

ShortWave

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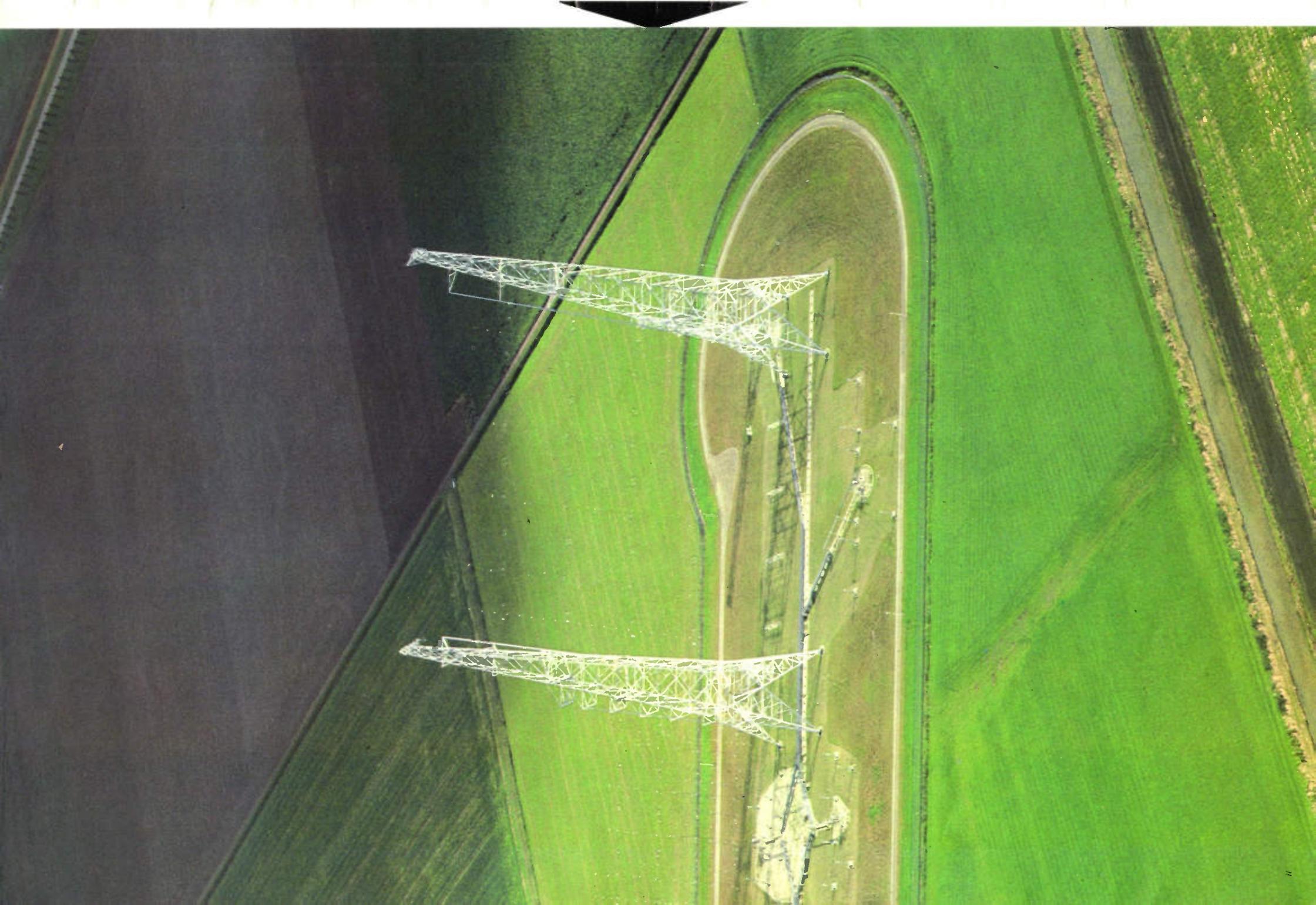
APRIL 1988



**RADIO NEDERLAND'S
FLEVO TRANSMITTER**

For The Radio Listener





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 1000 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. □



The grid contains 25 cards, each with a title and instructions:

- 1 THE INDUCTANCE**: Shows a cylindrical inductor with a wooden end piece and a groove.
- 2 METHOD A** and **3 METHOD B**: Illustrate two ways to secure a crystal set in the inductor's metal.
- 4 COMBINATION CRYSTAL DETECTOR (ZINCITE & BORNITE)**: Shows a sectional view of the detector on an ebonite base.
- 5 INDUCTANCE SLIDERS AND BARS**: Shows the two brass bars and ebonite sliders.
- 6 CARBORUNDUM DETECTOR**: Shows a carborundum detector with a spring steel plate.
- 7 THE COMPLETE INDUCTANCE MOUNTED ON BASEBOARD**: Shows the inductor assembly on the baseboard.
- 8 TO INDUCTANCE SLIDER BAR**: Shows the connection to a crystal detector and a battery.
- 9 CRYSTAL DETECTOR COPPER WIRE CONTACT** and **10 COMBINATION CRYSTAL - ZINCITE & BORNITE**: Shows different detector contact types.
- 11 POTENTIOMETER**: Shows a potentiometer circuit with a switch and battery.
- 12 HOW TO MAKE YOUR OWN WIRELESS SET THE CRYSTAL DETECTOR**: Instructions for making a crystal detector.
- 13 HOW TO MAKE YOUR OWN WIRELESS SET ASSEMBLING THE POTENTIOMETER**: Instructions for assembling a potentiometer.
- 14 HOW TO MAKE YOUR OWN WIRELESS SET THE INDUCTANCE SLIDER & BARS**: Instructions for making the inductance sliders and bars.
- 15 HOW TO MAKE YOUR OWN WIRELESS SET POTENTIOMETER**: Instructions for making a potentiometer.
- 16 HOW TO MAKE YOUR OWN WIRELESS SET HOW TO MOUNT THE INDUCTANCE**: Instructions for mounting the inductance on the baseboard.
- 17 HOW TO MAKE YOUR OWN WIRELESS SET CARBORUNDUM DETECTOR**: Instructions for making a carborundum detector.
- 18 HOW TO MAKE YOUR OWN WIRELESS SET THE BAND BOARD & SIDE SCRAPERS**: Instructions for making a band board and side scrapers.
- 19 HOW TO MAKE YOUR OWN WIRELESS SET ASSEMBLING CRYSTAL DETECTOR**: Instructions for assembling a crystal detector.
- 20 HOW TO MAKE YOUR OWN WIRELESS SET THE INDUCTANCE**: Instructions for making the inductance.
- 21 HOW TO MAKE YOUR OWN WIRELESS SET MOUNTING CRYSTALS**: Instructions for mounting crystals.



Cover Radio Nederland recently opened its new short wave transmitter site at Flevo. Our special gatefold cover enables us to show the entire site from the air. Inside Peter Laughton describes the story behind the building of this impressive array.

The popular series "Introduction to DX-TV" will continue next month.

Inside cover iii

We have taken the rare opportunity offered by our special cover to bring you a unique feature in full colour. The complete set of twenty-five coloured cigarette cards, given away free with Godfrey Phillips cigarettes in the 1920s, are reproduced opposite very slightly smaller than full size. Both sides are reproduced so that you can cut them out and glue the two sides back-to-back.

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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 Survey 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 "fag-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!

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 motorbikes, one-valve short wave receiver, Hornby "O" Gauge clockwork train set and so on — all disposed of in the quest of "something better"!

Referring to the Survey, you might be puzzled by the subsidiary part of Question 17. Unfortunately the wrong copy found its way in at the final stages of preparation. It should have read: If "YES" please state which model. . . — now I will never know what is the most popular home computer amongst SWM readers.

DICK GANDERTON

A WORD IN EDGEWAYS

Sir

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

Blatant 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, in 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?

*Forty years an s.w.l.
DAVID J. GOMMO
CREWKERNE
SOMERSET*

Sir

I thank Mr. W. Blanchard (Feb 88 SWM) for the information given about "Eureka". However, I feel that certain comments, no doubt give as good-natured badinage, cannot go unchallenged in the same spirit, this is good and what feedback is all about.

If he would care to peruse a copy of the RAF En Route Supplement British Isles and North Atlantic, he will find that "Eureka" is certainly not ready for any museum, but is alive and well at Brawdy, Chivenor, Leuchars, Shawbury and Valley. The above publication not only gives the air transmit and receive frequencies but also range and actual grid references.

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.

Mr Blanchard's comment about a pulse type interference on 24.3MHz 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*

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 as these 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 "Cat" 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.*

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 OF SWM SERVICES

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.

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*

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.

1988/89

Fifth Edition

DIAL-SEARCH

The Listener's Check-list
and Guide to European Broadcasting

Medium Wave
Long Wave
VHF
Short Wave

Including

- a full list of British stations
- a select list of European stations
- broadcasts in English
- classical music & jazz programmes
- "Making the Most of your Portable"
- two special maps
- new features

GEORGE WILCOX

The medium and long wave lists of European stations are a realistic selection, leaving out those that are unlikely to be heard in the UK. Information given includes hours of broadcasting and the languages used. There is a separate list for the British Isles, with another for v.h.f. f.m. stations. These lists are fully up-dated to November 1987.

Other features of the book are: the broadcast frequency bands, tabulated selection of world short wave, a selection of broadcasts in English, notation of some of the main interval signals heard on medium wave, a selection of regular broadcasts of classical music and jazz and a short list of North American medium wave stations.

Available from the Short Wave Magazine Book Service, £3.25, plus 75p P&P.

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.

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 s.w.l.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

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

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 more 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 Moortop Cleaning Company they can offer a 10% discount on carpet and upholstery

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.s.e. from:

Brian Morris G4KSO
22 Burdell Avenue
Sandhills Estate
Headington
Oxford OX3 8ED



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

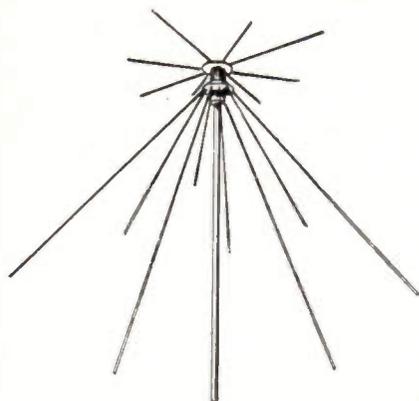
cleaning to anyone buying a rig from them. Also, anyone living within 40km of Mirfield gets delivery free."

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

WHAT'S NEW



The DSC770 Discone

This wide band discone antenna is available from South Midlands Communications Ltd. The frequency coverage is from 70 to 700MHz and the gain is 3.5dB compared with a ¼ wave dipole. It has been designed for use as either a receiving or transmitting (up to 500 watts p.e.p.) antenna.

The top, centre disc, cone and elements are all manufactured from high grade aluminium alloy. The elements screw directly into the cone and disc, to prevent elements vibrating loose in high winds. The antenna comes supplied with stub mast of

1.5in diameter and mast clamp to fit 1.25 to 2in mast. The stub mast protects the input connector from the ingress of moisture.

The DSC770 costs £55.75 including VAT. For further details, contact:

South Midlands Communications Ltd
SM House
School Close
Chandlers Ford Ind. Est.
Eastleigh
Hants SO5 3BY
Tel: 0703 255111

Ariel Joins In

The BBC Club's Ariel Radio Group are intending to join in this year's special celebration for the seventy-fifth anniversary of the RSGB.

At their annual summer festival on July 9, the Ariel Radio Group will have a display of the history of amateur radio, and will be using a special event call sign to try and contact many old hands who remember former days of wireless.

They hope to have a number of special and distinguished special guests calling in the fun and make this a special event to remember.

ISWL (1987)

Many readers will no doubt have heard of the ISWL, for its roots stretch a long way back in radio history. Many, perhaps, have been members at some time, a few may even be aware of the difficulties experienced in 1986 which led to the extinction of the league.

Efforts were made, however, by some members of the league to save something of the organisation, and like a phoenix from the ashes ISWL '87 arose.

The ISWL always had a reputation as a society catering for the short wave listeners amongst our fraternity. Although this is true, there is still much of interest to the licensed amateur, not least of which is the four weekly nets that take place on the 3.5MHz band. They are: Sat 1000 3.550MHz c.w.: Sat 1030 3.685MHz s.s.b., controller Dick Rugg G2BRR. Monday 2030 3.535MHz c.w. and Tuesdays 1900 2.700 s.s.b., controller Peter O'Neill GW4UZL.

The monthly magazine/newsletter for the International Short Wave League is *Monitor*. The November issue contains 42-pages of A4 packed with information ranging from transmitting topics to pages of loggings on all kinds of bands.

In fact, the quantity of logs submitted to "The Broadcast Bands" section is so great, it has been the practice to only print non-European loggings, which doesn't help newcomers to the hobby. Therefore in addition to the magazine, contributors to "The Broadcast Bands" section will in future also receive a separate copy of all the BC bands logs that have been presented during the previous month.

The subscription rates for the ISWL (1987) are £12 per annum for the UK, £25 for overseas members and \$40 for USA members. The QSL service costs members £5 or USA members \$10. For more details contact:

Jim May G-16782
10 Clyde Crescent
Wharton
Winsford
Cheshire CW7 3LA

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 dew 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 26 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 Bangkok 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 Arther Cushen.

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

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.

UTC	Area	Frequency (MHz)	Mins
0400	Middle East/E. Africa	13.7, 9.85	25
0630	W. Africa	11.93, 9.895	25
0730	New Zealand	9.715, 9.630	55
0830	New Zealand	9.63	25
0830	SE Asia	21.485, 17.575	55
1030	Australia/Caribbean	9.685, 6.020	55
1130	Middle East/Asia	21.480, 17.575, 15.560	55
1130	Europe	17.605, 9.715, 5.955	55
1430	SW Asia	17.575, 15.560, 13.770, 11.740, 5.955	55
1630	Southern/E. Africa	9.540, 6.020	55
1830	South/Central Africa	21.685, 17.605, 9.54, 6.02	55
1830	Europe	6.02 (parallel to Africa service)	55
2030	W. Africa	15.560, 11.740, 9.895, 9.54	55
0230	Eastern N. America	9.895, 9.590, 6.615, 6.020	55
0530	Western N. America	9.715, 6.165	55

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 Issac: A new television relay will shortly be in operation 16km north west of Bodmin. It is being built jointly by the BBC and the IBA at Trewetha 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 Brimming, 43 Atwood Drive, Bristol BS11 0SR.

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

Andex International

Andex is a listener's club operated in conjunction with the *DX Partyline* programme. Club benefits include an 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 there 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 be able to operate using the very special callsign of **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 first 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 quite unusual, July 24 is a Families Day, when the individual affiliated radio clubs and societies will take over. Just about anything goes as long as it 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 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 *Radcomm*. Overseas visitors should contact the RSGB HQ for an information pack.

There should be a 75th Anniversary Award available too for working either: (i) The HQ Station GB75RS 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.l.s and amateurs alike.

All Bands: Fifty points are needed for the basic awards made up of the following: GB0RRR, GB1RRR, GB2RRR, GB6RRR, GB8RRR, GB0RRA, GB1RRA, GB2RRA, GB4RRA, GB6RRA, GB8RRA 10 points each
G4MWC or G6FSA 5 points each
Any club member 1 point 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 25 points needed.
Outside G, GD, GM, GI, GW, EI (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

Band	Mode	Day/Date	Time
1.f.	phone	Sunday May 22	1400-2100UTC
144MHz	QRO s.s.b.	Sunday June 19	0900-1600UTC
144MHz	QRP s.s.b.	Sunday July 10	0900-1300UTC
432MHz	s.s.b.	Sunday July 10	1400-1800UTC
50MHz	s.s.b.	Sunday October 9	0900-1200UTC
3.5MHz	c.w.	Sunday November 6	0930-1230UTC

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

Laurie Segal G6XLL, 21 Blackstone Road, Cricklewood, London NW2 6DA

GRASSROOTS

Lorna Mower

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, G8HJS will be giving a talk on Chassis Bashing for all those at The Midland 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 is the Birmingham Central RAYNET monthly meeting. Every Wednesday they have Morse Classes with G0GPZ and 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 G8GAZ 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 Powys 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 RAFA Club, The Struet, Baecon. On April 5, they have the first part of Practical Satellite TV. If you would like more details then contact B. Carter GW8AAG on Bwlch 730158.

