the UK from other countries during daylight. However, some of them are difficult to identify because they are often very weak when you cross our shores. Some of those which reach the far north-east coast of England were noted in the report from David Middlemiss in Eyemouth. He noted WAVE (Berlin, Germany) 540; Bayreuth (W. Germany) 549; RTE-1 Tullamore (S. Ireland) 567; Flolland (Holland) 747; Nancy (France) 837; Wolvertem (Belgium) 927 and Bremen (W. Germany) 936.

Many of the transmitters on the Continent are located relatively close to our south and east coasts, so perhaps it is not surprising that some of their ground wave signals reach the UK well during daylight. Using a Recal RA17 receiver and a 100ft random wire antenna in Wootton on the Isle of Wight, George Millmore logged a remarkable number of them between 1345 and 1630. Some of the W. German stations were noted in his report, Muhlacker 576; Frankfurt 594; Braunschweig 756; Heusweiler 1422; Mainfinfer, 1539; Langenberg 1593. He also logged Burg (E. Germany) on 783. Another south coast DXer, John Nash of Brighton also compiled an extensive log of continental stations heard during daylight via ground wave paths, this included Wavre (Belgium) 621; Liblice (Czechoslovakia) 639; Flevoland (Holland) 1008 and two more stations in W. Germany, namely Wolfsheim 1017 and VOA Munich 1197.

The ground wave signals from Scandinavia reach some areas of NE England and Scotland particularly well during daylight. Neil Wheatley says that the signals from Kvitsoy (Norway) 1314 can be heard all day in New England, but they are heard upon-Tyne at SINPO 55555. In nearby Walsall, David Edwardson rated the signal from Pori (Finland) 963 as 35433 at 0730. Reporting from London, Stewart Russell says the signal from Solvorsberg (Sweden) 1179 is excellent throughout the afternoon. He now uses a “Sooper Loop” ahead of his new SBX-8000 Hi-fi system. It is interesting to note that Stewart also received good ground wave signals from AFN Frankfurt 873; VOA via Munchen-Ismaning (W. Germany) 1197; Marnach (Luxembourg) 1440 and BRT-2 Brussels (Belgium) 1512, no doubt the long sea path helps a good deal.

Some of the BBC low power relay transmitters have been attracting the attention of DXers. At mid-day, George Millmore picked up signals from two of their transmitters in Bournemouth, Radio 1 on 1485 (2kW) and Radio 3 on 1197 (0.5kW). Around London, Stewart Russell logged the BBC Sound Dumfries on 585 (2kW) and their Redross, Aberdeen relay on 1449 (2kW). Turning his loop towards Newcastle-by-the-Sea, he picked up the BBC Radio 4 relay there on 603 (2kW). Robert Taylor used a “Sooper Loop” with his Sony ICF-7600DS portable in Edinburgh to receive Dunfermline 585 and Newcastle 603, he logged both signals as SIO 444 at 1500.

Of course the majority of mw DXers rely on the sky wave paths to build up their DX card, there are more distant stations, Robert Taylor logged one of them for the first time recently, namely El Beida (Libya) on 1125. He rated their signal at SIO 222 at 2100. Three of the distant stations logged by Darran Taplin were Madrid (Spain) 1388 rated as SINPO 44444; Lisbon (Portugal) 2002; Lubliana (Yugoslavia) 918 54444 at 0024 and Radio Tirana (Albania) 1395 55555 at 1900, their 100kW transmitter is in Lushnje. Neil Wheatley has just received an interesting QSL to confirm his reception of their broadcasts, it depicts the studios at Radio Tira. Lisbon (Portugal) 1226 and four stations in Spain: Seville, 792; Madrid 810; Barcelona 828 and Bilbao 990 were logged after dark by John Nash.

Some of the sky wave signals from the nearer continental stations are very potent in the UK at night e.g. Radio Luxembourg via Marnach 1440. The report from Robert Taylor detailed some of the Continental broadcasts which reach Edinburgh at SIO 444 dark, but (E. Germany) 783; Braunschweig (W. Germany) 756; Paris (France) 864; Wolvertem (Belgium) 927; Bremen (W. Germany) 936; RIAS Berlin (W. Germany) 990; Granada (Spain) 1008; Solvesborg (Sweden) 1179; Neumünder (W. Germany) 1269 and Saarbrucken (W. Germany) 1442.

MW Local Radio DX

Listening in Morden, Sheila Hughes logged BBC Radio Leicester 837 for the first time recently, noting their signal as SINPO 33333 during a phone-in quiz at 1020.

Stewart Russell has been putting the pre-set tuning of the receiver in his new Technics SA-X800L hi-fi system to good use. He set it up on some of the local radio frequencies and then used a “Sooper Loop” to separate the stations heard on each frequency. As a result he logged Radio Cumbria 756 and 837; Radio Furness 837 and Radio Norfolk 855 for the first time.

Freq
Mhz
Station
Location
Time
(DXer)
USA
660 WNBC
New York, NY
0215 E
850 WHDH
Boston, MA
0200 B
850 WYDE
Binghamton, NY
0630 D
860 WOAY
Oak Hill, WV
2130 D
880 WCBS
New York, NY
0230 E
Philadelphia, PA
990 WZZD
0130 D
Chicago, IL
1230 WGF
0425 E
1010 WINS
New York, NY
1200 B,D,E
1030 WBZ
Boston, MA
0200 B,E
New York, NY
1050 WFAN
0200 B,E
Baltimore, MD
1080 WBAL
0200 B
New York, NY
1130 WNEW
0200 B
Philadelphia, PA
1210 WCAU
Washington, DC
0145 E
1470 WLAM
Leawston, MA
0200 B
Washington, DC
1500 WTOP
0200 B
Boston, MA
1510 WSSH
0200 B
CANADA
580 CJFX
Antigonish, NS
0420 E
St. John’s, NF
590 VOCM
0200 A,B,E
St. Anthony, NF
600 CBNA
0200 B
Grand Bank, NF
610 CKY
0100 B,E
Grand Falls, NF
620 PKX
0200 B
Matugraton, NF
710 CKVO
Clarenville, NF
0200 B
Bonnivista Bay, NF
750 CBGY
0200 B
Halifax, NS
930 FBGC
0200 B
St. John, NB
930 CJQY
St. John’s, NF
0005 A,B,E
940 CBB
Montreal
0200 B
940 CHER
0200 B
Sydney, NS
1150 CQXQ
0210 E
Hemlock, NE
1220 CKCW
0135 E
Moncton, NF
1570 CKLM
Lavel, PQ
0200 B
C. AMRICA & CARIBBEAN
555 ZIZ
C. AMRICA & CARIBBEAN
0330 D
Bissetts, St. Kitts
705 Kingston
St. Vincent
0130 D
750 XEKO
Las Cruces, Mexico
0200 E
770 R. JAM
Spur Tree, Jamaica
0500 B
750 XEBC
Tajuna, Mexico
0400 B
1570 Atlantic Seacon
Turks & Caicos Isls
0035 B,C,E
Antigua
1580 VOA
0200 B
1610 Caribbean Beacon
Anguilla
0200 C,B,E
SOUTH AMERICA
750 R. Vision
Carcus, Venezuela
0230 E
Brazil
890 R. Nacional
0300 E
Sao Paulo, Brazil
1100 R. Globo
2135 B,E
Rio, Brazil
1220 R. Globo
0035 A,B

DXers:

(A) David Edwardson, Walsall

(B) Simon Harmer, N Radnor

(C) Howard Newell, Great Missenden.