The Radio Society of Harrow meet every Friday evening at 8pm, in the Roxeth Room of the Harrow Arts Centre, High Road, Harrow Weald. March 25 is 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 Ruislip 673287.

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. Swithins 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 from John Puttock GOBWW 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 & Morse Tuition 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 G4HHT 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 Photograph, April 5 is 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. Linears and on the 25th, Eddie Doyle-Rush talks about Radio Astronomy. Further information available from Mike GWOHWK on Llandegla 621.

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

On Thursday April 21, the Eden Valley RS have planned a visit to Wray 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 66728.

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 G1IGH on Bradford 496222.

On Friday April 1, the Mansfield ARS have a Construction Competition with Guest Speaker. They meet every 1st Friday and 3rd Tuesday 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 Mariott G8TWH on Rugby 77986.

Felixstowe & District ARS are closed on April 4 for Easter, but on the 18th they have a talk on Pre-amplifiers & 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 Paul Whiting 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, Pellon Lane, Halifax at 7.30pm prompt. A Club Dinner is being organised for sometime in April. More from David Moss GODLM on Halifax 202306.

Torbay ARS holds its weekly meetings on Friday evenings, at 7.30pm, in the English China Clay Social Club, Highweak, 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 McCreadie G0FGX on Haytor 233.

Cheshunt & District ARC meet every Wednesday at 8pm, in the Church Room, Church Lane, Wormley. March 30 is a Lecture by G3OJI, April 6 and 20 are Natter Evenings and the 27th is a Construction Contest. Further information available from Peter Davies G1KQA on Lea Valley 764930.

Meetings for the Loughton & District ARS are usually held every other Friday at 7.45pm in Room 20 of Loughton Hall. March 25 is an RSGB Film Night, April 8 is their AGM and the 22nd is an Informal Evening — Club Project Building Night. More from John Ray G8DZH at 9 Albion Hill, Loughton IG10 4RA. Prestel Mbx No. 015083434.

Yeovil ARC meet every Thursday at 7.30pm in the Recreation Centre, Chilton Grove, Yeovil. March 31 and April 28 are Natter Nights, on April 7 G3MYM will be giving a talk on Transequatorial Propagation, the 14th is Simple h.f. Antennas by G3GC and their AGM follows on the 21st. Contact David Bailey G1MNM on Yeovil 79804 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 27th 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 — The Story of Electrons 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 Bonvilston Road (A4226), near the Welsh Hawking Centre. For more details contact Dr Kevin Johnston GW4 BCB at 68 Heol Isaf, Radyr, 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 G8KLH on the 12th, an Open Evening on the 19th and the 26th is Operating New Equipment by G4HKS. 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, N. Ireland. On Sunday April 10 there is the Mobile Rally, taking place at Killyhevlin Hotel and a talk entitled Secure your Rig follows on the 20th. Further details obtained from W. A. Ward at 6 Brackvede Park, Enniskillen, Co. Fermanagh, N Ireland BT74 6DX, or telephone Enniskillen 24905.

South East Kent (YMCA) ARC 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. Films — a showing of interest to all by G4VRB follows on the 27th. Meetings are held on Wednesday evenings and Construction Classes in Morse or Radio Amateur Examination Coaching are on Monday and Tuesday evenings. All events held at the Dover YMCA, Godwynehurst, Leyburne Road. 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 G6YLW and an Inter Club Quiz follows on the 28th. The Society meets every Thursday evening at 8pm, in the Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham. Kelvin GOAMZ on Medway 376991 can 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, Denne 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 Porchester Community Centre, Westlands Grove, Porchester. March 30 is a talk on Radio Measurements by G4VNM, April 13 is Demonstration of Measurements also by G4VNM and on the 27th, G3SED will be talking about HF Aerials. More from Alan Chester G3CCB on Fareham 288139.

Meetings for the South Bristol ARC are usually held in the

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 Len Baker G4RZY 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 59318.

On March 31, North Wakefield RC have their Monthly Meeting. April 7 is Cavity Wavemeters in 3 Easy Lessons by G3JME, the 14th is On the Air G4NOK, a Visit to Leeds Poly Computer Rooms follows on the 21st and their April Monthly Meeting is on the 28th. Meetings are any Thursday evening, 8pm onwards in The White Horse Public House, Fall Lane, East Ardsley. More from Steve Thompson G4RCH on Leeds 536633.

Mid-Warwickshire ARS usually meet at 8pm every 2nd and 4th Tuesday, in the St John Ambulance HQ, 61 Emscote Road, Warwick. April 12 is Norman's Night G8CXL and the 26th is a Radio Sale & Auction. More from Peter Brown G0HIH on Marton 632370.

Colchester RAS have a talk entitled Military Signals Equipment by Major J. L. Davis of the 19 Infantry Brigade HQ on April 14 and Shortwaves & Beams by J. Stanley Wood on the 28th.

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 348189.

On April 14, the Southgate ARC have a Grand Surplus Equipment Sale followed by an Informal Evening on the 28th. They meet 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 2435.

An Annual Quiz between local clubs is being organised for all those at the Exeter ARS for April 11. All meetings are at 7.30pm every 2nd Monday, in the Community Centre, St Davids Hill, Exeter. Contact Ray Donno G3YBK on Exeter 78710 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. Dyer G3GEH on Acton 3778.

Wirral & District ARC meet every other Wednesday evening at 8pm in the Irby Cricket Club, Irby Mill Road, Irby. April 13 is Film Night and the 27th is The Great Egg Race. For further information contact Alan Griffiths G1XYP on Moreton 7517.

The Cheltenham ARA 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, Thornclyffe 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 GB4IMD. For any further details contact N. Pascoe G4USB on Redruth 212314.

The East Kent RS meet every 1st and 3rd Thursday at 7.30pm in Parkside 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 Didmon G4RIS on Whitstable 262042.

The Irish RTS meet every Monday evening at 8pm, in The Spanish Convent, Finglas, Dublin 11. Further information available from Chris Yeates EI7AAB at 75 Georgian Village, Castleknock, Dublin 15 or telephone (Dublin) 01-215145.

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 G0FAH. The club meets every 3rd Saturday at 8pm, in the All Saints Parish Rooms, Beulah Hill, London SE19. More from Geoff Stone G3FZL 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 25th is Club Night/Night on the Air. All meeting unless otherwise stated, are held in the Physics Laboratory, Atherstone Upper School, Long Street, every 2nd and 4th Monday at 7.30pm. Any further information available from John Arrowsmith G4IWA on Ather-

stone 713670.

Vale of Evesham RAC have their Formal Evenings at 7.30pm every 1st Thursday in The Round of Gras, Badsey and Informal Evenings every 3rd Thursday in The Gardeners Arms, Charlton. April 7 is a talk on Packet Radio by G8AMD/G4JGD and a Ragchew Evening follows on the 21st. More from Mike 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 G4THN on Reading 774042.

Paddington College ARS meet at 7pm every 1st Wednesday, in the Paddington College, Paddington Green, London W2. Don Pye G1UCT on Paddington 3847 can tell you more.

A Junk Sale is planned at the York ARS meeting on April 15. Meetings continue each Friday at 7.30pm in the United Services Clubroom, 61 Micklegate, 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 Byles G6UWS on Wellingborough 71189.

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

RALLIES

★ SWM will be in attendance.

★ April 17: The Trafford ARC are holding the Trafford Rally & Components Fair at the Lancashire County Cricket Ground, Talbot Road, Old Trafford, Manchester. Talk-in on S22 using G1TRC/A. Doors open 11am (10.30am for the disabled).

April 24: The Swansea ARS will hold their 7th Annual Rally in the Swansea Leisure Centre on the A4067, Swansea - Mumbles Coast Road. Note that it's a change of venue. Doors will be open between 10.30am and 5pm. There will be plenty of traders, a bring and buy, bookstall, refreshments, licensed bar and an h.f. station. Talk-in will be by GB2SWR. More details from the rally secretary:

Roger Williams GW4HSH
Tel: 0792 404422

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

Les Hawkyard G5HD, The Eyr
Newtown St Petrock, Torrington
North Devon EX38 8LU

May 1: The Kelso Amateur Radio Society, assisted by the Borders Amateur Radio Society, will be hosting the 5th Anglo-Scottish Rally in the Tait Hall, Kelso. Doors open from 11am to 5pm. There will be the usual trade stands, talk-in on S22, Morse tests (booked through the RSGB), bar, hot and cold food, raffles, etc. Entrance will be £1, junior ops, YLs and XLs very welcome and admitted free. More information from:

Mr B. Cavers GM4UIB
Tel: 0573 24654

May 2: The Dartmoor Radio Club's annual mobile rally will be held at the Princetown Town Hall. The Rally is open from 10.30am to 5pm. There will all the usual traders in attendance. There will also be some display stands from RAYNET and local repeater groups as well as a bring & buy. There are refreshments available and a small entrance fee at the door. Ample parking is available and talk-in is on S22.

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

G3QQ
Tel: 0943 602118

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



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. If 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 Sanyo.

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 today's 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 a 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

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WHISKEY, WAVES AND WOMEN

John S Smith

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 Guiseppe 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.

It seems incongruous to me that the offspring of a daring and romantic runaway marriage, of fragmentary schooling and hence limited academic ability, should be the proclaimed father of modern radio.

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

An apology for confusing you. The February "Airband" referred to January's description of the different types of controlled airspace. Unfortunately there wasn't room for this in January and so here it is now. This subject is worth a mention because it often causes confusion — sometimes even to pilots! You shouldn't be in controlled airspace unless you are doing what the controller asks you (amusing sign seen at an air traffic control (a.t.c.) centre: "Controllers tell pilots where to go!"). The airspace is mainly radar-controlled and consists of the airways and the special rules areas surrounding major airports (there are also areas such as the North Atlantic Track System which is under procedural control). Instrument flight rules (i.f.r.) are usually followed even in perfect weather, but special clearances to transit these zones under visual flight rules (v.f.r.) are often possible. Another controlled area is the aerodrome traffic zone (a.t.z.) or military a.t.z. (m.a.t.z) that surrounds an aerodrome during its operational hours. Small airfields don't have radar. An a.t.z. has a radius of 2 nautical miles (2.5 if the runway is longer than 1850 metres), is centred on the runway, and extends from the surface upwards for 2000 feet (see Civil Aviation Authority (CAA) *Aeronautical Information Circular 61/1987*).

Frequency and Operational News

Just one new v.o.r. change from the CAA *General Aviation Safety Information Leaflet* that first appeared in the 1/88 issue: the Cranfield beacon in Bedfordshire is back on the air (CFD: dah-di-dah-dit, di-di-dah-dit, dah-di-dit, 116.5MHz). As a Flight Sergeant in the Air Training Corps **Chris Gall** (Orpington, Kent) has flown solo in a glider. He says that Air Cadet Gliding Schools have v.h.f. frequencies, e.g. West Malling is on 129.97MHz. I understand that civilian gliders use 129.9, 130.1, 130.125, and 130.4MHz.

A collector of h.f. frequencies is **Jonathan McCaughey** (Lisburn, Co. Antrim). Many African a.t.c. centres are on 5.658MHz u.s.b. from 17:00hrs until the early hours of the following morning. The frequency is also used by Cairo, Addis Ababa (Ethiopia), Khartoum (Sudan), Nairobi (Kenya), Tripoli (Libya), Karachi, Delhi, Bombay, Kabul, Bahrain and Aden. On 6.556MHz are Madras (India), Colombo (Sri Lanka), Male (an Indian Ocean island), Rangoon (Burma) and Jakarta (Java, Indonesia). On 8.903MHz are centres in southern Africa such as Kinshasa (Zaire) and Luanda (Angola). Another h.f. enthusiast, **T.S. Christian** (North Walsham, Norfolk) has sent me a detailed computer list of frequencies that he is compiling. In the evenings at 2200Z the Caribbean A frequencies on 6.577 and 8.846MHz get busy. **Paul Whiteley**

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 RAF 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 5.535, 6.568, 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 *Aerad Europe & Middle East Supplement*. This new edition combines the old volumes 1 and 2 in a single handy book and can be bought from Aerad Customer Services, Building 254, P.O. Box 10, London Heathrow Airport, Hounslow, Middlesex TW6 2JA Tel: 01-562 0795. The first time that you order any charts from Aerad, 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-di-dah, dah-dit, di-dit, 404.5kHz) and there is a new beacon (BMH: dah-di-di-dit, dah-dah, di-di-di-dit, 339kHz) at Bournemouth which is in addition to the existing Hurn (HRN: di-di-di-dit, di-dah-dit, dah-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 "Texel 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 877R receiver is very cheap. Looking at the adverts, 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.l.s. requires very powerful lights to be fitted to the test aircraft. On the ground the teleroscope instrument picks up the infra-red emission 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. 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), RAF Northolt, West End Road, Ruislip, Middlesex HA4 6NG. Please include a stamped reply envelope when inquiring about prices. The postcode 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 (part of UK 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 airliners. 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-di-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:

Aircraft transmits		Ground Station transmits	
Channel	MHz	Channel	MHz
A	214	1	214
B	218	2	218
C	222	3	222
D	226	4	226
E	230	5	230
F	234	6	234
G	Spare	7	Spare
H	Spare	8	Spare

Also, the UK stations are:

Ident	Location	Channel
BY (dah-di-di-dit, dah-di-dah-dah)	Brawdy	C5
CV (dah-di-dah-dit, di-di-di-dah)	Chivenor	C2
LO (di-dah-di-dit, dah-dah-dah)	Linton-on-Ouse	E4
LU (dih-dah-di-dit, di-di-dah)	Leuchars	B5
SY (di-di-dit, dah-di-dah-dah)	Shawbury	F5
VY (di-di-di-dah, dah-di-dah-dah)	Valley	D6

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 Bernascone** (Middlesbrough).

Tony also offers to help readers with aeronautical radio 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, 997-1001 High Road, Finchley, London N12 8QX and was discovered by **Chris Durkin** (Ormskirk, Lancashire). Chris would like to know the flight plan / nav log routings from London to Australia for flights such as British Airways BA9 and BA11. Send your answers to me and I'll write a section on flight plans.

You Write

"Are you a pilot?" asks **Stefano Malaspina 16MQS** (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 01-958 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 trickiest approach that I've tried is Hong Kong, 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 easterly 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.l.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 Mlynek.)

historical information that he obtained concerning RAF Kidbrooke, s.w. London. In the 1920s the supply of RAF wireless apparatus (*sic*) depended on its intended purpose: some airship equipment actually came from the Royal Navy.

John Sanderson (Mansfield, Nottinghamshire): do you fly? Your letterhead is embellished 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.l.) 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; there are no windows 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-ASWM, which we announce to the controller as "Golf Alpha Sierra Whiskey Mike". Thereafter the callsign is abbreviated to G-WM i.e. "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 Hotel 1004, 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 is also the side of the rudder pedal to be pressed: "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 rudder 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 occupied then 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 deale the landing whilst another aircraft clears the runway.

The Boeing 747 Cockpit

In the December 1987 issue the article on "Selcals" (page 19) included a photograph of the left-hand edge of the first officer's panel of Boeing 747-156 N134TW (19958) 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 climb 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 lowered. Above 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 pointers indicate the relative direction of each of two beacons. These pointers are showing the same bearing, 080°, 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 in past years the GB2HAS 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! □

ICOM

Count on us!

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



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

main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25KHz. The IC-R7000 has 99 memories available to store your favourite frequencies including the operating mode. Memory channels can be called up by pressing the memory switch then rotating the memory channel knob, or by direct keyboard entry. A sophisticated scanning system provides instant access to the most used frequencies. By depressing the Auto-M switch, the IC-R7000 automatically memorises frequencies that are in use whilst it is in the scan mode, this allows you to recall frequencies that were in use. The scanning speed is adjustable and the scanning system includes the memory selected frequency ranges or priority channels. All functions including the memory channel readout are clearly shown on a dual-colour fluorescent display. Other features include dial-lock, noise blanker, attenuator, display dimmer and S-meter and optional RC-12 infra-red remote controller, voice synthesizer and HP 1 headphones.

IC-R71E, General coverage receiver.

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

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



Helpline: Telephone us free-of-charge on 0800 521 145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

Datapost: Despatch on same day whenever possible.

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

Icom (UK) Ltd.

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



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

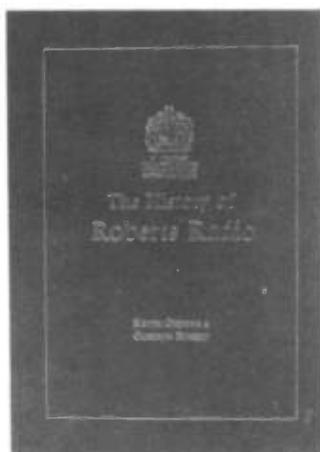
ISBN 0 9512590 0 8

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.

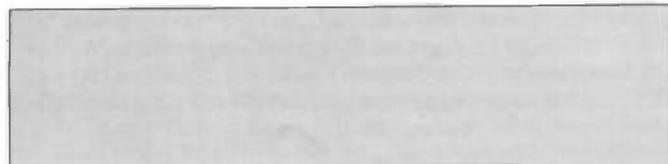
Roberts Radio hold three Royal warrants and are a British survivor of the radio industry battered by the Far East competition. They started business in 1923, partly financed by the sale of a motorbike, and Harrods (yes, the Harrods) became their first customer.

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 prisoners 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 — if 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

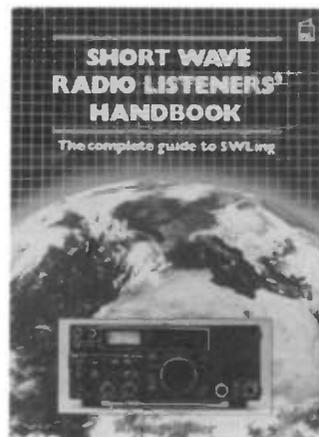
Available from Short Wave magazine Book Service

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.

AIR BAND RADIO HANDBOOK

by David J. Smith

Published by Patrick Stephens Ltd

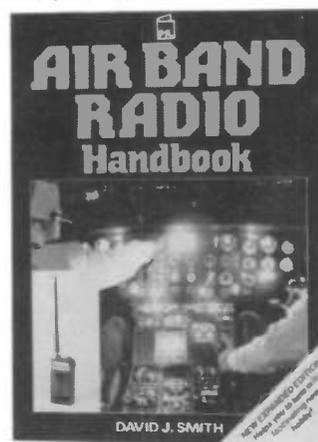
Available from Short Wave magazine Book Service

157 x 215mm, 174 pages. Price £5.99 plus 75p P&P

Prior to 1963, enthusiasts had to rely on their own eyesight, aided by binoculars and telescopes, to identify aircraft. A minor revolution occurred in that year when the first radios covering the v.h.f. air band were put on the market. Now the majority of aircraft flying over could be identified by their registration or serial number.

A great many people have bought air band radios, however, and found the jargon they hear almost incomprehensible. It is easy to pick out callsigns, but most v.h.f. listeners would like to build up a better picture of what is going on and to unravel the "mysteries" of Air Traffic Control (a.t.c.).

The terse messages, so confusing at first hearing, follow a definite pattern known as "standard phraseology". This verbal shorthand is designed to impart the maximum amount of unambiguous information in the shortest possible time. Since



English is the international language of a.t.c., it must be understood easily by those with a different native tongue. With careful listening, and the aid of the examples in this book, the r/t exchanges on the air band will soon become both logical and familiar.



GUIDE TO FORMER UTILITY TRANSMISSIONS 3rd Edition

by Klingenfuss

Published by Klingenfuss Publications

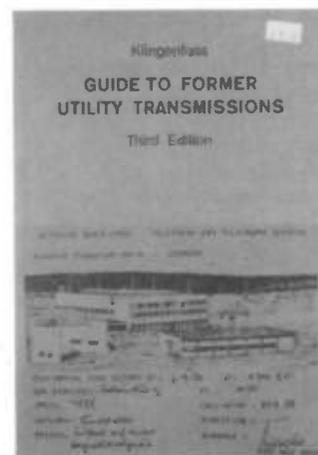
Available from the Short Wave Magazine Book Service

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.

Nowadays 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.

BOOKCASE

AN INTRODUCTION TO WEATHER SATELLITES & THEIR RECEPTION

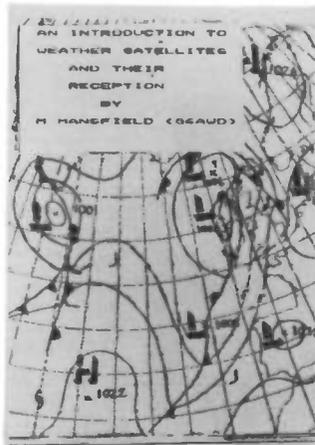
by M. Mansfield G6AWD

Available from M. Mansfield, Little Ash, Lower Whitley, Cheshire WA4 4EN.

150 x 210mm, 29 pages. Price £2.

At the time this booklet was written, the author could find very little information regarding weather satellites and their reception. Therefore a prolonged research program was required to see if a home-built system could be constructed. It is now two years since the author successfully built a system capable of displaying the polar and geostationary satellites.

The author discusses all his mistakes so that anyone following in his footsteps may avoid the problems. Details and help is given on the following subjects: First steps; Construction of a receiver; construction of a digital frame store; Conversion for geostationary satellites. Plenty of useful



addresses can be found at the back of the booklet too.

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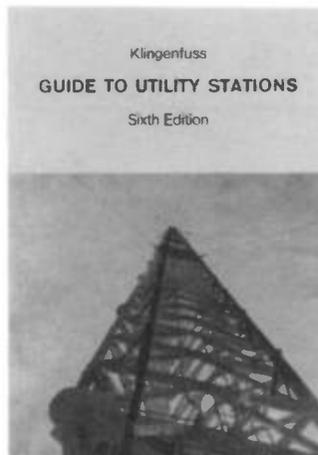
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This annually updated 494 page book covers the reception of all types of utility station between v.l.f. and 30MHz. For those of you who want even more up-to-date information there is a supplement service available which gives you an update in April and the following August! The range of information included in this book is truly amazing making it the short wave listeners "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



is some 248 pages long, lists 15802 frequencies between 9kHz and 30MHz. The format

used for the display of the data is the frequency followed by the call sign, location including country, mode and any operational notes. As the list also includes voice transmissions the utility stations are highlighted by employing bold type.

A very comprehensive call sign list comes next which is very well presented in that against each call sign is the station name and location followed by all the frequencies used by that call. This is very useful for identifying new stations when all you have is the call sign. The chapter preceding the call sign list gives a selection of the regulation regarding the construction and use of call signs which is very interesting.

Press stations are given a special mention starting with an alphabetical list of countries and their press agencies. This list also gives the transmission times and frequencies of all the stations mentioned. The next list I have found to be invaluable as it com-

prises a chronological list of press services. In order to find an active press station all you have to do is check against this list for the required time of day and you can instantly see which stations and frequencies are in use.

The next chapter is for the FAX operator and comprises a list of transmission schedules and frequencies for all the main FAX stations.

The final schedule concerns the NAVTEX navigational and meteorological warning service on 518kHz. Listed here are all the active stations along with their individual transmission times and identification details.

The remaining chapters cover the complete Q, Z and signal reporting codes along with a host of definitions and regulations. There are even two fold-out maps showing the world and regional air route areas.

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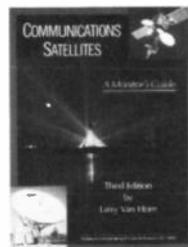
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SCANNING

Alan Gardener

Alan Gardener starts off this month's column with an interesting look at the latest trends in scanning receivers and attempts to predict what features the next generation of receivers may have.

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 anything 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 800 — 950MHz range to conventional scanner circuitry to produce the AR800. This looks similar in style to the Regency HX850E and is selling in the US for \$259.

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 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 Z80 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 — 628MHz 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) 581089 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.

Discones

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 $70 \times 2 \times 2$ or 280MHz. This equates to the specification of discones produced for military use, published in reference books such as *Janes 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 a 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 US 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 is itself 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 ($2 \times 19\text{kHz} = 38\text{kHz}$).

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 retune itself to the strongest signal carrying the same programme (see the article by Peter Shore

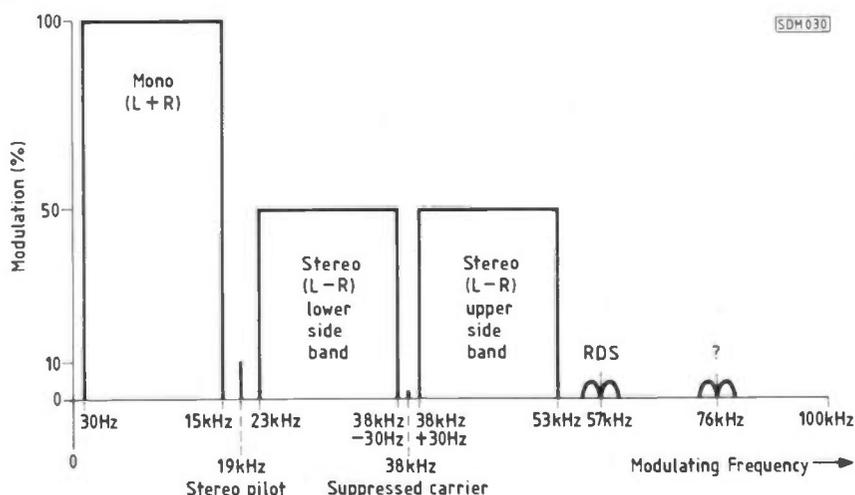
in last December's *SWM*). In order to do this the digital signal is carried on a 57kHz subcarrier. I believe that the two ILR stations in London also carry some form of encoded data transmission intended to give a radio teletext type of service for the city, although exact details are not known. As 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.

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Fig. 1



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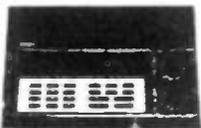
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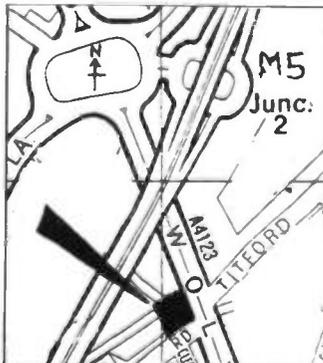
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HELPING TO BUILD YOUR STATION

KENWOOD RZ-1 RECEIVER

John Waite

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 Ω 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.

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 only other socket, which is quite useful, is a 3.5mm stereo jack on the front panel for the connection of a pair of stereo headphones.

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 receiver's 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 steps 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!



KENWOOD RZ-1 RECEIVER

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 MSG 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.

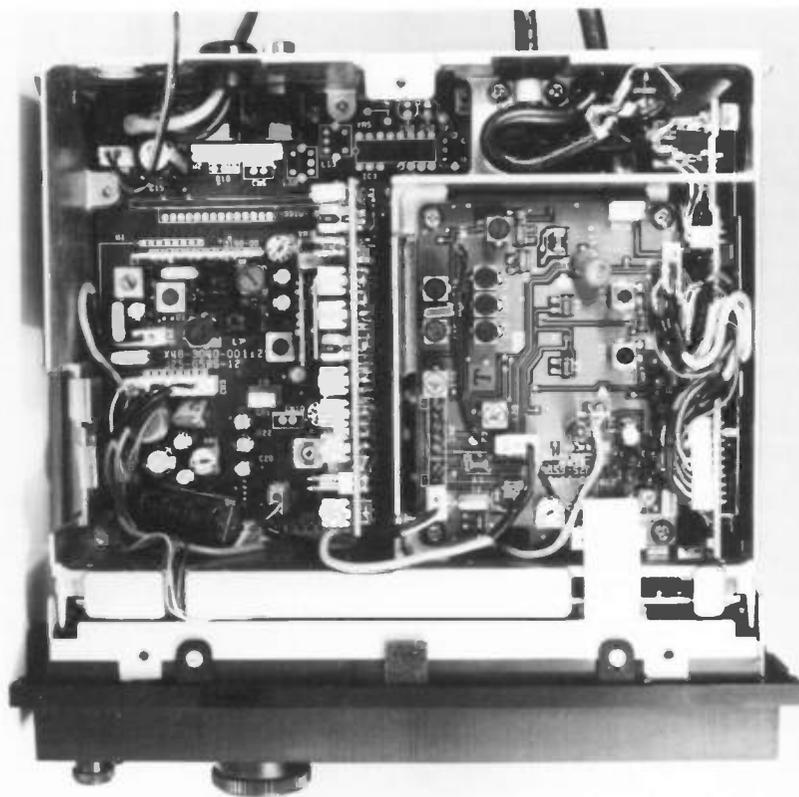
The changeover from memory to v.f.o. operation is very quick as it only requires a single press of the VFO/M.ch button to toggle between the two modes. Another feature which is very handy is that any memory frequency can be transferred to the v.f.o. with a single press of the M button without affecting 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 in to 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

KENWOOD RZ-1 RECEIVER

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 h.f. 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.

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 0.78 μ V at 4MHz to the worst case of 5.1 μ V at 400MHz. On n.b.f.m. the picture was very similar with the best 12dB SINAD sensitivity of 0.16 μ V at 60MHz to the worst of 1.09 μ V 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 de-emphasis was 75 μ S instead of the correct 50 μ S 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.

SPECIFICATION	
Frequency Range	500kHz to 905MHz
Frequency Steps	5kHz, 12.5kHz, 20kHz, 25kHz
Sensitivity	a.m. 10dB S/N 5 μ V <i>(0.78 to 5.1μV)</i> n.b.f.m. 12dB SINAD 500kHz-60MHz <6 μ V <i>(1.1μV)</i> 60MHz-905MHz <3 μ V <i>(0.9μV)</i> Wideband f.m. 83MHz <1 μ V <i>(0.6μV)</i> Squelch sensitivity n.b.f.m. <0.1 μ V <i>(0.09μV)</i>
Memory Channels	100
Output Power	Speaker 2 watts (2.1) across 8 Ω at 5% t.h.d. Line Out 150mV <i>(353mV)</i>
Stereo Separation	30dB at 1kHz
Modes	A3E (a.m.) F3E (f.m. narrow and wide) C3F (TV NTSC) USA version only
Antenna Impedance	50 to 300 Ω (50 Ω nominal) unbalanced
Power Requirements	11 to 16 volts d.c. at 1 amp
Dimensions	180mm wide, 50mm high, 176mm deep
Weight	1.5kg

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



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Jonathan Marks

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 rotatable 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 1950s, 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 Zuidersee 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 "Flevo" 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

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.

broadcasting bands such as the 6MHz band (49m), entails very large structures. Since Flevo 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

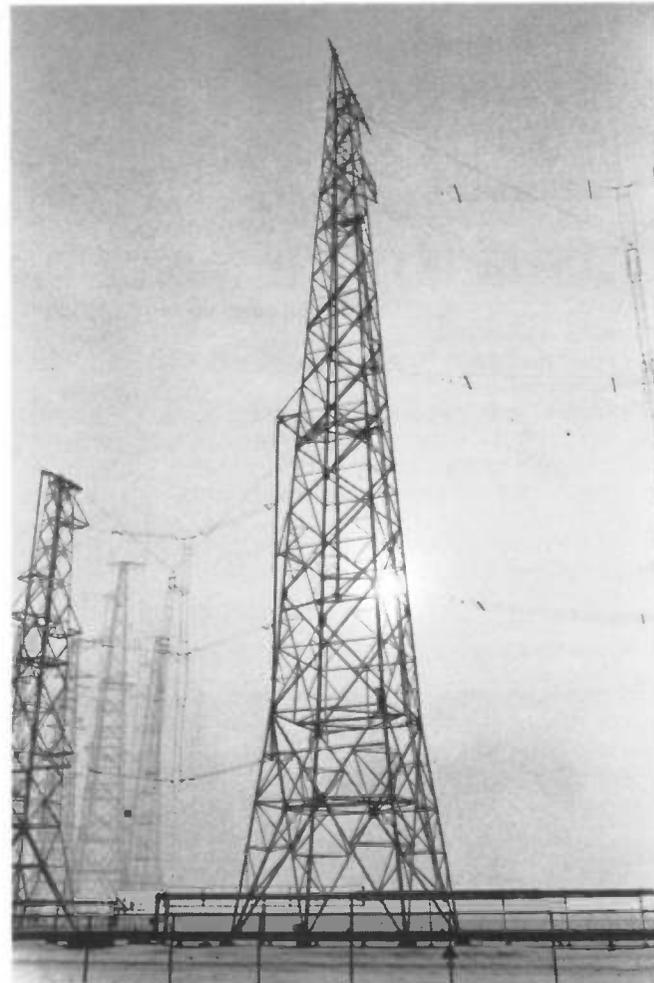
Flevo is equipped with one "omni-directional" antenna used to serve nearby target areas in Europe. This radiates

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.