(D) Tim Shirley, Bristol.

(E) Jim Willert, Grimgby.
George Milmore says he finds the best time for local radio DXing is during the morning. He used an Eddystone 840C receiver with a random wire antenna and a Racial RA 17 receiver with a "Long Arm" loop to prepare a list for the chart this time. George says, "The Eddystone 840C is no match for the Racial but it does give quite a good performance, bearing in mind that it is a single conversion superhet".

It took just four hours for David Glover to compile his impressive list for the chart in Newton-le-Willows! He used a Matsui 4099 portable with a GSVR antenna connected to the set via a homemade att. At first he was not sure about the set for serious DXing, but having learnt a little about how to "drive" it, he now says "for the price it's brilliant!". He has been doing pretty well on the tropics bands too, see chart!

Although most of the local radio stations welcome reception reports and verify them by QSL, some appear to be less likely to respond. John Nash says that only some of his QSL requests are getting rather old, he has sent new ones to BBC Radio Cornwall and to ILR Saxon Radio.

**Short Wave DX**

A gradual improvement in the conditions prevailing on the 25MHz (11m) band is taking place as we climb the steep slope of the present solar sunspot cycle but so far Radio Norway International is the only broadcaster to take advantage of them. Since their regular daily broadcasts to listeners in S. Africa from 1200 until 1345 on 25:730 are being so well received there, no doubt other broadcasters will soon decide to establish a regular service, or at least make some test transmissions on this band. The reception of the RNI broadcasts in the UK is generally poor or even non-existent. Bill Eyre picked them up in Stockport recently and he noted generally weak signals with occasional sudden bursts of high intensity.

Although there are daily variations in the conditions prevailing on the 21MHz (13m) band, the broadcasts intended for listeners in Europe are generally well received here. The majority of the programmes are in English but a variety of other languages are also evident. Afrikaans, German and English are the languages used by Radio RSA in Johannesburg, S. Africa during their daily transmissions to Europe on 21:590 from 0830 until 1156. However, from 1300 until 1556 their programmes are only in English. They welcome reception reports and confirm them with a series of attractive QSL cards. Using a Matsui 4099 portable in Great Missenden, Howard Newell rated their signal as 6 + on 1200.

Arabic is the main language used by UAR Radio Dubai during their broadcast to Europe on 21:605 from 0615, but there are segments in English between 1030 and 1100 and from 1330 until close down at 1400. Some idea of their signal may be ascertained from the 5654 rating noted by Neil Dove in Lockerbie during bulletin of World news and a Mail Bag programme in English at 1338.

During the day, a number of broadcasts in several languages

<table>
<thead>
<tr>
<th>Freq</th>
<th>Station</th>
<th>Power in kW</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>580</td>
<td>R. Solway</td>
<td>2.00</td>
<td>C,G,H,N</td>
</tr>
<tr>
<td>610</td>
<td>Invicta Sound</td>
<td>0.10</td>
<td>C,G,H,J,K,N</td>
</tr>
<tr>
<td>630</td>
<td>R. Bedfordshire</td>
<td>0.30</td>
<td>C,G,F,J,M,N</td>
</tr>
<tr>
<td>650</td>
<td>R. Cornwall</td>
<td>2.00</td>
<td>*</td>
</tr>
<tr>
<td>675</td>
<td>R. Clwyd</td>
<td>2.00</td>
<td>A,C,N</td>
</tr>
<tr>
<td>666</td>
<td>Dev Airl R.</td>
<td>0.34</td>
<td>G,H,J</td>
</tr>
<tr>
<td>660</td>
<td>R. York</td>
<td>0.50</td>
<td>A,C,D,F,J,M,N</td>
</tr>
<tr>
<td>720</td>
<td>BBC Essex</td>
<td>0.10</td>
<td>C,G,H,J,K</td>
</tr>
<tr>
<td>750</td>
<td>R. Cumbria</td>
<td>1.00</td>
<td>C,D,I,J,N</td>
</tr>
<tr>
<td>795</td>
<td>R. Shropshire</td>
<td>1.00</td>
<td>C</td>
</tr>
<tr>
<td>760</td>
<td>BBC Essex</td>
<td>0.50</td>
<td>C,G,E,H,K</td>
</tr>
<tr>
<td>774</td>
<td>R. Kent</td>
<td>0.70</td>
<td>C,G,E,H,K</td>
</tr>
<tr>
<td>774</td>
<td>R. Leeds</td>
<td>1.00</td>
<td>C,F,M,N</td>
</tr>
<tr>
<td>774</td>
<td>Severn Sound</td>
<td>0.14</td>
<td>C</td>
</tr>
<tr>
<td>792</td>
<td>Chelten R.</td>
<td>0.27</td>
<td>C,G,E,K,N</td>
</tr>
<tr>
<td>801</td>
<td>R. Devon</td>
<td>2.00</td>
<td>C,G,H</td>
</tr>
<tr>
<td>828</td>
<td>2CR</td>
<td>0.27</td>
<td>G,H</td>
</tr>
<tr>
<td>828</td>
<td>R. WM</td>
<td>0.20</td>
<td>C</td>
</tr>
<tr>
<td>828</td>
<td>R. Aire</td>
<td>0.20</td>
<td>A,J,G,N</td>
</tr>
<tr>
<td>837</td>
<td>R. Cumbria</td>
<td>1.00</td>
<td>D,I,N</td>
</tr>
<tr>
<td>837</td>
<td>R. Furness</td>
<td>1.00</td>
<td>C,I,N</td>
</tr>
<tr>
<td>837</td>
<td>R. Leicester</td>
<td>1.00</td>
<td>E,G,H,K,N</td>
</tr>
<tr>
<td>855</td>
<td>R. Devon</td>
<td>1.00</td>
<td>G,H</td>
</tr>
<tr>
<td>855</td>
<td>R. Norfolk</td>
<td>1.00</td>
<td>E,F,H,U,K,N</td>
</tr>
<tr>
<td>855</td>
<td>R. Lancashire</td>
<td>1.00</td>
<td>C</td>
</tr>
<tr>
<td>873</td>
<td>R. Norfolk</td>
<td>0.25</td>
<td>E,G,H,K,N</td>
</tr>
<tr>
<td>896</td>
<td>GWR</td>
<td>0.18</td>
<td>C,G,E,H,M,N</td>
</tr>
<tr>
<td>945</td>
<td>R. Trent</td>
<td>1.00</td>
<td>?</td>
</tr>
<tr>
<td>954</td>
<td>Devonair</td>
<td>0.32</td>
<td>G,H</td>
</tr>
<tr>
<td>954</td>
<td>R. Wyvern</td>
<td>0.16</td>
<td>C,G,H,J,N</td>
</tr>
<tr>
<td>960</td>
<td>R. Riwelton</td>
<td>1.00</td>
<td>C,F,J,M</td>
</tr>
<tr>
<td>990</td>
<td>Beacon R.</td>
<td>0.09</td>
<td>C</td>
</tr>
<tr>
<td>990</td>
<td>Hallam R.</td>
<td>0.25</td>
<td>N</td>
</tr>
<tr>
<td>990</td>
<td>Red Rose R.</td>
<td>0.60</td>
<td>A,C,N</td>
</tr>
<tr>
<td>999</td>
<td>R. Kent</td>
<td>2.00</td>
<td>E,G,H,K</td>
</tr>
<tr>
<td>1026</td>
<td>R. Cambridgeshire</td>
<td>0.50</td>
<td>E,K,N</td>
</tr>
<tr>
<td>1026</td>
<td>R. Towndown</td>
<td>1.70</td>
<td>I,J,N</td>
</tr>
<tr>
<td>1026</td>
<td>R. Jersey</td>
<td>1.00</td>
<td>G,H</td>
</tr>
<tr>
<td>1035</td>
<td>R. Kent</td>
<td>1.00</td>
<td>G,E,K</td>
</tr>
<tr>
<td>1035</td>
<td>North Sound</td>
<td>0.78</td>
<td>*</td>
</tr>
<tr>
<td>1035</td>
<td>North Sound</td>
<td>0.78</td>
<td>LL,*</td>
</tr>
<tr>
<td>1035</td>
<td>North Sound</td>
<td>0.78</td>
<td>LL,*</td>
</tr>
<tr>
<td>1107</td>
<td>Moray Firth</td>
<td>1.50</td>
<td>I,N</td>
</tr>
<tr>
<td>1107</td>
<td>Stornoway R.</td>
<td>0.50</td>
<td>G,E,H,K</td>
</tr>
<tr>
<td>1116</td>
<td>R. Derby</td>
<td>0.50</td>
<td>C</td>
</tr>
<tr>
<td>1116</td>
<td>R. Guernsey</td>
<td>0.50</td>
<td>G</td>
</tr>
<tr>
<td>1116</td>
<td>R. Broadland</td>
<td>0.83</td>
<td>N</td>
</tr>
<tr>
<td>1152</td>
<td>R. Clyde</td>
<td>3.60</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