Flevo on an autumn day.

REPORT FROM THE POLDER

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 buys 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 a 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 focussed 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.



Antenna Design

Antenna design is a specialised part of engineering technology. A directional antenna is more than a simple dipole strung between two supporting towers. In fact, most of the Flevo antennas consist of 16 dipoles, arranged in four rows, each of four dipoles, forming a so-called "curtain array". A screen of horizontally strung metal wires is put behind the stack of dipoles, acting rather like a mirror. This ensures that energy is radiated in one direction only. The size of the dipoles is important, as some antennas are designed only to operate on four out of the total of nine short wave bands used by Flevo for international broadcasting. If you try to operate an antenna on frequencies outside the ones it's designed for, it will not match electrically. Energy is then reflected back into the transmitter, and generally lost as excess heat. Since Flevo uses about 3.5 million watts from the mains electricity (think of it as paying the electricity bill for 35 000 light bulbs), it's important that as much of this energy as possible is used for broadcasting programmes.



The sticker celebrating 40 years of Radio Nederland.

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 500m, 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 290° 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 060, 075, 105 and 120° 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, 500kW 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 20dB. 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. □

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, Chinese and Russian. 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, Shanwick 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 callsign and position, often described just by a word which refers to a particular position en route. (For example, "DESIL" 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.

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 Lusaka, depending on DX conditions. Weather stations for aircraft (VOLMET) can also be heard from as far away as Moscow,

A fascinating first insight into the aeronautical scene on the h.f. bands. In this article Andy Thomas explains some of the codes and callsigns and ends with some useful addresses and frequencies.

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/Letter" identifies a British location, EGLL being Heathrow and EGDL RAF Lyneham, for example. The "E/D/Letter/Letter" 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, 5680-5730kHz, 6685-6765kHz, 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 callsigns are: ARCHITECT, GIBRALTAR, 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 callsign. This varies from "ASCOT/number/number/number/number" for transport aircraft to a five-element alphanumeric mix for tactical callsigns, 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 callsign. An aircraft callsign ASCOT 4/number/number/number is a Hercules C1 based at RAF Lyneham; callsign U1T34 was, that day, a Tornado from 229 Operational Conversion

Unit, the even number denoting an instructor; and a letter/letter/letter/number/number callsign 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 callsign 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 RNAS Culdrose 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 callsign "Navy 576". Ship callsigns 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, Boulmer, Neatishead and Portreath; NATO E-3A AWACS aircraft; and RN ships. Often NATO aircraft use the callsign "MAGIC number/number" for their flights from Geilenkirchen in West Germany to RAF Waddington. Patrols use tactical callsigns.

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 (c).

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 58°N, 2°W, MKPP 0000. Other information relayed is the detected 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

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-ee). 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. dipoles 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.

Fig. 1

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 Portishead 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! □

Useful Addresses

- (1) International Telecommunications Union, Place des Nations, CH-1211 Geneva, Switzerland.
- (2) Joerg Klingenfuss, Panoramastrasse 81, 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 63118-3399, USA.
- (5) Evans Air Publications, 11 Hill View, Bryn-y-Baal, Mold, Clwyd.
- (6) *Short Wave Magazine* Book Service, Enefco House, The Quay, Poole, Dorset BH15 1PP. Tel: (0202) 678558.
- (7) Danish Short Wave Club International, Tavlaeger 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) Shanwick 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.

NAT-A 3.016 5.598 8.825 13.306 17.946
 NAT-B 2.899 5.616 8.864 13.291 17.946
 NAT-C/D 2.962 5.649 8.879 13.306 17.946

(b) RAF Strike Command Integrated Communications System:

ARCHITECT (24hr freqs.) 2.591 4.540 4.742 5.729 8.190 6.738 9.032 11.204 11.234 18.018 23.220; 0800-1900 UK time: 13.257 15.031.

HAVEN (24hr) 11.234; 0800-2000GMT 9.032; 2000-0800GMT 4.742.

CYPRUS (24hr) 4.730 11.234; 0600-1700GMT 18.018; 1700-0600GMT 9.032.

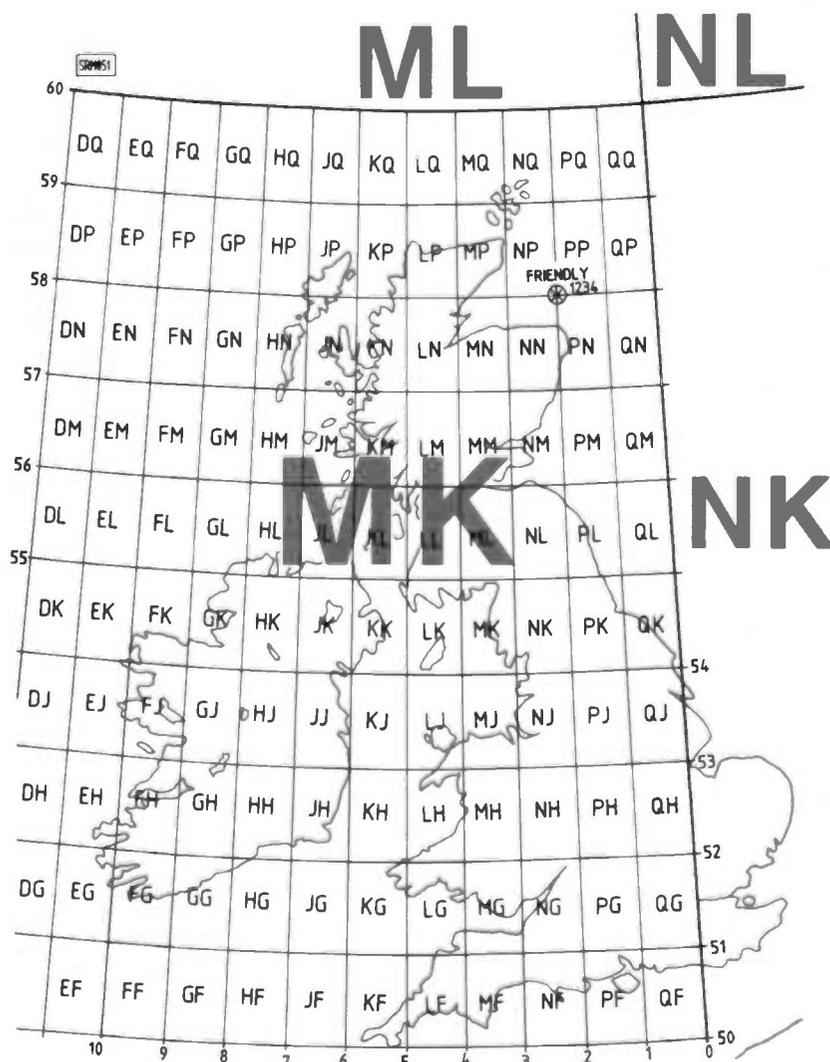
GIBRALTAR 2100-0800GMT 4.742; 0800-2100GMT 11.234.

VIPER (24hr) 11.234; 0800-2000GMT 9.032; 2000-0800GMT 4.742.

(c) RAF Air Defence frequencies: 3.120 3.939 4.707 4.710 4.739 5.747 6.693 6.715 6.733 6.740 6.765.

(d) CROUGHTON AIRWAYS frequencies: 2300-0500GMT 3.067; 0500-2300GMT 9.011; 2100-0800GMT 5.703; 0800-2100GMT 13.214; 24hr 6.750 11.176.

(e) Some freqs. used by AIR FORCE ONE: 6.731 6.756 8.967 9.018 11.182 13.201 13.247 (note: uses l.s.b.).



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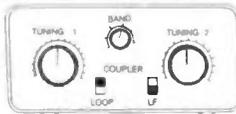
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FRG9600 Scanner 60-950MHz	£509.00
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BANDSCAN

Peter Laughton

USA-USSR

We kick off with an update to last year's story on the Reagan/Gorbachov 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

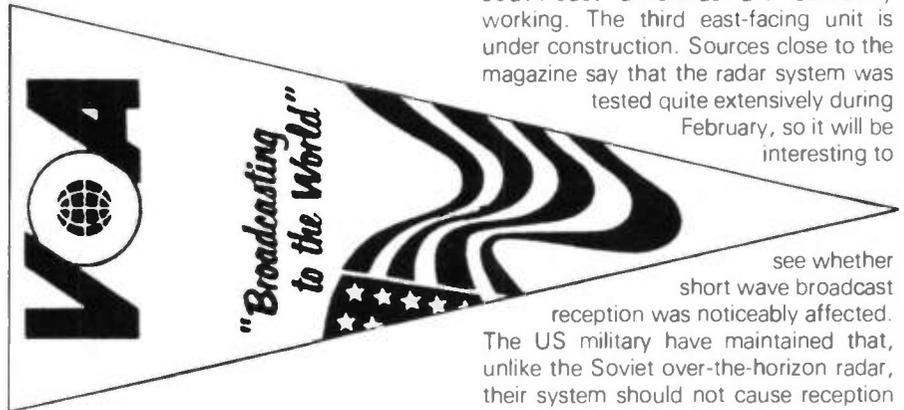
As we predicted, transmissions of the new short wave station in Utah USA did materialise, they've been playing quite a lot of Beatles records. The schedule is 1600-1900 on 15.225, 1900-2200 17.715, and 2200-0000 15.580MHz. Signals in West Europe are weak at present, though they may improve as the nights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

Radar System Testing

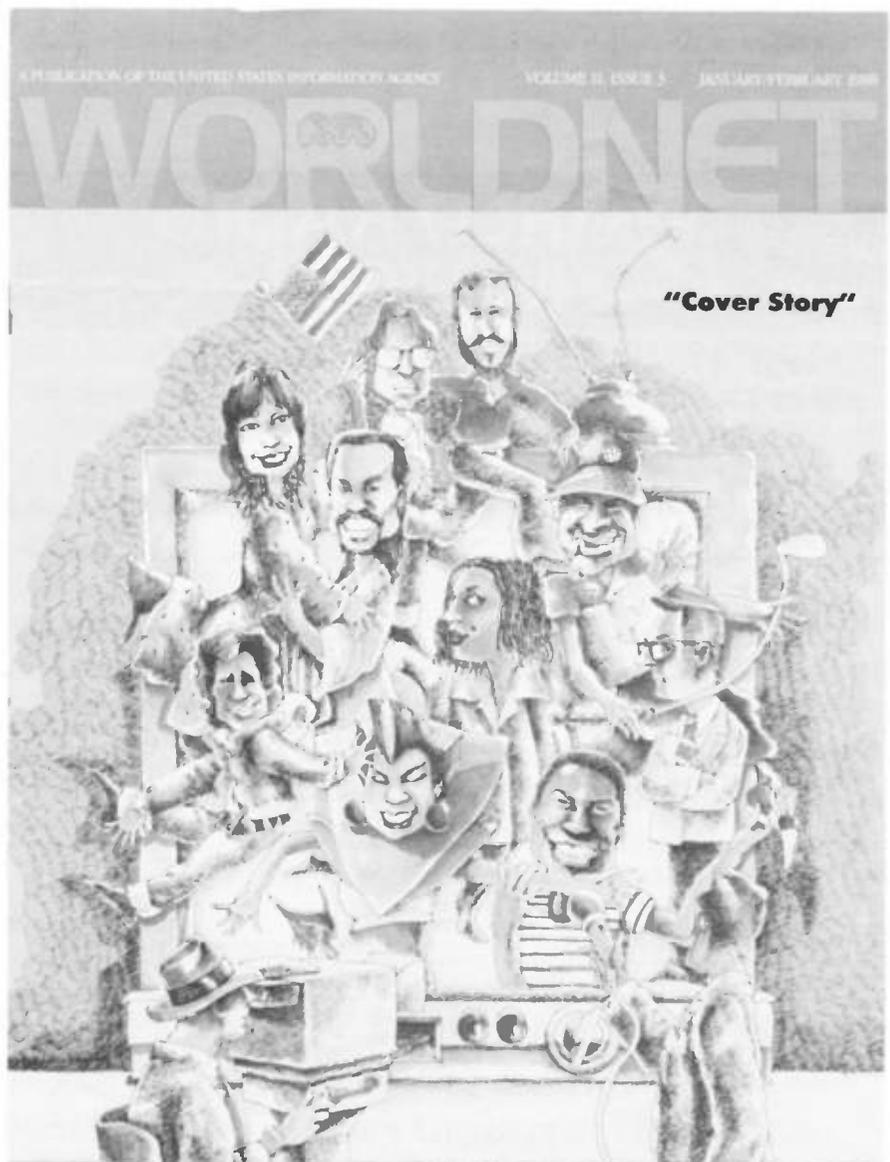
The magazine *Aviation Week and Space Technology* has reported that a section of the US over-the-horizon backscatter s.w. radar system has finally become operational. A powerful complex consisting of several 100 kilowatt short wave transmitters has been constructed at a place called Moscow, in the State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

Following a few months silence, Peter Laughton is back reporting on the world of broadcasting.

Construction of the system was started in 1982 and has been tested on an irregular basis on frequencies between 5 and 28MHz. The system is supposed to detect aircraft and missiles approaching the US by refracting signals off the ionosphere. The site in Maine is said to have a range of 3200km, although only the north-east and south-east antennas are currently working. The third east-facing unit is under construction. Sources close to the magazine say that the radar system was tested quite extensively during February, so it will be interesting to



see whether short wave broadcast reception was noticeably affected. The US military have maintained that, unlike the Soviet over-the-horizon radar, their system should not cause reception problems to other users. No-one seems quite sure what it sounds like.



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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. We rang Jack Brooks, who coordinates technical matters for FEBC. He is based in Redwood City California, and he was surprised to hear of 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 Savitri 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 5, 10 and 15MHz, 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

One expect to be on the large cable systems in Rotterdam and Amsterdam in the next few days. When they officially signed on at the end of January they had reached their goal of 700 000 households. They hope that figure will rise to 5 million homes by the end of this year.



Spain and China Swap

As from January 1, Radio Beijing in China and Spanish Foreign Radio based in Madrid started a live programme swap to improve reception. A 120 kilowatt transmitter at Xian is currently putting out a Spanish language test broadcast beamed to Japan between 1000 and 1100 UTC on 7.165MHz. That is followed by a second hour beamed to the Philippines from 1100 onwards using 11.870MHz. Radio Beijing is being relayed to listeners in North America from the Spanish transmitter site at Noblejaw. That is heard between 0500 and 0600UTC daily on 9.630MHz. That frequency was a schedule for English to west coast of North America 0500-0600 from Spanish Foreign Radio, but that has moved to the 49 metre band instead. As from July 1, Radio Beijing will use a second Spanish transmitter and antenna when construction work is completed.

Austria

Radio Austria International based in Vienna has changed its interval signal. A version of the Blue Danube waltz used to be played on trumpets. In the 1970s it changed to a guitar, now they're using a synthesiser, though it sounds to me that such music distorts terribly in slight fading in contrast to the older version. Professor Paul Lendvai, the director

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 £96.

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-1060 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

The need for high stability in the local oscillator of any superhet receiver cannot be over-emphasised — ideally its operating frequency should be unaffected by vibration, changes in temperature and power supply variations. The purity of the output waveform from the oscillator is also important because any harmonics present will enter the mixer and may cause unwanted signals at the input to the mixer to be converted to the chosen i.f. The oscillator output should also be relatively free from noise because high noise levels degrade the performance of most mixers.

In practice it is very difficult to construct a highly stable, free running, variable frequency oscillator (v.f.o.). Due to their inherent features, some v.f.o. circuits are preferable to others; however, the use of rigid mechanical construction, good screening, high quality components and a voltage regulated power supply is essential with all types of circuit if a reasonably satisfactory performance is to be achieved.

Fluctuations in temperature will cause minute physical changes to occur in the components of a v.f.o. circuit, which in turn will result in variations in the frequency of oscillation. The small currents which flow through the transistors, numerous resistors and some other components within a receiver cause heat to be generated, which will affect the stability of the v.f.o. During the first hour of operation the rise in temperature within the cabinet may be quite rapid, causing a considerable change or **drift** in frequency as the v.f.o. components warm up. Such changes are usually referred to as **short term stability**.

Subsequent temperature changes are more gradual and tend to level out after an hour or two. Much greater v.f.o. stability is then normally evident (**long term stability**). The more advanced v.f.o. designs usually incorporate some form of temperature compensation, whereby a special capacitor with a negative temperature coefficient is wired across the frequency determining network of the v.f.o. to provide an equal but opposite change in frequency.

Although strict adherence to all the foregoing points may result in good oscillator stability at relatively low frequencies, it is unlikely that high stability will be achieved when the fundamental output frequency required is greater than about 10MHz. In view of the fact that a high injection frequency from the local oscillator will be required by the mixer of a single-conversion superhet RX with a low i.f. (455kHz) when one of s.w. ranges is selected, it is easy to see why poor stability, poor tuning accuracy and drift will be a feature of simple receivers. How, then, may this be overcome?

There are a number of ways in which this problem may be approached. One popular method avoids the need for a v.f.o. operating at high fundamental

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.

frequencies altogether! The secret is to use the second of the double-conversion techniques described last month, whereby a narrow band of incoming signals is initially converted to a lower frequency narrow band first 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.

Heterodyne VFO

Another approach, which can be used in either single or double-conversion receivers which have fixed intermediate frequencies, is to employ a heterodyne v.f.o. In this system the output from a high frequency crystal controlled oscillator (fx) is pre-mixed with the output from a relatively low frequency v.f.o. (fv) which covers only a single range, e.g. 3.0-3.5MHz. The resulting output (fx + fv) is then carefully filtered to remove any unwanted mixing products and harmonics before it is injected into the receiver mixer as the local oscillator frequency (fo) — see Fig. 1. Because the tuning range of the v.f.o. is limited to 500kHz, it can be carefully designed and temperature

compensated to achieve good stability. Additional crystals will enable the RX to cover several bands 500kHz wide, but note that the same v.f.o. tuning rate will exist on every band.

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 stable 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 ($n \times fr = f1$); 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. ($n \times fr = f1$) in mixer one, to produce an output frequency ($f3 = f2 -$

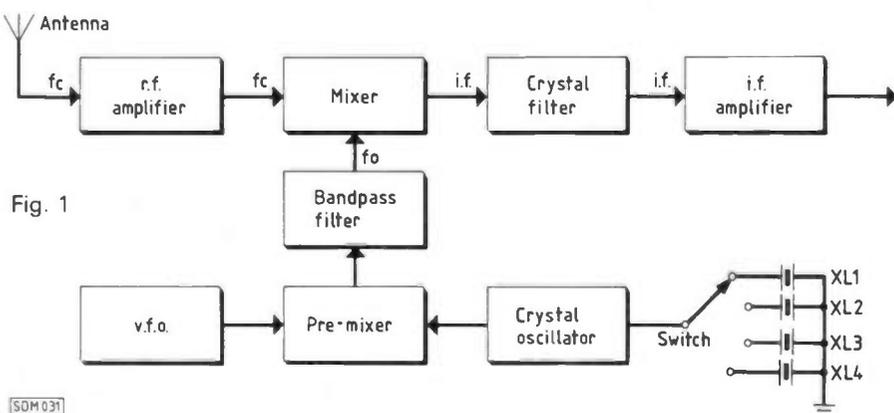


Fig. 1

SOM031

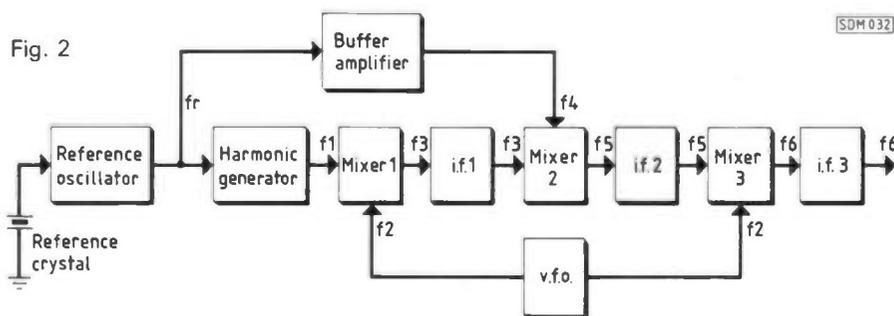


Fig. 2

SOM032

STARTING OUT

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:

$$f3 = f2 - f1$$

$$f5 = f3 - f4 = f2 - f1 - f4$$

$$f6 = f2 - f5 = f2 - (f2 - f1 - f4)$$

$$\text{therefore } f6 = f1 + f4$$

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 (fr) = 1MHz;

The output of the h.g. = $n \times fr = f1$;

The buffer amplifier output (f4) = 1MHz;

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

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

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

At the first mixer $f2 - f1 = f3$,

so $50 - f1 = 30$, therefore $f1 = 20\text{MHz}$.

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

At the 2nd mixer $f3 - f4 = f5$,

so $30 - 1 = 29\text{MHz}$, i.e. i.f.2.

At the 3rd mixer $f2 - f5 = f6$,

so the output frequency (f6) = $50 - 29 = 21\text{MHz}$.

By substituting the appropriate figures it will be seen that if the v.f.o. frequency is changed to 49MHz the 19th harmonic from the h.g. will be selected and the output frequency will be 20MHz. If the v.f.o. frequency is increased to 51MHz the output frequency will become 22MHz. Note however that if the v.f.o. drifts to, say, 51.250MHz the output frequency remains at 22MHz, thus:

At the first mixer $f2 - f1 = f3$,

so $51.250 - 21 = 30.250$.

At the 2nd mixer $f3 - f4 = f5$,

so $30.250 - 1 = 29.250$.

At the 3rd mixer $f2 - f5 = f6$,

so the output frequency = $51.250 - 29.250 = 22\text{MHz}$.

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 1MHz reference they may be in steps of 100kHz or 10kHz, etc.

The general principles of the Wadley Loop have been used in a number of well-known receivers including the Racal 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.

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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 Arktichesky 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 Shparo, 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 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 Nordski Comm as it's being termed. This mission is a truly international project. In order to determine where they 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 UOSAT OSCAR-11. If you tune a v.h.f. receiver to 145.825MHz 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 Digitalker 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. Ensign

AMSAT Science Education Advisor

421 N. Military

Dearborn, MI 48124 USA

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 980kHz. 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 been 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 1965.

SEEN & HEARD

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Justin Cooper

PO Box 4, Newtown SY16 1ZZ

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.
7. 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 CQ 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 contesters 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

All-Time Post War HPX Ladder

Name	Phone Only	Prefixes
B. Hughes (Harvington)		3363
E. M. Gauci (Malta)		3298
E. W. Robinson (Felixstowe)		2683
M. Ribton (Gillingham)		2103
M. Rodgers (Bolton)		1827
R. Shilvock (Halesowen)		1680
N. Henbrey (Northiam)		1615
B. Patchett (Sheffield)		1307
C. R. Eve (Jersey)		1165
A. Woodcock (Denmark)		1027
B. E. Woodcock (Leeds 17)		1020
A. P. Lincoln (Aldershot)		898
R. G. Williams (Borehamwood)		874
S. Burgess (Stockport)		776
L. Marcquardt (Hereford)		634
D. R. Tanswell (Iver)		621
P. McAllen (Southampton)		528
R. Gawan (Preston)		510
CW Only		
H. Scott (Rievaulx)		1396
N. Melville (Edmonton)		1241
P. J. Barnes (Blackpool)		548
M. Rodgers (Bolton)		347
C. R. Eve (Jersey, C.I.)		342
RTTY Only		
W. J. Prior (Lochcarron)		552
A. P. Lincoln (Aldershot)		551
C. R. Eve (Jersey, C.I.)		500
N. Henbrey (Northiam)		334
D. R. Tanswell (Iver)		301
M. Rodgers (Harwood)		270

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

Annual HPX Ladder Starting date January 1, 1987

Name	Prefixes
J. J. Sales (Lancaster)	450
A. Hall (Lockington)	406
N. K. Yule (Bengeo)	394
C. R. Eve (Jersey)	361
S. Hill (Port Talbot)	339
D. McGlone (Limerick)	302
S. Myers (Liverpool 9)	275
D. Gilbert (Farnham)	223

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

Most in 1987

E. M. Gauci (Malta)	1049
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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 Ws 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 path to VK/ZL. 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 (Felixstowe) agrees with D. A. Whitaker's comments in January about a clean 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 IQ9YXO Sicilian and CH9ASJ New Brunswick 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, VK9LM, VKOHI and VK9NS amongst the 130 offered for the Ladder.

D. McGlone (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) who 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 D. Gilbert (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

P. McAllen writes from Belfast, where he thanks the Maritime Mobile Net for many of his new prefixes to take him to 500-plus. On a different tack, Peter says he finds the 144MHz band much more civilised over there than it is in the south of England. He would find it so in Wales, too, or probably anywhere where the old standards of behaviour exist and activity isn't so high.

R. Shilcock (Halesowen) is the first one to have a G7 in his list and one of the first to offer SORASD. The latter, I hear, has passed the first stage in the validation process, so I can reasonably hope it will soon be a valid country; it certainly is a valid prefix.

Problem!

This one is from P. Townsend (London E17) who has a Lowe SRX-30 receiver. Philip finds he doesn't get much on Top Band save for BC stations and the occasional very weak amateurs around mid-band. First I have to say I have never crossed swords with the Lowe receiver, so I could be well adrift in my comments. However, I think the BC stations are simply images of Radio London and Capital Radio. Thus you need to get rid of the carriers.

Probably a wave-trap would serve. This comprises either a series resonant circuit tuned to the offending BC station carrier frequency and connected between antenna and earth terminal of the receiver; or alternatively a parallel resonant circuit tuned similarly and connected in the antenna line. In either case, tune to the offending

m.w. station, fit the trap and tune the trap to remove or greatly reduce the offender. Such a trap could be made easily enough with a medium wave antenna coil and one gang of a two-gang variable capacitor, or even by winding up a coil on a home-brew former, mounting all into a tin box of some sort.

It should be located as near to the receiver antenna/earth terminals as possible by the shortest possible leads. This reduces stray pick-up by the lead from trap to antenna terminal; a more general arrangement would be a suitably designed high-pass filter in the antenna lead.

Secondly, Top Band activity tends to be mainly c.w. and mainly later in the evenings or early in the mornings. This is a complete change from the days twenty years or so ago, when most local nattering was done on Top Band because of TVI. Improving reception on this band is very largely a function of what you can contrive to improve the earth connection. G3BDQ, for instance has several thousand square feet of earth mat. Other big signals have miles of wire down in the ground to give the antenna part of the system a chance to generate a decent "image" half of itself down below. Also, some sort of antenna tuner will help.

Nice to hear again from A. P. Lincoln (Aldershot). Peter has

suffered various problems arising from the gales last October. First, the mast for the domestic TV antenna on the chimney was bent by the gale, thus the rotator for the shack ATV array couldn't operate, because it was fouling the bent mast. Were that not enough, the rotator then decided to seize up and no amount of juggling from down below would cure it. So, a new rotator was bought, and so after it was up in the air it was found to have a fault on it, so down it had to come again for repairs. At last it is back up again and I hope operating reliably and correctly. I know the feeling only too well, at this very moment my workshop vice is supporting a misbehaving rotator whose control unit seems equally determined to point in a different direction from the one the head unit looks.

On a totally different tack, Peter has been looking at SSTV with a Spectrum computer and print-out since the price of Polaroid film went up. The difficulty is that he isn't happy with the result he has been getting back from the process houses. Maybe a talk to a local photographic shop or even the local photographic club would be able to shed some light on the problems. Another question that might arise is that if the 35mm camera is not a single-lens reflex, parallax may be causing the image photographed to be what is

printed, for which you can hardly blame the photofinisher!

Now to T. Woodcock (Denmark) who is chuffed to report that he has passed the written exam for his licence and is now studying hard for the Morse. I hope that when Tony has the Morse "in the bag" that he will come on the c.w. end of the band and use the mode. It can be much more fun than s.s.b. once you get the hang of it and stop worrying about the odd missed letter or word. Odd isn't it, that the test, by definition almost causes us to be obsessed with the worry of the occasional lost letter or word, while a blast of QRM that takes away much more information on phone is hardly noticed!

Final letter this time is a first entry from R. Gawan (Preston). Ron started listening back in 1973 with a BC receiver and then thanks to RAIBC was kitted with an HRO. Progress from there was to an FR50B and now to a Trio R1000. Ron nowadays uses this with an a.t.u., to which are connected 21/28MHz dipoles in inverted-V form on a common feeder, plus a random length end-fed for the 3.5/7/14MHz bands — all this wire being within doors. As for the score, some 508 are claimed and entered in the ladder. Welcome to the gang, Ron.

Deadline Address

May I remind you first of the deadlines for your letters and scores, which are shown in the box for the next few issues. Please DO NOT mail to the Poole address, as that will merely inject a further postal delay in the system. For the rest, good luck and good DX.

Deadlines are April 19,
May 17 and June 21

DECODE

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

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 AMTOR and SITOR actually sound the same as they are technically very similar. The most appropriate description of AMTOR/SITOR is a repetitive chirp-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 Norman uses a Matsui MR-4099 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 results at around 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 7.52MHz 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 Bankok Meteo which transmits meteorological

information using 50 baud RTTY. The station frequency, callsign and power is shown here: 17.520MHz HSW61 with 20kW. 10.298MHz HSW62 with 5kW. 10.169MHz HSW63 with 5kW. 7.395MHz HSW64 with 5kW.

Another useful station is the Czechoslovak News Agency CTK 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 15.8975MHz
1630-1745 17.525MHz and 9.353MHz

1800-1900 13.5975MHz and 5.917MHz

1930-2030 9.353MHz

This schedule applies for Monday to Friday. The Saturday transmissions are similar but with some changes after 1800UTC. Sunday transmissions are totally different with transmission starting at 1600UTC.

Jan has also supplied a schedule for the Islamic Republic News Agency IRNA which broadcasts news reports using 50 baud RTTY. The schedule for English transmissions is as follows:

1000-1100 18.56MHz, 19.2MHz and 19.98MHz

1100-1230 19.2MHz

1500-1730 7.96MHz, 7.8MHz and 19.8MHz

1900-2030 7.4MHz, 7.96MHz and 8.05MHz

2030-2200 8.05MHz and 7.96MHz

All stations are rated at 20kW with the exception of 7.4MHz, 18.56MHz and 19.8MHz which use 10kW.

Whilst featuring Press stations the Polish Press Agency, Polska Agencja Prasowa (PAP) are using the following frequencies after 1700UTC:

5.903MHz SOF290

6.805MHz SOG280

7.845MHz SOH284

8.1925MHz SOL219

FAX

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 ZKLF. 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 5.8066MHz, 9.458.6MHz, 13.5501MHz and 16.3397MHz.

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 120 r.p.m. The only breaks in FAX transmission occur during the following times when Morse is transmitted: 0145-0200, 0500-0545, 0845-0945, 1400-1415, 1800-1830 and 2045-2145UTC. For those of you who would like a full schedule these are broadcast at 0445 and 1645UTC.

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.

134.2kHz DCF54 Offenbach
6.79MHz YMA22 Ankara Meteo
8.1466MHz IMB55 Rome Meteo
10.536MHz CFH Halifax
10.555MHz AX134 Darwin
10.966MHz NPO USN Subic Bay
12.759MHz NGR USN Kato Soli
12.777MHz NDT USN Yokosuka
12.829MHz 3SD Beijing
13.920MHz AXM35 Canberra
17.585MHz AOK USN Rota
18.712MHz Moscow

RTTY Frequency List

The usual format has been used, i.e. frequency/mode/speed/shift/callsign. The frequencies in bold type are new ones that are not shown in most published frequency lists.