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

**DXers:**

(A) Alan Curry, Stockton-on-Tees.

(B) Colin Diffell, Corsham.

(D) Paul Hawkyard, Newcastle-upon-Tyne.

(E) Sheila Hughes, Morden.

(G) C. Milmore, Wootton, IoW.

(H) John Nash, Brighton.

(I) Stewart Russell, Forfar.

(J) Tim Shirley, Bristol.

(K) Darran Talpin, Tynbridge Wells.

(L) Robert Taylor, Edinburgh.

(M) N. Wheatley, Newcastle-on-Tyne.

(N) Jim Willett, Grimsby.

Short Wave Magazine April 1988

47
are directed towards eastern, central and southern European areas. Five frequencies are used via Gloria, Portugal. These are, 21.500 (Bulgarian 1400-1555); 21.530 (Czech 0800-1555); 21.665 (Polish 0800-1600); 21.720 (Czech 0800-1455) and 21.745 (Bulgarian 1800-1755). Robert Taylor picked up their transmission on 21.530 and rated it as 444 at 1420.

A transmitter in Gloria, Portugal is used by Radio Liberty to beam programmes in Russian to listeners in E. Europe on 21.745 from 0800 until 1600. The BBC also beam programmes in Russian to E. Europe via Rampaich, Dorset on 21.640 between 1130 and 1200 and from 1300 until 1330. The programmes from the Voice of Israel, Jerusalem on 21.625 are also intended for listeners in E. Europe, they are in Russian 1000-1030; English and French 1100-1200; and Russian and Georgian 1400-1525.

Radio Japan beams its programmes in English and Japanese to Europe via a relay in Yokohama, Gabon on 21.700 between 1500 and 1700. Using a Yaesu FRG-5, a receiver with a long wire antenna and an a.t.u. in Stockton-on-Tees, Alan Curry rated their signal as 33323 during a news bulletin in English at 1500.

Robert Taylor
One of the broadcasts to Europe from the USA stems from WHRI in South Bend on 21.640. John Nash says, “I have heard them most afternoons from 1600UTC coming in at an incredible SINPO 55544, this is easily the best reception I have had from the USA”.

When conditions permit, some of the 13m broadcasts to other areas may also be heard here. Philip Rambaut logged several of them in Macclesfield, namely BRT Belgium 21.810 (Dutch to Africa 0910-1755) as SIO 222 at 1145; Vatican Radio, Rome 21.485 (French/English/Polsih to Africa 1100-1200) 222 at 1100; at Bucharest, Rumania 21.665 (English to E. Asia 1200-1225) 444 at 1215; Radio Nederland via Talata Volon, Madagascar 21.480 (English to S.E. Asia 1130-1225) 222 at 1221.

Other reports included RSI Stockholm, Sweden 21.690 (Swedish/French/English to the Middle East 1000-1130), logged by David Middlemas at 1105; RFI Berlin 17.350 (English/Hi-Fi in S.E. Asia 1145-1445), rated as 25443 by Neil Dove at 1330; REE via Nojelas, Spain 21.575 (Spanish to the Middle East 1300-1425), logged by Dick Moon 24:14:44; WYFR via Okeechobe, Florida, USA 21.625 (English, Arabic, French, Portuguese to W. Africa 1600-1945), received in Bisho Storford by John Sadler at 1615.

The conditions prevailing on the 17MHz (16m) band have enabled DXers to log a number of interesting receptions. At midnight Stewart Russell decided to try listening for Radio Australia via Darwin, N. Australia on 17.750 (to E. Asia 2359-0900); of a programme from N.S. Australia on 17.795 (to Pacific areas 2200-0630). To his surprise he found that he could hear both broadcasts! He says their transmissions were stronger than 17.750 but both signals were rather ‘scratchy’ at times.

Radio Australia also broadcast to the Middle East on 17.790 at Cambridge, W. Australia from 0100 until 0910. George Hewlett monitors that frequency on a daily basis in Torquay from 0400. He says their transmissions were rarely heard at that time although it occasionally peaks SIO 322 around 0745. Following my comments on the “long and short path” propagation from Radio Australia to reach the UK (see LMS February ‘88), David Edwardson decided to check several of their transmissions and compare the paths they took from Radio Australia to reach the UK (as seen from LMS February ‘88), David Edwardson decided to check several of their transmissions and compare the paths they took. He logged their signal on 17.715 via the “short path” as 23432 at 0855.

Some of the early morning broadcasts to the Middle East and E. Africa were noted in the report from P. R. Guruprasad in Molepolole, Botswana. These stemmed from Radio Pakistan, Lahore 17.665 (Urdu 0430-0845), rated as 54554 at 0440; AIR via Aligarh, N. India 17.805 (Swahili 0430-0530), 54554 at 0505; Radio RSA Johannesburg, S. Africa 17.780 (English 0630-0730), 44344 at 0710; FEBA Radio, Seychelles 17.855 (English 0600-0700), their transmission may also be heard in the UK.

The long morning Radio Pakistan, Islamabad beam their programmes in Urdu and English towards Europe on 17.660 from 0715 until 1120. David Middlemas picked up their news bulletin in English at 1110. In addition to their 13m broadcasts, UAE Radio Dubai also use their band to reach their listeners in Europe. Their transmission on 17.865 commences at 0615 in English and Arabic. There are several stations in English at 1030 and 1330. Using a Panasonic RF-860L portable and built-in whip antenna in Edinburgh, Kenneth Buck often listens to their bulletin and logs the report in English at 1030. Arabic is used throughout the broadcasts from Tunis to the Middle East on 17.610 from 0700 until 1300, Iraqi DXers logged their transmission at 1030. Commencing at 1430, RCI in Montreal, Canada beam their programmes in Russian, Ukrainian, French, English, Polish and German to listeners in Europe via Sackville, E. Canada on 17.820. Robert Taylor logged them as SIO 423 at 1600. He also picked up the signal from Morocco on 17.595, his beam programmes in Arabic to the Middle East from 1400 until 1700. John Nash logged VOA via Greenville, USA on 17.785 as 44322 at 1600 (English to W. Africa 1600-2200).

Some of the broadcasts which may be heard during the evening include Radio Surinam International via RBV Brazil 17.835 (Dutch/English 1700-1745), rated as 44443 by Sheila Hughes at 1725; BBC via Ascens Island 17.885 (English, Italian 0730-1430), rated as 23222 at 1900 by Howard Newwell; RCI Montreal, Canada 17.875 (English, French, Russian 1300-1400), logged as SIO 1940 by Kenneth Buck; WYFR via Okeechobe, Florida, USA 17.845 (Spanish, Arabic, Italian, English 1600-1945), noted as 45544 by Neil Dove at 1900; also KUUS in Portland, Oregon 17.715 (English to E. USA 1900-2200), logged by John Thompson in Rahaim at 1900 as 23222.

The 15MHz (19m) band has been attracting the attention of some UK DXers recently because the broadcasts from Radio New Zealand on 15.150 have occasionally been audible here during the early evening. Although their broadcast is intended for listeners in the Pacific area, from time to time the propagation conditions are good enough to enable their signal to travel across the UK and reach the UK and other areas too.

Many DXers have been searching for the signals from RNZ for years, so if you intend to look for them, do bear in mind their transmitter power is only 7.5kW and at best their signal is likely to be weak! A rapid type of fading has been noted on their signal here, which makes readability poor. Some idea of the kind of signal to expect when conditions are suitable may be ascertained from the report sent along by Kenneth Reece in Preston. Using a Trio RS500 receiver he logged their signal as 24232 at 1851 but by 1913 it was 24222 and “difficult to decipher”. The noise level gradually increased and the signal rating fell to 14212 by 1918.

One of the DXers who logged their signal for the first time was John Thompson. He writes, “I am pleased to say that I have managed to log Radio New Zealand at long last and I have a QSL to prove it”. Simon Hamer logged their signal at 1830, being the first time he had heard it this year. He says, it was lucky enough to find the propagation just right”. It seems that their broadcasts have also been reaching S. Africa. According to George, Dick Moon picked up their signal during a programme announcement at 1815.

Radio Australia beam their programmes to the S. Pacific area on 0900 until 1100 but severe interference prevents good reception here.

The programmes from RNZ in Oslo, Norway 15.235 (Norwegian, English, Spanish to W. Africa and Middle East 1000-1045) have been attracting the attention of Edward at W6KIQ in Waco, Texas. Using a Sony 7600DS portable with built-in whip antenna, Paul Hawkward picked up Radio Austria, Vienna 15.320 during a broadcast to N. America (Europe 0720-1200, Africa 1200-1255), he rated their signal as 434. Another broadcast to N. America was logged by Phil Townsend, this stemmed from Radio Finland in Helsinki 15.400 (English/Finnish 1200-1500). The main s.w. receiver at his “listening post” in London is a Lowe SRX 30.
<table>
<thead>
<tr>
<th>Freq MHz</th>
<th>Station</th>
<th>Country</th>
<th>UTC</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.333</td>
<td>RRI Jakarta</td>
<td>Indonesia</td>
<td>1636 L</td>
<td></td>
</tr>
<tr>
<td>2.560</td>
<td>Xinjiang</td>
<td>China</td>
<td>2330 J</td>
<td></td>
</tr>
<tr>
<td>3.205</td>
<td>Ribeirao Preto</td>
<td>Brazil</td>
<td>1454 S</td>
<td></td>
</tr>
<tr>
<td>3.215</td>
<td>Orange</td>
<td>S. Africa</td>
<td>1709 P</td>
<td></td>
</tr>
<tr>
<td>3.225</td>
<td>Club-Li</td>
<td>Singapore</td>
<td>0200 S</td>
<td></td>
</tr>
<tr>
<td>3.320</td>
<td>ELWA</td>
<td>Liberia</td>
<td>2110 C</td>
<td></td>
</tr>
<tr>
<td>3.323</td>
<td>ELWA</td>
<td>Indonesia</td>
<td>0330 S</td>
<td></td>
</tr>
<tr>
<td>3.325</td>
<td>SABC Radio 5</td>
<td>South Africa</td>
<td>2205 L</td>
<td></td>
</tr>
<tr>
<td>3.370</td>
<td>SWABC</td>
<td>Namibia</td>
<td>1830 G</td>
<td></td>
</tr>
<tr>
<td>3.385</td>
<td>R. Belize</td>
<td>Belize</td>
<td>0010 V</td>
<td></td>
</tr>
<tr>
<td>3.390</td>
<td>R. Cultural</td>
<td>Guatemala</td>
<td>0615 Q</td>
<td></td>
</tr>
<tr>
<td>3.400</td>
<td>V of Rev. Bujumbura</td>
<td>Burundi</td>
<td>0230 U</td>
<td></td>
</tr>
<tr>
<td>3.405</td>
<td>R. Zimbabwe</td>
<td>Zimbabwe</td>
<td>1805 P</td>
<td></td>
</tr>
<tr>
<td>3.410</td>
<td>R. Universal</td>
<td>Universal</td>
<td>0240 V</td>
<td></td>
</tr>
<tr>
<td>3.425</td>
<td>R. Orin</td>
<td>South Africa</td>
<td>2210 L</td>
<td></td>
</tr>
<tr>
<td>3.435</td>
<td>BBC World</td>
<td>Russia</td>
<td>1454 S</td>
<td></td>
</tr>
<tr>
<td>3.445</td>
<td>R. Free</td>
<td>Indonesia</td>
<td>0330 S</td>
<td></td>
</tr>
<tr>
<td>3.450</td>
<td>VORB</td>
<td>Indonesia</td>
<td>0340 S</td>
<td></td>
</tr>
<tr>
<td>3.455</td>
<td>R. Malaysia</td>
<td>Malaysia</td>
<td>1731 H</td>
<td></td>
</tr>
<tr>
<td>3.460</td>
<td>BBC World</td>
<td>United Kingdom</td>
<td>1940 G,P,Q</td>
<td></td>
</tr>
<tr>
<td>3.470</td>
<td>R. Ireland</td>
<td>Ireland</td>
<td>2330 J</td>
<td></td>
</tr>
<tr>
<td>3.475</td>
<td>BBC World</td>
<td>United Kingdom</td>
<td>2330 J</td>
<td></td>
</tr>
<tr>
<td>3.480</td>
<td>VOMA</td>
<td>Indonesia</td>
<td>0458 Q</td>
<td></td>
</tr>
<tr>
<td>3.485</td>
<td>R. Beijing, China</td>
<td>China</td>
<td>2250 A.G.L.Q,T</td>
<td></td>
</tr>
<tr>
<td>3.490</td>
<td>R. Berne Radiant</td>
<td>Switzerland</td>
<td>1923 B.D.Q,R</td>
<td></td>
</tr>
<tr>
<td>3.495</td>
<td>R. Colour</td>
<td>Germany</td>
<td>1900 C.G.I.Q.T</td>
<td></td>
</tr>
<tr>
<td>3.500</td>
<td>R. Bosnian</td>
<td>Bosnia-Herzegovina</td>
<td>1800 S</td>
<td></td>
</tr>
<tr>
<td>3.510</td>
<td>R. Dufor</td>
<td>Peru</td>
<td>0145 Q</td>
<td></td>
</tr>
<tr>
<td>3.515</td>
<td>R. Moscow Kharov</td>
<td>Russia</td>
<td>1940 B.G.I,J.Q,K,L,Q</td>
<td></td>
</tr>
<tr>
<td>3.535</td>
<td>R. Uganda</td>
<td>Uganda</td>
<td>2330 S</td>
<td></td>
</tr>
<tr>
<td>3.550</td>
<td>Xinhua</td>
<td>China</td>
<td>2355 J</td>
<td></td>
</tr>
<tr>
<td>3.560</td>
<td>R. Rivadavia</td>
<td>Argentina</td>
<td>0100 S</td>
<td></td>
</tr>
<tr>
<td>3.570</td>
<td>R. Bangladeshi</td>
<td>Bangladesh</td>
<td>2300 U</td>
<td></td>
</tr>
<tr>
<td>3.580</td>
<td>BBC World</td>
<td>United Kingdom</td>
<td>1900 J.L.Q,T</td>
<td></td>
</tr>
<tr>
<td>3.590</td>
<td>R. Afghanistan</td>
<td>Afghanistan</td>
<td>0036 S</td>
<td></td>
</tr>
<tr>
<td>3.600</td>
<td>R. Afghanistan</td>
<td>Afghanistan</td>
<td>0145 E,L.Q</td>
<td></td>
</tr>
<tr>
<td>3.610</td>
<td>R. Afghanistan</td>
<td>Afghanistan</td>
<td>3201 P,Q</td>
<td></td>
</tr>
<tr>
<td>3.640</td>
<td>R. Angola</td>
<td>Angola</td>
<td>2020 D,G.M.O.V</td>
<td></td>
</tr>
<tr>
<td>3.650</td>
<td>R. Belgian</td>
<td>Belgium</td>
<td>1900 J</td>
<td></td>
</tr>
<tr>
<td>3.670</td>
<td>R. Inca, Lima</td>
<td>Peru</td>
<td>0036 S</td>
<td></td>
</tr>
<tr>
<td>3.680</td>
<td>R. Afghanistan</td>
<td>Afghanistan</td>
<td>0145 E,L.Q</td>
<td></td>
</tr>
<tr>
<td>3.690</td>
<td>R. Afghanistan</td>
<td>Afghanistan</td>
<td>3201 P,Q</td>
<td></td>
</tr>
<tr>
<td>3.700</td>
<td>R. African</td>
<td>Afghanisth</td>
<td>Afghanistan</td>
<td>2020 D,G.M.Q.V</td>
</tr>
<tr>
<td>3.710</td>
<td>R. Gabon Libre</td>
<td>Gabon</td>
<td>1900 J</td>
<td></td>
</tr>
<tr>
<td>3.720</td>
<td>AIR Gauhati</td>
<td>India</td>
<td>1901 Q</td>
<td></td>
</tr>
<tr>
<td>3.740</td>
<td>R. Rio Sul</td>
<td>Brazil</td>
<td>1900 J</td>
<td></td>
</tr>
<tr>
<td>3.750</td>
<td>R. Bukau</td>
<td>Gambia</td>
<td>1950 I.L</td>
<td></td>
</tr>
<tr>
<td>3.755</td>
<td>R. Tanzania</td>
<td>Tanzania</td>
<td>2225 A.K</td>
<td></td>
</tr>
<tr>
<td>3.760</td>
<td>R. Nac Americas</td>
<td>Mexico</td>
<td>2010 P</td>
<td></td>
</tr>
<tr>
<td>3.770</td>
<td>R. Popular</td>
<td>Ecuador</td>
<td>2041 B</td>
<td></td>
</tr>
<tr>
<td>3.780</td>
<td>R. Moscow US</td>
<td>Russia</td>
<td>2225 A.K</td>
<td></td>
</tr>
<tr>
<td>3.800</td>
<td>R. Moscow Yakutsk</td>
<td>Russia</td>
<td>1920 D.L.P</td>
<td></td>
</tr>
</tbody>
</table>