2.716MHz SITOR A
3.318MHz RTTY 50/R
3.79MHz SITOR A
4.56MHz RTTY 50/ YMH5 Turkey Meteo
4.605MHz SITOR A
5.335MHz RTTY 50/ RDM78 Tbilisi Meteo
5.457MHz RTTY 50/
5.6566MHz SITOR A
5.702MHz RTTY 50/N
5.915MHz RTTY 50/850 Y2V53 News
6.736MHz RTTY 50/ ETD3 Addis Ababa Air

6.830MHz RTTY Petra Amman

7.520MHz RTTY 50/425N

BZP57 Xinhua

7.723MHz SITOR A

7.887MHz RTTY 50/425N

BZS27 Xinhua

7.9723MHz RTTY 50/N

8.047MHz RTTY 50/850 Rome News

8.068MHz RTTY 50/850 Y2V7A

Berlin News

8.146MHz RTTY 50/N

8.21MHz RTTY 50/N

10.298MHz RTTY 50/ HSW62

Bankok Meteo

10.815MHz RTTY 50/425 Rome News

14.0MHz RTTY 50/850 FUN

French News

18.3635MHz RTTY 50/9PL

Kinshasa

19.98MHz RTTY 50/ EPJ2 IRNA

News

NAVTEX and the FAX-1

I have just received some hot news from ICS Electronics concerning this popular FAX decoder. Regular readers will probably recall that I recently mentioned the availability of a RTTY enhancement, well, the latest enhancement also enables NAVTEX to be decoded. The NAVTEX implementation allows the operator to select the required message category and station whereupon the FAX-1 automatically prints the selected messages, provided of course that the receiver is tuned to 518kHz. All new versions of the FAX-1 will include this enhancement as standard.

As a further development a new version of the FAX-1 will be launched in April which will include a 518kHz receiver and will feature completely automatic NAVTEX reception even whilst receiving weather charts! This new version will be called the FAX-1N and will cost £399.95 including VAT.

RSGB Data Convention

This year is the RSGB's 75th Anniversary and as part of the celebrations a Data Convention is being organised. This Convention represents a unique opportunity for data enthusiasts from all amateur fields to get together and exchange ideas. The venue is to be The Harrow School, Harrow-on-the-Hill, Harrow, Middlesex on the weekend of the 22/23 July 1988. In addition to lectures and presentations there will be time for informal chats and also a comprehensive bookstall. I will publish details of cost and booking arrangements as soon as I receive them.

Admiralty List of Radio Signals

The final letter this month comes from Mr T. F. Bernascone who is associated with the School of Information Engineering at Teeside Polytechnic in Middlesbrough. Mr Bernascone points out that an excellent source of frequency allocations is the *Admiralty List of Radio Signals*. This publication actually comprises seven volumes covering the following topics:

- Vol. 1 Coast Radio Stations.
- Vol. 2 Radio Beacons.
- Vol. 3 Radio Weather Services.
- Vol. 3A Weather Reporting and Forecast Areas.
- Vol. 4 Meteorological Observation Stations.
- Vol. 5 Time Signals and Navigational Systems.
- Vol. 6 Port Operations and Information Services.

Probably the most useful is *Volume 3* as it gives a complete list of all weather stations including power output and schedules. These publications can be obtained either from HMSO, stationers or some marine chandlers at a cost of about £11 each.

Finally please keep those reports coming either to the address at the head of the column or to my Prestel mailbox 425470071.

Reports for June '88 issue
by April 19 please

INFO IN ORBIT

Pat Gowen G3IOR

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

Circuit Advances

Considerable improvements in v.h.f. receiver signal to noise ratios have been made over the past twenty years, with fully resolvable outputs now resulting from low signal strength levels that would have proved impossible to effect in the earlier days. Early valves, used as r.f. amplifiers and mixers, whilst

capable of excellent gain, contributed significant thermionic noise, and regardless of the amplification of a weak incoming signal, the signal in the noise could not be improved, as the ratio not only remained, but was added to by the noise of the amplifying device itself.

Nuvistors were a big breakthrough, and transistors an

even bigger one, reducing noise to far lower levels. Recent advances have been brought about mainly the use of GaAsf.e.t.s which, especially if used as an r.f. pre-amplifier at the antenna at u.h.f., can supply gains of up to 25dB with noise figures of less than 1dB. Even better results have been claimed with the new NEC m.e.s.f.e.t.s., which can be

purchased for as little as £10 UK. With the high sky noise present at 137MHz being far greater than that contributed by that from the typical GaAsf.e.t. or m.e.s.f.e.t., the advantages of these specialised devices cannot always be justified, but strategic improvements can also be made by simple modifications to existing equipment.

SEEN & HEARD

As promised in our February column, from our regular reader and satellite enthusiast Gordon Train of Keswich now comes the details of the improvements that he has made to his Cirkuit weathersat receiver, as developed by R. Lyder on 20 December 1987, which he recommends to users of this popular system. Many of these Cirkuit kits are in use world wide, by many weathersat 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. Data available from the Nippon Electric Company for the 3SK88 device states that at this level the amplifier provides a stage gain of less than 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 15dB, and lowers the noise figure to under 4dB, immediately improving sensitivity as borne out by the experimental data. If a 12 volt supply voltage is used, the Gate 2 voltage can be increased to 5.4 volts by merely changing both R2 and R7 from the existing to a new value of 39kohms, 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 damping 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 decoupling 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 masthead pre-amplifier, and whilst it may be that the sensitivity was limited in the interests of stability and lower cross modulation, experience has shown that these changes can be made to the original design with safety".

He proves the point that he makes by sending in two excellent examples of some 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.

Weathersat Info

Those enthusiasts with a 300 or 1200 bauds modem and a telephone now have an updated weather satellite information service available by dialling the N5ITU bulletin board system on 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 sixty plus satellites being tracked, giving tracking, programs, passes, crossings, telemetry decoding, frequencies, etc.

New NOAA

NOAA-H, postponed from the intended 5 November launch (very apt for rockets!) (or dare I even say "APT"?), is now planned to fly in mid-April, to become NOAA-11. It will take some time before commissioning into active service, so we can still 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 wide band f.m. visible 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 USSR space programme races ahead, now also including a new "shuttle" type of orbiter, the USA is still stuck with the vestiges 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 Leetsma. 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 WA4SIR 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 W5LFL/WOORE type amateur shuttle mission.

Meanwhile, the USSR amateurs have an amateur transceiver ready to go for MIR, but no amateur radio licensee 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 COSPAS/SARSA navigational information by its 145.825MHz digitaletalker as it performs its polar pass. The trip, commencing from Cape Articheskoy on the Severnaya Zemlya islands in early March, will take some 90 to 100 days for the 1730km trip, to reach Cape Columbia on Ellesmere Island in Northern Canada. In addition to the UK3KP built expedition equipment, Icom are providing hand-held 145MHz band transceivers for the skiers and N7ZL is donating the packet radio requirements.

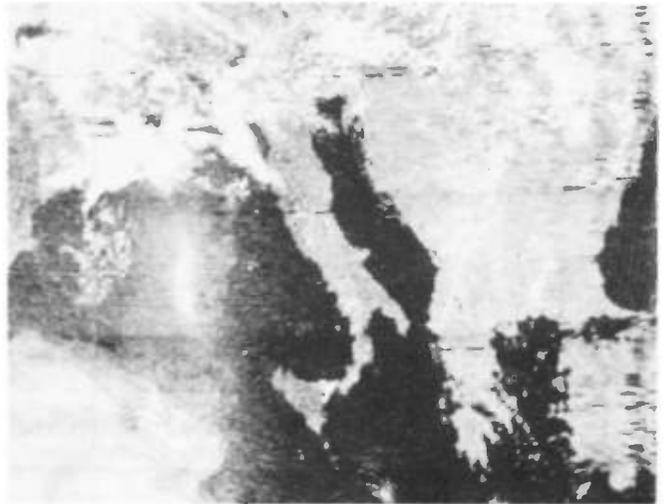
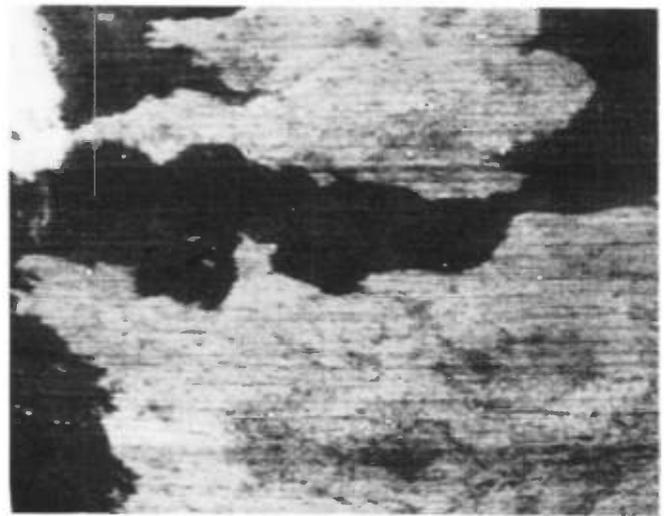


Fig. 1

Fig. 2



SEEN & HEARD

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 N81WJ, of 421 North Military, Dearbourn, 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 call signs, expected to be EKO 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.

The latest UoSAT information is available by calling the University of Surrey information line on (0483) 61707 for UoSAT-1 alias OSCAR-9, and/or (0483) for UoSAT-2 alias OSCAR-11 updates, the previously mentioned bulletin board, or by following the various AMSAT nets.

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

Wallio WORPK, AMSAT's communications manager, with broadcasts starting from some one hour before lift off until deployment, with direct lines from the launch site. 14.282MHz should be open direct to the states, ARRL frequencies will be used, and a line to the University of Surrey will result in AMSAT-UK's coverage on 3.780MHz. 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.

During a tropospheric-opening, signals may well be heard in the UK from a number of stations between 87 and 104MHz. 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, Süddeutscher 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 TVR5D 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

BAND II DX

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



pressure in millibars 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 193ft 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 with 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 994mb at almost 200ft.

Reports

Around 1400 on January 31, amid a lot of aircraft flutter, Simon Hamer heard programmes from Belgium (BRT-2) on 98.6 and 100.1MHz; France (Musique, Culture and Inter) on 88.7, 98.3 and 99.6MHz respectively and Holland (NOS-2) on 88MHz. He also logged BBC Radio 4 from the Channel Islands on January 31.

The barometer was far from steady between January 16 and February 15 and only above 30.0in (1015mb) 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 29.6in (1002mb) at 2300 on February 11 to 30.1in (1019mb) 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 88.7MHz and 97.9MHz.

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 one of the late November openings he listened to BBC Radio 1, "in stereo without a rustle" on 104.8MHz.

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 TVDXing were amazing and, for the first time in eight years, I logged Divis (N. Ireland) on Ch. 24 at 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.

Test-cards to watch for are Iceland (RUV Island) Fig. 1, on

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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, Ian 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 (RTE-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 then 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-

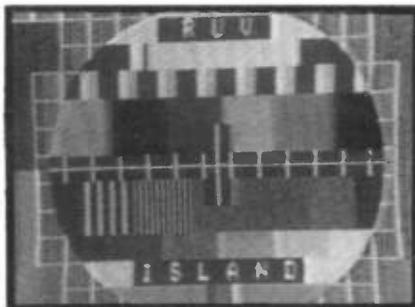


Fig. 1: Iceland

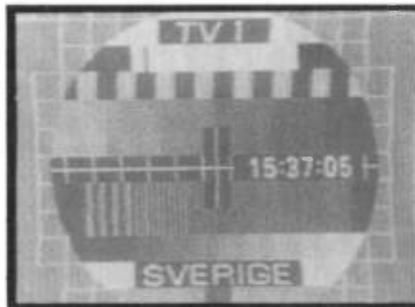


Fig. 2: Sweden

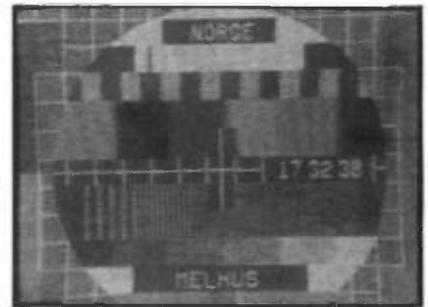


Fig. 3: Norway



Fig. 4: Yugoslavia



Fig. 5: USSR



Fig. 6: Sweden

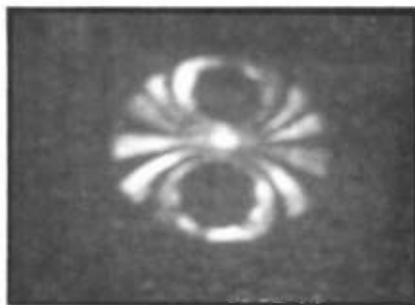


Fig. 7: Iceland



Fig. 8: Sweden



Fig. 9: Russia

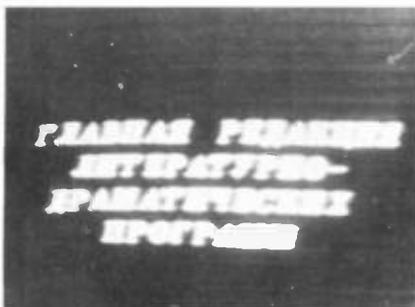


Fig. 10: Russia



Fig. 11: Poland



Fig. 12: Spain

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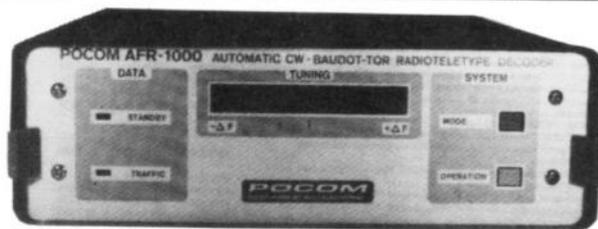
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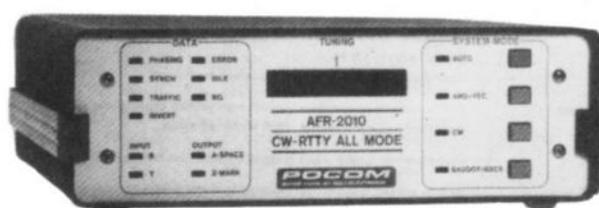
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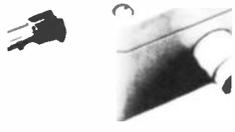
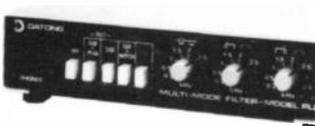
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SEEN & HEARD

800G receivers via a Labgear CM7066 mast head amplifier.

With fluctuating atmospheric pressure during the month prior to February 10, various signal paths opened in Band III for relatively short periods as the Mancinis found when they logged test-cards, from Belgium (RTBF-1) on January 12, 14 and 19; programmes from France (Canal +) on 19 of the days and test-cards from Ireland (RTE-1 and 2) on January 12, 13, 19, 30, February 4

and 10. They also found "lots of pics, possibly from the USSR" around Chs. R6, 7 and 10, during the opening on January 16.

While operating portable from a site on the Black Mixen around midday on February 14, Simon Hamer, using a small screen

Hitachi, logged pictures from Belgium and France on Band III and France and Holland on the u.h.f. band.

SSTV

Slow scan television pictures were received on 14MHz from

stations in Cyprus and Portugal last December by Ray Gilchrist (Millom).

"I found SSTV on 14MHz quite active recently, although it is still the West Germans and Italians that dominate the mode," wrote Peter Lincoln on January 15. During the month prior to the 15th, Peter also copied pictures from stations in Austria, Czechoslovakia, Greece, Poland, Sweden, Switzerland and Yugoslavia.

Reports for June '88 issue
by April 19 please

LONG MEDIUM & SHORT

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

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 March 27, so it's very important that all 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: l.w. and m.w. frequencies in kHz, s.w. in MHz: Time UTC).

Long Wave DX

The second part of the new l.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 l.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 l.w. chart this month details some of the new frequencies now in use, they were confirmed by the logs from DXers, but so far there have been no reports 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 press, Radio Monte-Carlo (Monaco) has yet to comply with the plan. Their 1400kW Roumoules 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 whistles at 216 and 234. He says that apart from the BBC transmission on 198 which rates as SIO 555, l.w. reception is quite poor in his area. It seems that l.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 Sangean ATS-803 receiver, which he says is practically the same as the Saisho SW-5000.