**DXers:**

(A) Allan C. Patrik, Stockton-on-Tees.
(B) Colin Draper, Cosham.
(C) Noel Crowe, Lockleaze.
(D) David Edwardson, Wallisend.
(E) George E. Stradakis, Tassosantiki, Greece.

The programmes in English from Whirl South Bend, USA are beamed to Europe on 15105 between 1700 and 2100. John Evans rates their signal in Rochester as 333 at 1705. He uses a Larkspur R210 receiver and a multi-band dipole antenna. The broadcasts from KUSW, the new station in Salt Lake City, Utah have been attracting the attention of John Proudford in Newcastle.
upon-Tyne, he rated their signal on 15.225 as 3444 (English to N. America 1600-1900). Ron Uses a Racial RA17 receiver with a 10m long vertical antenna.

Listening in Dendermonde (Belgium), Maurice Andries logged Africa No. 1 Gabon 15.475 as 4444 at 1822 (French, English to W Africa 1700-2000). Using his Mathis 4099 on 20, David Glover picked up RNB Brasilia, Brazil for the first time on 15.265 at 1840 (English, German to Europe 1800-1950). Cyril Kellas now uses a Sony 7600DS portable in Sheffield and he has been listening to the African Service of RCI Montreal via Sackville, E. Canada on 15.260 at 1900. Paul Hawkward says he enjoys listening to the DX-Partyline programme broadcast by Radio HCJB in Quito, Ecuador on 15.312 at 2131.

Several of the broadcasters using the 13MHz (22m) band were mentioned in the reports this time. Radio Korea Seoul, S. Korea 13.670 (Italian, French, German, English, Korean, Spanish, Portuguese to Europe 0600-1100) was rated as 34222 at 0800 by John Nash; Radio Moscow, USSR 13.625 (Chinese to C. Asia 0300-1100) was logged at 1000 by Tim Shirley; RUV Reykjavik, Iceland 13.775 (Icelandic to Europe 1215-1300) was rated as 333 at 1246 by Philip Rambaut; Radio Prague, Czechoslovakia 13.715 (English/Czech to S. Asia 1430-1625) was logged as 444 at 1530 by John Evans; WYFR via Okeechobee, Florida 13.695 (French/English to N. America 1200-2245) was rated as 242 at 1715 by Kenneth Buck; Radio Västernorrland, Sweden (English/Latvian to N. America 2300-0130) was noted as 12211 at 2315 by Howard Newell.

Some of the broadcasts which may be heard on the 11MHz (25m) band stem from some interesting places. The remote island of Guam in the mid-Pacific was mentioned in the report from John Evans. He picked up the early morning broadcast in English from KTKW on Guam 11.605 at 0815 and rated their signal as 333. Their transmission from 0805 until 0930 is beamed to listeners in E. Asia but when conditions permit their signals travel on and reach the UK.

Two late night broadcasts from Guam were noted in the report from George Feratitadi. AWR Guam 11.965 with programmes in Tagalog and English to S.E. Asia from 2100 until 2300 was noted as 232 at 2130; also TWR Guam 11.850 broadcasting in Indonesian to S.E. Asia. From 2200 until 2300 was noted as 222 at 2300. George logs a Philips 22225 portable with just the built-in whip antenna in Thessaloniki, Greece and he logged another DX spot at 2200 – KFBV Spor; N. Carolina 12.052 (Chinese to C. Asia 2200-2359), noting their signal as 343.