Bill Eyre has been putting his new Trio R5000 receiver to good use in Stockport on the l.w. band, see chart. He 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 is to switch to lower sideband (l.s.b.) when receiving Oslo on 216 and to upper sideband (u.s.b.) when listening to Roumoules 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 l.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 "nulled-out".

A 55-turn 0.25m by 0.25m loop was used ahead of an l.f. converter and a Trio R600 receiver by David Edwardson in Wallsend to compile much of his log for the chart. Ron Pearce has been putting the directional properties of his new Steeplestone MBR7 receiver to good use on the l.w. band in Bungay. Darran Taplin of Tunbridge Wells also has a MBR7 receiver, however he finds his trusty Vega 206 portable very good on the l.w. band, so he used it to prepare his list for the chart.

Writing from Newcastle-upon-Tyne, Paul Hawkyard says he encountered the problem of station identification when checking the band with his Sony

7600DS portable, consequently his full log contained a number of unidentified station entries. Relatively few station announcements are given by the l.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 l.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 Radnor, Simon Hamer says he found the best DX became audible well after

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

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

DXers:

- | | |
|---|-------------------------------------|
| (A) Colin Diffell, Corsham. | (I) Ron Pearce, Bungay. |
| (B) David Edwardson, Wallsend | (J) Philip Rambaut, Macclesfield. |
| (C) Bill Eyre, Stockport. | (K) Tim Shirley, Bristol. |
| (D) G. Glen-Davison, Newcastle-on-Tyne. | (L) Darran Taplin, Tunbridge Wells. |
| (E) Colin Godwin, Malvern. | (M) Robert Taylor, Edinburgh. |
| (F) Simon Hamer, New Radnor. | (N) Phil Townsend, London. |
| (G) P. Hawkyard, Newcastle-on-Tyne. | (O) N. Wheatley, Newcastle-on-Tyne. |
| (H) D. Masterson, Stoke-on-Trent. | (P) Julian Wood, Buckie. |

SEEN & HEARD

midnight, so he had to restrict his listening mainly to the weekends. The stations noted in his 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 Willett** searched the band for DX during several nights between 0100 and 0420. Among the stations he logged was XEKOK 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 on 1150 at 0400, it referred to Grimsby, Ontario which is some 43km from Hamilton and also mentioned Grimsby, UK! No doubt they will be very surprised 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 growing list of transatlantic DX at 0500. During the month Tim logged several stations which have not been mentioned before in this series, namely ZIZ Basseterre, St. Kitts 555 at 0330; Kingston, St. Vincent 705 at 0130; WYDE Birmingham, AL 850 at 0630 and WCFL Chicago, IL 1000 at 0436, all are subject to confirmation by QSL. Tim also mentioned hearing WOAY 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 of KDKA in Pittsburgh, PA.

David Edwardson was less fortunate this month, he only managed to log VOCM and CJYQ 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 by the time they 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 Wavre (Belgium) 540; Bayreuth (W. Germany) 549; RTE-1 Tullamore (S. Ireland) 567; Flevoland (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 us as well during daylight. Using a Racal RA 17 receiver with a 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; Mainflingen 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 Newcastle-upon-Tyne at SINPO 55555. In nearby Wallsend, **David Edwardson** rated the signal from Pori (Finland) 963 as 35433 at 0755. Reporting from Forfar, **Stewart Russell** says the signal from Solvesborg (Sweden) 1179 is excellent throughout the afternoon. He now uses a "Sooper Loop" ahead of his new Technics SA-X800L hi-fi system. It is interesting to note that Stewart also received good ground wave signals from AFN Frankfurt (W. Germany) 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 the signals from two of their transmitters in Bournemouth, Radio 1 on 1485 (2kW) and Radio 3 on 1197 (0.5kW). Around 1400, **Stewart Russell** logged the BBC Scotland Dumfries relay on 585 (2kW) and their Redmoss, Aberdeen relay on 1449 (2kW). Turning his loop towards Newcastle-upon-Tyne, 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 Dumfries 585 and Newcastle 603, he rated both signals as SIO 444 at 1500.

Of course the majority of m.w. DXers rely on the sky wave paths at night to enable them to hear the 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) 585 rated as SINPO 44444 at 2002; Ljubljana (Yugoslavia) 918 54444 at 0024 and Radio Tirana (Albania) 1395 55555 at 1900, their 1000kW 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 Tirna. Lisbon (Portugal) 666 and four stations in Spain — Sevilla, 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 after dark, Burg (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; Neuminster (W. Germany) 1269 and Saarbrucken (W. Germany) 1422.

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 (UTC)	DXer
USA				
660	WNBC	New York, NY	0215	E
850	WHDH	Boston, MA	0200	B
850	WYDE	Birmingham, AL	0630	D
860	WOAY	Oak Hill, WV	2130	D
880	WCBS	New York, NY	0230	E
990	WZZD	Philadelphia, PA	0130	D
1000	WCFL	Chicago, IL	0436	D
1010	WFGW	Black Mountain, NC	0100	D
1010	WINS	New York, NY	0120	B,D,E
1030	WBZ	Boston, MA	0200	B,E
1050	WFAN	New York, NY	0220	B,E
1090	WBAL	Baltimore, MD	0245	B,E
1130	WNEW	New York, NY	0200	B
1210	WCAU	Philadelphia, PA	0200	B
1260	WWDC	Washington, DC	0145	E
1470	WLAM	Lewiston, MA	0200	B
1500	WTOP	Washington, DC	0200	B
1510	WSSH	Boston, MA	0200	B
CANADA				
580	CJFX	Antigonish, NS	0420	E
590	VOCM	St. John's, NF	0200	A,B,E
600	CBNA	St. Anthony, NF	0200	B
610	CKYQ	Grand Bank, NF	0100	B,E
620	CKCM	Grand Falls, NF	0200	B
670	CHYQ	Musgravetown, NF	0200	B
710	CKVO	Clarenceville, NF	0200	B
750	CBGY	Bonavista Bay, NF	0200	B
920	CJCH	Halifax, NS	0200	B,E
930	CFBC	St. John, NB	0200	B
930	CJYQ	St. John's, NF	0005	A,B,E
940	CBM	Montreal	0200	B
950	CHER	Sydney, NS	0210	E
1150	CKOC	Hamilton, ON	0400	E
1220	CKCW	Moncton, NB	0135	E
1570	CKLM	Lavel, PQ	0200	B
C. AMERICA & CARIBBEAN				
555	ZIZ	Bisseterre, St. Kitts	0330	D
705	Kingston	St. Vincent	0130	D
750	XEKOK	Las Cruces, Mexico	0200	E
770	R. Jamaica	Spur Tree, Jamaica	0500	D
1470	XEBBC	Tijuana, Mexico	0300	E
1570	Atlantic Beacon	Turks & Caicos IIs	0035	B,C,E
1580	VOA	Antigua	0200	B
1610	Caribbean Beacon	Anguilla	0200	C,B,E
SOUTH AMERICA				
750	R. Vision	Caracas, Venezuela	0230	E
980	R. Nacional	Brazil	0300	E
1100	R. Globo	Sao Paulo, Brazil	0215	B,E
1220	R. Globo	Rio, Brazil	0035	A,B

DXers:

(A) David Edwardson, Wallsend.
(B) Simon Hamer, New Radnor.

(C) Howard Newell, Great Missenden.
(D) Tim Shirley, Bristol.
(E) Jim Willett, Grimsby.

SEEN & HEARD

George Millmore 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 Racal RA17 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 Racal 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 G5RV antenna connected to the set via a home-made a.t.u. 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 with

it on the tropical 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 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 reception 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 54544 at 1120.

Arabic is the main language used by UAE 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 55554 rating noted by Neil Dove in Lockerbie during a bulletin of World news and a Mail Bag programme in English at 1338.

During the day, a number of broadcasts in several languages

Freq kHz	Station	ILR BBC	Power in kW	DXer
585	R. Solway	B	2.00	C,I,L,M,N
603	Invicta Sound	I	0.10	C,G,H,J,K,N
630	R. Bedfordshire	B	0.30	C,E,G,J,K,N
630	R. Cornwall	B	2.00	J*
657	R. Clwyd	B	2.00	A,C,N
666	DevonAir R.	I	0.34	G,H,J
666	R. York	B	0.50	A,C,D,F,J,M,N
729	BBC Essex	B	0.10	C,H,K
756	R. Cumbria	B	1.00	C,D,I,J,N
756	R. Shropshire	B	1.00	C
765	BBC Essex	B	0.50	C,E,G,H,K
774	R. Kent	B	0.70	E,G,H,K
774	R. Leeds	B	1.00	C,F,M,N
774	Severn Sound	I	0.14	C
792	Chiltern R.	I	0.27	E,G,K,N
801	R. Devon	B	2.00	C,G,H
828	2CR	I	0.27	G,H
828	R. WM	B	0.20	C
828	R. Aire	I	0.12	A,J*
828	Chiltern R.	I	0.20	E,K
837	R. Cumbria	B	1.00	D,I,N
837	R. Furness	B	1.00	C,I,N
837	R. Leicester	B	1.00	E,G,H,K,N
855	R. Devon	B	1.00	G,H,J
855	R. Norfolk	B	1.00	E,F,H,I,K,N
855	R. Lancashire	B	1.00	C
873	R. Norfolk	B	0.25	E,G,H,K,N
936	GWR	I	0.18	B*,C,G,H,N
945	R. Trent	I	?	H,N
954	Devonair	I	0.32	G,H
954	R. Wyvern	I	0.16	C,J,N
990	R. Aberdeen	B	1.00	F,I,M
990	Beacon R.	I	0.09	C
990	Hallam R.	I	0.25	N
999	Red Rose R.	I	0.80	A,C,N
999	R. Solent	B	1.00	E,G,H,K
1026	R. Cambridgeshire	B	0.50	E,K,N
1026	Downtown R.	I	1.70	I,J,N
1026	R. Jersey	B	1.00	G,H
1035	R. Kent	B	1.00	E,G
1035	NorthSound R.	I	0.78	I,L*,N
1035	R. Sheffield	B	1.00	C
1107	Moray Firth R.	I	1.50	I,N
1107	R. Northampton	B	0.50	E,G,H
1116	R. Derby	B	0.50	C
1116	R. Guernsey	B	0.50	G
1152	R. Broadland	I	0.83	N
1152	R. Clyde	I	3.60	I

Freq kHz	Station	ILR BBC	Power in kW	DXer
1152	LBC	I	23.50	G,J*,K,N
1152	Metro R.	I	1.80	N
1152	Piccadilly R.	I	1.50	C
1161	R. Sussex	B	1.00	G,J,K
1161	R. Tay	I	0.70	L*,N
1161	Viking R.	I	0.35	C
1170	R. Owell	I	0.28	K,N
1170	Signal Radio	I	0.20	C
1170	R. Tees	I	0.32	M
1170	Ocean Sound	I	0.12	G
1242	Invicta Sound	I	0.32	E,G
1251	Saxon R.	I	0.76	C,H,K,N
1260	GWR	I	1.60	G,H
1260	Marcher Sound	I	0.64	C
1260	R. York	B	0.50	M
1278	Pennine R.	I	0.43	B*,G,H
1305	R. Hallam	I	0.15	B*
1305	Red Dragon R.	I	0.20	H
1323	R. Bristol	B	1.00	C
1323	Southern Sound	I	0.50	E,G,K
1359	Essex R.	I	0.28	K,N
1359	Mercia Sound	I	0.27	C
1359	R. Solent	B	0.25	G
1368	R. Sussex	B	0.50	E,G,J,K
1431	Essex R.	I	0.35	H
1431	Radio 210	I	0.14	E,G,H
1458	R. Devon	B	1.00	G
1458	R. London	B	50.00	G,K
1458	R. Manchester	B	5.00	C,J
1476	County Sound	I	0.50	E,G,K
1485	R. Sussex	B	1.00	E,G,K
1503	R. Stoke-on-Trent	B	0.50	B*,C
1521	R. Mercury	I	0.64	E,G,K
1530	R. Essex	B	0.10	H,K
1530	Pennine R.	I	0.74	C
1530	R. Wyvern	I	0.52	D*,G
1548	Capital R.	I	97.50	G,K
1548	R. Cleveland	B	1.00	D*
1548	R. Forth	I	2.20	D*,J
1557	Hereward R.	I	?	K*
1557	R. Lancashire	B	0.25	C,N
1557	Northants 96	I	0.76	D*
1557	Ocean Sound	I	0.50	E,G
1584	R. Nottingham	B	1.00	C
1584	R. Shropshire	B	0.30	N
1584	R. Tay	I	0.21	I
1602	R. Kent	B	0.25	C,E,G,J,N

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.
(C) David Glover, Newton-le-Willows.

(D) Paul Hawkyard, Newcastle-upon-Tyne.
(E) Sheila Hughes, Morden.
(F) David Middlemiss, Eyemouth.

(G) G. Millmore, Wootton, IoW.
(H) John Nash, Brighton.
(I) Stewart Russell, Forfar.
(J) Tim Shirley, Bristol.

(K) Darran Taplin, Tunbridge Wells.
(L) Robert Taylor, Edinburgh.
(M) N. Wheatley, Newcastle-on-Tyne.
(N) Jim Willett, Grimsby.

are directed towards eastern, central and south eastern 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 1600-1755). 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 Rampisham, 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; Russian and Georgian 1400-1525.

Radio Japan beams its programmes in English and Japanese to Europe via a relay in Moyabi, Gabon on 21.700 between 1500 and 1700. Using a Yaesu FRG-7700 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/Polish to Africa 1100-1200) - 222 at 1100; Radio Bucharest, Roumania 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 Middlemiss at 1105; RBI Berlin 21.540 (English/Hindi to S.E. Asia 1145-1445), rated as 25443 by Neil Dove at 1330; REE via Noblejas, Spain 21.575 (Spanish to the Middle East 1030-1900), noted as 444 at 1430 by Robert Taylor; Radio Prague, Czechoslovakia 21.505 (English, Arabic and Czech to Africa 1430-1825), logged by Sheila Hughes as 24322 at 1445; WYFR via Okeechobee, Florida, USA 21.525 (English, Arabic, French, Portuguese to W. Africa 1600-1945), received in Bishops Stortford by John Sadler at 1615.

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

Radio Australia also broadcast to S. Asia on 17.715 via Carnarvon, W. Australia from 0100 until 0910. George Hewlett monitors that frequency on a daily basis in Torquay from 0400. He says their transmission is rarely heard at that time although it occasionally peaks SIO 322 around 0745. Following my comments on the "long and short path" routes taken by the signals from Radio Australia to reach the UK (see LMS February '88), David Edwardson decided to check several of their transmissions and he found the results interesting. 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, Islamabad 17.660 (Urdu 0430-0645), rated as 54554 at 0440; AIR via Aligarh, N. India 17.805 (Swahali 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.

During the morning Radio Pakistan, Islamabad beam their programmes in Urdu and English towards Europe on 17.660 from 0715 until 1120. David Middlemiss 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 Arabic but there are segments in English at 1030 and 1330. Using a Panasonic RF-B60L portable and built-in whip antenna in Edinburgh, Kenneth Buck often listens to their news bulletin and local weather report in English at 1030. Arabic is used throughout the broadcasts from Tunis to the Middle East on 17.610 from 0700 until 1300, Tim Shirley logged them at 1130.

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 RTM Morocco on 17.595, they beam programmes in Arabic to the Middle East from 1400 until 1700. John Nash logged VOA via Greenville, USA on 17.785 as 43344 at 1600 (English to W. Africa 1600-2200).