VOIR Tehran, Iran 11.790 broadcast to S.E. Asia in English from 1115 until 1215 but their signals also reach the UK. Bill Stewart logged them in Lossiemouth as 23322 at 1150. Listening in London, Peter Vilestnik heard Radio Kuwait on 11.665, they beam their programmes in English to Europe at 2200. Ron Pearce has been listening to Radio Japan via Miyagi, Japan 11.805 to the English/Japanese to Europe 2200-2359). At 0200, David Minter picked up a news bulletin and a sports report broadcast by RAE Buenos Aires, Argentina 11.710 (Spanish, Portuguese, English to N. America 2200-0500). Their signal in Bekhili-On-Sea was rated as 22222.

The broadcasts from Radio Australia have been reaching the UK well on the 9MHz (31m) band. Their transmission to Europe via Shepparton 9.655 was logged by David Masterson as 433 at 0910, this reaches us via the “long path.” Their transmission to S.E. Asia from Shepparton 9.770 has also been reaching the UK well via the “short path” at 1000.

During the evening, Colin Godwin of Malvern listened to an interesting talk on crocodiles, broadcast by Radio RSA in Johannesburg, S. Africa 9.580 (English to Europe 2100-2156). He rated their signal as 42223 at 2154. At 2200 he tuned to All India Radio, New Delhi on 9.910 (English to Europe 2000-2230) and listened to their news broadcast.

Despite the overcrowding many interesting broadcasts may be heard on the 7MHz (4m) band during the day or night. On Sunday of each month the news from the International Red Cross in Geneva is broadcast to Europe via SRI Berne, Switzerland on 2100 (English, French, German, Spanish 1100-1240). Colin Godwin logged their transmission as 54444. News for Farmers, broadcast by Radio Polotcka, Warsaw 7.285 in English to Europe (1200-1225) was noted by John Evans as SIO 444. Radio Australia broadcast news of events “Down Under” via Darwin, W. Australia 7.205 (English to S. Asia 1430-2030), received by Darran Taplin as 54444 at 1600.

In Manchester, Hiron Khan listens to Radio Bangladesh, Dhaka 7.505 with programme in English and Bengali to Europe from 1815 until 2000. Using a Panasonic DR49 receiver in Nuneaton, Graham Johnson heard Radio Australia via Shepparton, S.E. Australia for the first time on 7.215 (English to S. Pacific area 1500-2000) their signal as 34343 at 2030. He also heard the Voice of Turkey, Ankara 7.215 (German, English, Finnish to Europe 2000-2250), noting 44433 in his log at 2100.

While checking the 6MHz (49m) band in Cardiff at 0730, John Berridge heard Radio HCJB Quito, Ecuador 6.205 (Spanish, English to Europe 0600-0830). At 0900, Ron Proudfoot logged La Voz de Los Centauros, Columbus 5.055 as 35333 and at 0915 he heard KUSW in Salt Lake City, USA 6.135. Later, Radio Kiev, Ukraine 6.165 was logged by Julian Wood in Buckie at 1900. From 2000 onwards, Colin Diffell of Corsham logged Radio Australia, Vienna 5.945; Radio Bucharest, Roumania 5.990; BBC Ascension Island 6.005; Radio Moscow, USSR 6.030; Radio Prague, Czechoslovakia 6.085, RAI Rome, Italy 6.060; Radio Sophia, Bulgaria 6.070; Vatican Radio, Rome 6.180.

Station Addresses

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 for envelope plus international Reply Coupons for overseas readers.
4. Write to the Editor, "Short Wave Magazine", Eneco 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 in the UK and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available private price £3.90 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, Eneco House, The Quay, Poole, Dorset BH15 1PP, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Poole (0202) 67858. An answering machine will accept your order out of office hours.
PLEASE MENTION SHORT WAVE MAGAZINE WHEN REPLYING TO ADVERTISEMENTS

ADVERTISERS INDEX

Aerial Techniques.................. 44
AJH Electronics................... 41
Bredhurst......................... 51
Colomor......................... 51
Component Centre............... 25
Datong......................... 44
Dewsbury Electronics......... 44
Dessler Communications...... 16
Elliott Electronics......... 22
Fairbotham...................... 51
Garex Electronics Ltd......... 22
Hamgear......................... 26
Howes C M Communications.... 26
ICOM (UK) Ltd.................. 13
Interbooks....................... 16
Johnsons Shortwave Radio...... 32
K&M.............................. 51
Lowe Electronics................ 8
Nevada Communications....... 25
Practical Wireless............... 42
Raycom Communications Systems.. 19
Rylands F. G.................... 51
SEM............................... 41
South Midland Communications... Cover V
Spacetech....................... 26
Stephens James................ 32
Short Wave Newsletter....... 51
Stephens James................ 12
Technical Software............... 25
Uppington Tele-Radio (Bristol)... 22
Ward. Reg & Co.................. 41
Waters & Stanton............. 30,41

PLESSEY PR155 SERIES HF COMM RECEIVERS

FOR SPARES AND SERVICE

CONTACT

K and M SPECIAL PRODUCTS
8a, ST DAVIDS ROAD, CLANFIELD, HAMPSHIRE
PO6 ONL. Tel: 0706 594438

FLIGHTDECK

THE AIRBAND SHOP

NORTH-WEST SPECIALISTS IN AIRBAND AND SHORTWAVE COMMUNICATIONS RECEIVERS.

SETS BY SIGNAL • UNIDEN • SONY • REVO • LOWE ELECTRONICS • KENWOOD • GRUNDIG • PANASONIC •

FAIRBOTHAM & CO LTD
58-62 LOWER HILLGATE, STOCKPORT, CHERSHIRE SK1 3AN

Telephone: 061-480 8060

SHORT WAVE NEWSLETTER

Our fortnightly report will keep you up to date on the everchanging world of short wave radio. Every issue contains the latest logs from both the official and unofficial broadcasters along with the latest schedules. A feature section is also presented and this may be the latest MW/LW DX tips, a special article or something else. For the latest issue, send 70p, or to get a better idea of SWN, why not try a sample subscription of three issues for £2.10? Please make all cheques payable to P.S. Willsher and write to: SWN, 3 GREENWAY, HAROLD PARK, ROMFORD, ESSEX, RM3 OHH.

SPECIAL NOTICE TO READERS

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

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

Published on the Fourth Thursday of each month by P/W Publishing Limited, Enfield House, The Quay, Poole, Dorset BH15 1PF. Printed in England by K&SSC Photograph Ltd., Tunbridge Wells, Kent. Distributed by CDMAAG, Tavistock Road, West Drayton, Middlesex UB7 7GE; telephone West Drayton 444065; Telex 881277 Sole Agents for Australia and New Zealand - Gordon & Gotch (Aust) Ltd, South Africa - Central News Agency Ltd. SHORT WAVE MAGAZINE is sold subject to the following conditions, namely that it shall not, without the written consent of the Publishers first having been given, be lent, rented, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.
**WHAT RECEIVER?**

**Panasonic RF-B40DL Multi-band Portable Receiver**

- **Coverage**: 146 - 288kHz, m.w. 520 - 1611kHz, s.w. 1.615 - 28.995MHz, f.m. 87.5 - 108MHz
- **Modes**: a.m., f.m., m.w.
- **Sensitivity**: f.m. 2.5μV, l.w. 553μV at 28kHz S/N 20dB, m.w. 45μV, s.w. 1.1μV at 8MHz S/N 20dB
- **Resolution**: 5 and 6kHz
- **Selectivity**
- **IF Rejection**
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 550mW (r.m.s., max)
- **Features**: Mains adapter included; operation key lock switch; a.m. sensitivity switch; 27-station preset tuning. (C.d. display)
- **Reviewed**: Short Wave Magazine September 1987
- **Price**: £139.95

**Grundig Satellit 400 International Multi-band Portable Receiver**

- **Coverage**: 148 - 35kHz, 513 - 1611kHz, 1.6 - 30MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.w.
- **Sensitivity**: 100μV
- **Resolution**: 55Hz
- **Selectivity**:
- **Image Rejection**: 33kHz
- **IF Rejection**:
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 3 watts
- **Features**: Automatic waveband scan; i.e.d. clock; sockets for headphones, external antenna, line in, line out and external d.c. supply and peak tuning meter.
- **Reviewed**:
- **Price**: £350

**Sony ICF-7600DA Portable Receiver**

- **Coverage**: f.m.: 87.5 - 108MHz, l.w.: 150 - 285kHz, m.w. 531 - 1500kHz, s.w.: 3.250 - 3.500MHz, s.w.: 3.7 - 4.215MHz, s.w.: 3.65 - 5.165MHz, s.w.: 5.8 - 6.315MHz, s.w.: 6.65 - 7.405MHz, s.w.: 6.875 - 10.0MHz, s.w.: 7.1125 - 12.10MHz, s.w.: 13.375 - 14.010MHz, s.w.: 14.475 - 15.61MHz, s.w.: 16.10 - 17.475 - 18.11MHz, s.w.: 21.325 - 21.96MHz, s.w.: 25.475 - 26.1MHz
- **Modes**: a.m., f.m., m.w.
- **Sensitivity**: f.m.: 31dB/s at 998kHz, s.w.: 3dB/s, f.m.: 10dB/V
- **Resolution**: 55μV on s.w., 3kOhm on l.w., 3kOhm on f.m.
- **Selectivity**: l.w.: 6.5kHz - 50dB, f.m.: 53dB at 400kHz
- **Image Rejection**: 63.5dB/s on s.w., and 6.94.5dB on l.w.
- **IF Rejection**: 50dB
- **Spurious Rejection**: 50dB
- **Frequency Stability**
- **Audio Output**: 450mW at 10% t.h.d.
- **Stage**: 10.7MHz - 45kHz
- **Features**: digital and analogue display, clock and alarm, 15 memories, telescopic antenna
- **Reviewed**: Short Wave Magazine August 1987
- **Price**: £159.95

**Panasonic RF-810 Compact Portable Receiver**

- **Coverage**: m.w.: 520 - 1610kHz, s.w. 1 5.95 - 6.20MHz, s.w. 2 7.10 - 7.30MHz, s.w. 3 9.50 - 9.80MHz, s.w. 4 11.65 - 12.05MHz, s.w. 5 15.10 - 15.60MHz, s.w. 6 17.55 - 17.90MHz, f.m.: 87.5 - 108MHz
- **Modes**: a.m., f.m., m.w., s.w.
- **Sensitivity**: f.m. 3V, m.w. 100μV, s.w. 4μV
- **Resolution**: 55Hz
- **Selectivity**
- **Image Rejection**: 33kHz
- **IF Rejection**
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 200mW
- **Stage**: 10.7MHz - 45kHz
- **Features**: Operation hold switch; a.m. sensitivity switch; i.e.d. tuning indicator, carrying case and earphone included.
- **Reviewed**:
- **Price**: £170

**Realistic DX-360 Portable Receiver**

- **Coverage**: l.w.: 150 - 285kHz, m.w.: 520 - 1620kHz, s.w. 1 4.5 - 5.5MHz, s.w. 2 5.8 - 7.5MHz, s.w. 3 8.2 - 10MHz, s.w. 4 11.4 - 14MHz, s.w. 5 15.4 - 18.2MHz, s.w. 6 21.6 - 26.1MHz
- **Modes**: m.w., f.m.
- **Sensitivity**: At 6dB: 600kHz, 25μV, 1000kHz, 25μV, 250μV, 250kHz
- **Selectivity**: At 600kHz: 26dB normal 20dB limit at 1kHz, 100μV normal 2dB limit at 1kHz, 1000kHz 3dB limit 10μV normal 2dB limit at 1kHz, 25kHz 10μV normal 2dB limit at 1kHz
- **Image Rejection**: l.w.: 260kHz 26dB/s, a.m.: 1400kHz 38dB/s, f.m.: 10MHz 38dB/s, s.w.: 1 5.5MHz 22dB/s, s.w.: 2 7.4MHz 20dB/s, s.w.: 3 10MHz 18dB/s, s.w.: 4 14MHz 16dB/s, s.w.: 5 18MHz 14dB/s, s.w.: 6 26MHz 10dB/s, s.w.: 7 50MHz 85dB/s, s.w.: 8 14.5MHz 70dB/s, s.w.: 9 36MHz 70dB/s, s.w.: 10 11.5MHz 80dB/s, s.w.: 11 15MHz 80dB/s, s.w.: 12 21MHz 80dB/s
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 660mW
- **Stage**: 10.7MHz - 45kHz
- **Features**: telescopic antenna, low battery indicator, wrist strap
- **Reviewed**: Short Wave Magazine July 1987
- **Price**: £59.95

**Sony ICF-PRO80 Portable Receiver**

- **Coverage**: 150kHz - 108MHz, 115.1MHz - 225MHz (using supplied frequency converter)
- **Modes**: a.m., f.m., n.b.f.m.
- **Sensitivity**: f.m.: 42dBμV (999kHz), s.w.: 29dBμV (ext. a.m.), 42dBμV (ext. n.b.f.m.), f.m.: 33dBμV
- **Resolution**: 1kHz, m.w.: 10kHz, s.w.: 5.5kHz, f.m.: 5kHz
- **Selectivity**: 3kHz (4kHz), 5kHz (6kHz)
- **Image Rejection**: 7dB
- **IF Rejection**: 63dB
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 500mA at 10% t.h.d.
- **Stage**: l.w.: 8 watts, m.w.: 55.85MHz, 45kHz, f.m.: 5kHz
- **Features**:
- **Price**: £350

**Panasonic RF-B60 Portable Receiver**

- **Coverage**: l.w.: 155 - 519kHz, m.w.: 522 - 1611kHz, s.w.: 1.615 - 28.995MHz, f.m.: 87.5 - 108MHz
- **Modes**: a.m. and f.m.
- **Sensitivity**: 21dBμV at 3MHz
- **Resolution**: 5kHz steps on s.f., 9kHz on m.w. and f.m., 1kHz steps on h.f.f., kHz fine tune on l.w., m.w. and s.w.
- **Selectivity**: 6kHz at ±4kHz, 60dB at ±6.35kHz
- **Image Rejection**: 60dB
- **IF Rejection**
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 150mA
- **Stage**: 45kHz, 10.7MHz, 55.85MHz
- **Features**: 5-meter, telescopic antenna, 36 memory channels, digital display, scanning, dual-time clock and alarm, timer, external antenna socket, headphones socket
- **Reviewed**: Short Wave Magazine May 1987
- **Price**: £170

**Panasonic RF-B20L Compact Portable Receiver**

- **Coverage**: l.w.: 150 - 285kHz, m.w.: 520 - 1611kHz, s.w. 1 5.95 - 6.30MHz, s.w. 2 7.10 - 7.30MHz, s.w. 3 9.50 - 9.80MHz, s.w. 4 11.65 - 12.05MHz, s.w. 5 15.10 - 15.60MHz, s.w. 6 17.55 - 17.90MHz, f.m.: 87.5 - 108MHz
- **Modes**: a.m., f.m., m.w., s.w.
- **Sensitivity**: f.m.: 12μV, m.w. 100μV, s.w.: 1.4V
- **Resolution**: (average), f.m. 2μV
- **Selectivity**
- **Image Rejection**: 33kHz
- **IF Rejection**
- **Spurious Rejection**
- **Frequency Stability**
- **Audio Output**: 400mA
- **Stage**: 10.7MHz - 45kHz
- **Features**: Operation hold switch; i.e.d. tuning indicator, and external speaker/earphone socket
- **Reviewed**:
- **Price**: £74.95

---

Short Wave Magazine April 1986
AMATEUR RADIO
A GUIDE TO AMATEUR RADIO (RSGB)
AMATEUR RADIO—the hobby, the equipment, the working procedures, plus the Radio Society (of which the RSGB is the USA equivalent) has published a comprehensive guide to the hobby, the equipment, and the working procedures. This book is a valuable resource for anyone interested in the world of amateur radio communication. It covers the basic principles of the hobby, including antennas, transceivers, and digital communications. The guide is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AMATEUR RADIO CALL BOOK (RSGB)
This is a valuable resource for anyone interested in the world of amateur radio communication. It contains a comprehensive list of call signs for amateur radio operators worldwide. The book is organized by country and includes information such as the operator's name, call sign, location, and other relevant details. This resource is useful for locating operators, confirming call signs, and verifying licenses. Recommended for all levels of expertise.

WINTER 87/88 Edition
This issue contains a wide range of articles, including technical and practical tips, interviews with operators, and reviews of new equipment. It also includes the annual Amateur Radio Show Report, which provides an overview of the event, including highlights and insights from the different exhibitors. Overall, this issue is a valuable resource for anyone interested in the latest developments in the world of amateur radio communication. Recommended for all levels of expertise.

AMATEUR RADIO LOGBOOK
This is a valuable resource for anyone interested in the world of amateur radio communication. It serves as a record of your communications, including details such as the date, time, location, and operator. The logbook is essential for maintaining accurate records of your contacts and is a useful tool for planning future activities. Recommended for all levels of expertise.

AMATEUR RADIO DIRECTOR'S MANUAL (RSGB)
This is a valuable resource for anyone interested in the world of amateur radio communication. It contains detailed information on the rules and regulations governing the hobby, including details on licensing, equipment, and operating procedures. The manual is organized in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

CARRYING GRID TUBES (USA)
This handbook explains the operation of ECM power grid tubes and provides design and application information that assist the use of these valves. 156 pages £7.95

HOW TO DO THE RADIO EXAMS (AMATEUR RADIO)
The background to multiple choice exams and how to study for them with sample REA papers covering all major topics. 91 pages £3.15

PASSPORT TO AMATEUR RADIO
The way and why of the mechanism and variations of the h.f. bands. 144 pages £6.95

AMATEUR RADIO'S MAP DF
AMATEUR RADIO'S MAP OF THE WORLD (USA)
Shows amateur radio prefixes, boundary details and related data. 162 x 260mm £28.25

THE AMATEUR'S Q & A REFERENCE Guide
3rd Edition
R. G. Jessop G8CCJ
This book has been compiled especially for students of the Radio Society, and it is designed to assist in answering frequently asked questions. The book includes information on the theory and practice of the hobby, including details on antennas, transceivers, and digital communications. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

CARRYING GRID TUBES (USA)
This handbook explains the operation of ECM power grid tubes and provides design and application information that assist the use of these valves. 156 pages £7.95

FAULT-FINDING
ARE THE VOLTAGES CORRECT?
Republished from Electronic Engineering this is a valuable resource for anyone interested in the world of amateur radio communication. It covers the basic principles of the hobby, including antennas, transceivers, and digital communications. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AMATEUR ELECTRICITY (USA)
H. L. Gibson GB12
VHF/UHF propagation, including monoband and multiband systems. 175 pages £7.95

AMPLIFIER LAYOUT AND CONSTRUCTION
R. G. Jessop G8CCJ
This is a comprehensive guide to the theory and practice of the hobby, including details on antennas, transceivers, and digital communications. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

HOW TO DESIGN AND MAKE YOUR OWN C.P.U. (RSGB)
R. A. Penfold
Designing and building a computer system from scratch requires an understanding of the hardware and software components involved. This book provides a comprehensive guide to the design and construction of a computer system, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

INTRODUCING QRP
Collecting Articles from PW 1983-1985
This book provides a comprehensive guide to the world of QRP, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

MORE ADVANCED POWER SUPPLY PROJECTS
This book provides a comprehensive guide to the world of advanced power supply systems, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

PRACTICAL POWER SUPPLIES
Collecting Articles from PW 1978-1985
This book provides a comprehensive guide to the world of practical power supplies, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AERIALS PROJECTS (BP105)
R. A. Penfold
This book provides a comprehensive guide to the world of aerials, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AERIALS PROJECTS (BP222)
R. A. Penfold
This book provides a comprehensive guide to the world of aerials, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AERIALS PROJECTS (BP228)
R. A. Penfold
This book provides a comprehensive guide to the world of aerials, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.

AERIALS PROJECTS (BP229)
R. A. Penfold
This book provides a comprehensive guide to the world of aerials, including details on the selection of components, the assembly process, and the testing of the finished product. The book is written in a clear and concise manner, making it easy for beginners to understand the concepts involved. The book also includes helpful tips and strategies for improving your skills in the hobby. Overall, this guide is an excellent resource for anyone looking to get started in the world of amateur radio communication. Recommended for all levels of expertise.
Yaesu's serious about giving you better ways to tune in the world around you.

And whether it's for local action or worldwide DX, you'll find our VHF/UHF receivers are the superior match for all your listening needs.

**The FRG-9600. A premium VHF/UHF scanning communications receiver.** The 9600 is no typical scanner. And it's easy to see why.

You won't miss any local action with continuous coverage from 60 to 905MHz.

You have more operating modes to listen in on: upper or lower sideband, CW, AM wide or narrow, and FM wide or narrow.

You can even watch television programmes by plugging in a video monitor into the optional video output. (NTSC System).

Scan in steps of 5, 10, 12½, 25 and 100kHz. Store any frequency and related operating mode into any of the 99 memories. Scan the memories. Or in between them. Or simply "dial up" any frequency with the frequency entry pad.

Plus there's more, including a 24-hour clock, multiplexed output, fluorescent readout, signal strength graph, and an optional PA4C, AC power adaptor.

Extend the coverage further with the optional FC965DX 0.15-30MHz and FC1300 800-1300MHz external converters.

**The FRG-8800 HF communications receiver. A better way to listen to the world.** If you want a complete communications package, the FRG-8800 is just right for you.

You get continuous worldwide coverage from 150kHz to 30MHz. And local coverage from 118 to 174MHz with an optional VHF converter.

Listen in on any mode: upper and lower sideband, CW, AM wide or narrow, and FM.

Store frequencies and operating modes into any of the twelve channels for instant recall.

Scan the airwaves with a number of programmable scanning functions.


Listen in. When you want more from your VHF/UHF or HF receivers, just look to Yaesu. We take your listening seriously.

Yaesu has serious listeners for the serious listener.

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

Dealer inquiries invited.

Prices and specifications subject to change without notice.
FRG-9600 SSB coverage: 60 to 460 MHz.