Some of the broadcasts which may be heard during the evening include Radio Surinam International via RNB Brazil 17.835 (Dutch/English 1700-1745), rated as 44433 by Sheila Hughes at 1725; BBC via Ascension Island 17.885 (English, Portuguese to S. Africa 1400-1800), logged by John Parry in Northwich as SIO 444 at 1800; Radio HCJB Quito, Ecuador 17.790 (Czech, German, English, Norwegian, French, Spanish 1800-2230), rated as 23322 at 1900 by Howard Newell; RCI Montreal, Canada 17.875 (English, French, Russian 1930-2100), logged as SIO 455 at 1940 by Kenneth Buck; WYFR via Okeechobee, Florida 17.845 (Spanish, Arabic, Italian, English 1600-1945), noted as 45544 by Neil Dove at 1900; also KUSW Salt Lake City, Utah 17.715 (English to E. USA 1900-2200), logged by John Thompson in Raiham 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 on 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 that 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 Prenton. Using a Trio R5000 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, "I was lucky enough to find the propagation just right". It seems that their broadcasts have also been reaching S. Africa. Listening in George, Dick Moon picked up their signal during a programme announcement at 1815.

Radio Australia beam their programmes to the S. Pacific area via Shepparton from 2100 until 0730 on 15.240 and they have been reaching from 2100 until 0730 on 15.240 and they have been reaching the UK in the early morning.

George Hewlett rated their signal as 433 at 0430. They also beam their programmes to S. Asia via Carnarvon on 15.415 from 0900 until 1100 but severe interference prevents good reception here.

The programmes from RNI in Oslo, Norway 15.235 (Norwegian, English, Spanish to W. Africa and Middle East 1000-1045) have been attracting the attention of Edward Broadsmith in Worcester. Using a Sony 7600DS portable with built-in whip antenna, Paul Hawkyard picked up Radio Austria, Vienna 15.320 during a broadcast to N. America (German/English 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 on 15.400 (English/Finnish 1200-1500). The main s.w. receiver at his "listening post" in London is a Lowe SRX 30.



Phil Townsend's "Listening Post in London".

SEEN & HEARD

Freq MHz	Station	Country	UTC	DXer
2.333	RRI Jakarta	Indonesia	1636	L
2.560	Xinjiang	China	2330	J
3.205	R. Ribeirao	Brazil	0145	S
3.215	R. Orange	S. Africa	1709	P
3.225	R. Clube Lins	Brazil	0200	S
3.230	ELWA Monrovia	Liberia	2110	C
3.230	R. El. Sol Los Andes	Peru	0330	S
3.235	AIR Guahati	India	2330	V
3.250	SABC Radio 5	S. Africa	2205	L
3.270	SWABC 1	Namibia	1830	G
3.285	R. Belize	Belize	0100	V
3.300	R. Cultural	Guatemala	0615	V
3.330	V of Rev. Bujumb	Burundi	0230	V
3.305	R. Zimbabwe	Zimbabwe	1805	P
3.310	R. Universal	Peru	0240	V
3.320	R. Orion	S. Africa	2210	L
3.325	R. Liberal	Brazil	0240	V
3.325	FRCN Lagos	Nigeria	2215	C,Q
3.330	R. Rwanda	Kigali	1810	P
3.355	R. Botswana	Gaborone	1825	G
3.365	AIR New Delhi	India	0215	J
3.365	GBC Radio 2	Ghana	2250	A,C,Q
3.370	R. Nuevo Mondo	Bolivia	0200	S
3.375	R. Dourados	Brazil	0130	S
3.380	R. Cumbre	Bolivia	0032	S
3.380	R. Iris Esmeraldas	Ecuador	2130	S
3.380	R. Chortis Jocotan	Guatemala	0100	S
3.380	R. Malawi	Malawi	1840	G,P
3.395	ZBC Gweru	Zimbabwe	1731	H
3.400	Reykjavik	Iceland	1940	G,P
3.905	AIR Delhi	India	2305	J,P
3.915	88C Kranji	Singapore	1850	C,G,J,P,Q
3.940	PBS Hubei Wuhan	China	2250	J
3.950	Moscow	USSR	1600	N
3.995	BBC Daventry	England	2000	A,B,G,I,L,Q,T
3.965	RFI Paris	France	2145	G,I, K,Q,U
3.975	88C WS Skelton	UK	1634	L,Q
3.980	VOA Munich	W. Germany	0458	Q
3.985	R. Beijing, China	via SRI Berne	2250	A,G,L,Q,T
3.985	SRI Berne	Switzerland	1823	B,D,I,Q
3.995	DW Cologne	W. Germany	1900	C,G,I,Q,T,U
4.000	Bofoussam	Cameroon	1800	S
4.005	R. Difusora Grau	Peru	0145	S
4.060	R. Moscow Kharkov	USSR	1940	B,G,I,J,K,L,Q
4.080	R. Ulan Bator	Mongolia	2200	S
4.190	R. Uchiza	Peru	0300	S
4.220	Xinjiang	China	0005	J
4.450	R. Afghanistan	via USSR	1755	Q
4.460	R. Nor Andina	Peru	0400	S
4.470	R. Movima	Bolivia	0700	S
4.500	Xinjiang	China	2355	J
4.558	R. Rivadavia	Argentina	0100	S
4.725	8BS Rangoon	Burma	2350	S,V
4.740	R. Afghanistan	via USSR	1900	J,L,Q,T
4.760	ELWA Monrovia	Liberia	0628	Q
4.760	R. Inca, Lima	Peru	0036	S
4.760	R. Afghanistan	via USSR	1900	A,I,L,Q,U
4.765	R. Moscow	via Cuba	3201	P,Q
4.770	FRCN, Kaduna	Nigeria	2020	D,G,M,Q,V
4.775	R. Gabon Libreville	Gabon	1900	J
4.775	AIR Gauhati	India	1901	Q
4.780	RTD	Djibouti	0647	Q
4.785	R. Baku	USSR	1950	I,L
4.785	RTM Bamako	Mali	2200	G,Q
4.790	Azad Kashmir R.	Pakistan	1700	J
4.795	R. Douala	Cameroon	2041	B
4.795	R. Moscow	USSR	2225	A,K
4.800	R. Nac Amazonas	Brazil	2310	P
4.800	R. Popular Cuenca	Ecuador	0440	V
4.800	LN8S Lesotho	Maseru	1937	L,Q
4.800	R. Moscow Yakutsk	USSR	2020	I

Freq MHz	Station	Country	UTC	DXer
4.805	R. Nac Amazonas	Brazil	0135	V
4.810	R. Yerevan	USSR	2015	G,I,M,Q
4.815	R. diff TV Burkina	Ouagadougou	2130	C,G,M,Q
4.820	R. Botswana	Botswana	2000	D,L,P,Q
4.820	Khanty-Mansiysk	USSR	1619	Q
4.820	La Voz Evangelica	Honduras	0430	Q,V
4.825	R. Ashkhabad	USSR	2043	B
4.830	Africa No. 1	Gabon	1920	D,G,I,L,M,Q,T
4.830	R. Relej	Costa Rica	0757	D,P,Q,V
4.830	R. Tachira	Venezuela	0240	V
4.845	R. Nacional, Manus	Brazil	0228	C
4.845	ORTM Nouakchott	Mauritania	2043	D,K,M,P,Q
4.850	R. Tashkent	USSR	0220	C,L
4.850	R. Yaounde	Cameroon	2200	C,F,G,K,L,M,Q
4.850	AIR Kohima	India	0350	Q
4.860	AIR New Delhi	India	0130	C
4.860	Kalinin	USSR	2030	B,F,I,Q
4.865	PBS Lanzhou	China	2256	J,P
4.865	R. Mozambique	Mozambique	2058	D
4.870	R. Cotonou	Benin	2222	F,G,L,M,Q
4.880	R. Acreana	Brazil	0300	V
4.880	SABC Radio 5	S. Africa	1835	C,D,L,M,Q,R,T
4.885	R. Clube do Para	Brazil	0310	V
4.885	Voice of Kenya	Kenya	0030	V
4.890	RFI Paris	via Gabon	0400	Q
4.890	ORTS, Dakar	Senegal	2125	D,J,M,P,Q
4.895	Ashkhabad	USSR	2110	F,G,M,Q
4.895	R. Moscow Kalinin	USSR	2228	C,F,I,K
4.895	R. Bare, Manus	Brazil	0754	Q
4.905	N'djamena	Chad	1945	C,G,M,Q
4.905	R. Relegio, Rio	Brazil	0205	C,D
4.910	R. Zambia	Zambia	1830	P,V
4.915	R. Ghana, Accra	Ghana	2250	C,E,F,G,L,M,Q
4.915	R. Anhanguera	Brazil	0135	C,D
4.920	AIR Madras	India	1628	Q
4.920	VLM4 Brisbane	Australia	1950	D,M
4.920	R. Nat. N'djamena	Chad	2230	O
4.930	Ashkhabad	USSR	1950	C,G,M,Q
4.930	R. Tbilisi	USSR	2048	I
4.940	R. Abidjan	Ivory Coast	2230	Q,V
4.940	Kiev	USSR	2230	F,G,M,Q
4.940	R. Yakutsk	USSR	0625	Q
4.945	Caracol, Neiva	Colombia	0637	Q,V
4.945	R. Nat. Porto Velho	Brazil	0629	Q
4.995	R. Baku	USSR	0500	Q
4.960	R. Federacion	Ecuador	0250	V
4.970	R. Rumbos	Venezuela	2300	C,P,V
4.975	R. Uganda	Uganda	1910	C,M,P,Q
4.980	Ecos del Torbes	Venezuela	2240	C,D,P,Q,V
4.990	VOIRI Tehran	Iran	1740	P
4.990	FRCN, Lagos	Nigeria	2050	B,Q
4.990	Yerevan	USSR	2215	G,Q
5.005	R. Nacional, Bata	Eq. Guinea	2125	F,M,Q
5.010	R. Garoua	Cameroon	2110	F,G,M,Q
5.010	R. Pakistan	Pakistan	2300	K
5.015	Arkhangelsk	USSR	0547	Q
5.015	R. Vladivostok	USSR	0245	C
5.020	ORTN Niamey	Niger	2125	C,M,Q
5.025	R. Uganda, Kampala	Uganda	1930	M
5.035	Alma Ata	USSR	0257	C,Q
5.035	R. Bangui	C. Africa	2120	G,M
5.040	Omdurman	Sudan	2214	V
5.040	R. Tbilisi	USSR	2053	B
5.045	R. Togo Lome	Togo	2110	M,Q
5.057	Gjrokaster	Albania	2106	G,I,L,Q
5.060	PBS Xinjiang	China	2220	U
5.060	R. Amazonas	Peru	0145	V
5.090	R. Beijing T2	China	2110	I
5.090	R. Pakistan	Islamabad	0100	C,J
5.095	R. Sutatenza, Bogata	Colombia	0045	V
5.290	R. Krasnoyarsk	USSR	2134	I

DXers:

(A) Alan Curry, Stockton-on-Tees.
 (B) Colin Diffell, Corsham.
 (C) Neil Dove, Lockerbie.
 (D) David Edwardson, Wallsend.
 (E) George Efstratiades, Thessaloniki, Greece.

(F) G. Glen-Davidson, Newcastle-on-Tyne.
 (G) D. Glover, Newton-le-Willows.
 (H) P. R. Guruprasad, Molepolole, Botswana.
 (I) P. Hawkyard, Newcastle-on-Tyne.
 (J) Hiron Khan, Manchester.

(K) David Middlemiss, Eyemouth.
 (L) John Nash, Brighton.
 (M) Fred Pallant, Storrington.
 (N) John Parry, Northwich.
 (O) Ron Pearce, Bungay.
 (P) Philip Rambaut, Macclesfield.

(Q) Kenneth Reece, Prenton.
 (R) John Sadler, Bishops Stortford.
 (S) Tim Shirley, Bristol.
 (T) Darren Taplin, Tunbridge Wells.
 (U) Robert Taylor, Edinburgh.
 (V) Jim Willett, Grimsby.

The programmes in English from WHRI South Bend, USA are beamed to Europe on 15.105

between 1700 and 2100. John Evans rated their signal in Rochdale 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 Ron Proudfoot in Newcastle-

upon-Tyne, he rated their signal on 15.225 as 34443 (English to N. America 1600-1900). Ron Uses a Rascal 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 1700-2300). Using his Matsui 4099 portable, David Glover picked up RNB Brasilia, Brazil for the first time on 15.265 at 1840 (English, German to Europe 1800-1950). **Cyril Kellam** 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 Hawkyard says he enjoys listening to the *DX-Partyline* programme broadcast by Radio HCJB in Quito, Ecuador on 15.270 at 2130.

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 34242 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 Vilnius, USSR 13.645 (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 KTWR on Guam 11.805 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 Efstratiades**. AWR Guam 11.965 with programmes in Tagalog and English to S.E. Asia from 2100 until 2300 was noted as 232 at 2150; also TWR Guam 11.850 broadcasting in Indonesian to S.E. Asia from 2200 until 2300 was noted as 333 at 2200. George uses a Philips D-2225 portable with just the built-in whip antenna in Thessaloniki, Greece and he logged another DX spot at 2200 — KFBS Saipan, N. Mariana Islands 12.025 (Chinese to C. Asia 2200-2359), noting their signal as 343.

VOIRI 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 Vlietinck** 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 Moyabi, Gabon on 11.800 (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 Bexhill-on-Sea 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 **Daniel 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 42233 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 (41m) band during the day or night! On the last Sunday of each month the news from the International Red Cross in Geneva is broadcast to Europe via SRI Berne, Switzerland on 7.210 (English, French, German, Spanish 1100-1240). **Colin Godwin** logged their transmission as 54444. News for Farmers, broadcast by Radio Polonia, 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 Carnarvon, 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 1500-2030) and rated their signal as 34343 at 2030. He also heard the Voice of Turkey, Ankara 7.215 (German, English, French 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 (German, English to Europe 0600-0830). At 0900, **Ron Proudfoot** logged La Voz de Los Centauros, Columbia 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, Roumaina 5.990; BBC Ascension Island 6.005; Radio Moscow, USSR 6.030; Radio Prague, Czechoslovakia 6.055; RAI Rome, Italy 6.060; Radio Sophia, Bulgaria 6.070; Vatican Radio, Rome 6.190.

Station Addresses

BBC Radio York, 20 Bootham Row, York, YO3 7BR. ILR North-sound Radio, 45 King's Gate, Aberdeen, AB2 6BL. Radio Mediterranean, P.O. Box 2, Valletta, State of Malta. RFI Berlin, Nalepastrasse 18-50, DDR — 1160 Berlin, GDR. Radiodiffusion TV Nationale, B.P. 171, Bamako, Rep. Mali. Radio Tashkent, 49 Khorezm St, Tashkent, Uzbekian, USSR.

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Grundig Yacht Boy 215
Portable Receiver



- **COVERAGE:** 150–260kHz, 510–1620kHz, 5.9–21.9MHz, 87.7–108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:**
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 0.4 watts
- **IF STAGE:**
- **FEATURES:** Carrying strap; 3.5mm headphone socket; l.c.d. clock and snooze and sleep facilities
- **REVIEWED:**
- **PRICE:**

Panasonic RF1680L
Portable Receiver



- **COVERAGE:** l.w.: 150–285kHz; m.w.: 520–1610kHz; s.w.: 5.9–18MHz; f.m.: 87.5–108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** l.w.: 56.3µV/m/50mW output; m.w.: 56.3µV/m/50mW output; s.w.: 11.2µV/50mW output; f.m.: 0.4µV/50mW output (–3dB limit sens)
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 1.2W r.m.s.
- **IF STAGE:** l.w., m.w., s.w.: 455kHz; f.m.: 455kHz
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £39.95

Sony ICF-5100
Portable Receiver



- **COVERAGE:** m.w.: 530–1605kHz; s.w.1: 5.85–6.35MHz; s.w.2: 6.95–7.45MHz; s.w.3: 9.4–9.9MHz; s.w.4: 11.6–12.1MHz; s.w.5: 15–15.5MHz; s.w.6: 17.55–18.05MHz; s.w.7: 21.4–21.9MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** m.w.: 36dBµV, s.w.: 1dBµV (9.6MHz), f.m.: 13dBµV
- **RESOLUTION:**
- **SELECTIVITY:** ±7.2kHz (–50dB)
- **IMAGE REJECTION:** m.w.: 32dB (1605kHz), s.w.: 49dB, f.m.: 30dB
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 100mW at 10% t.h.d.
- **IF STAGE:** m.w.: 455kHz, s.w.: 10.7MHz & 455kHz, f.m.: 10.7MHz
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £80

WHAT RECEIVER?

Uniden CR-201
Portable Receiver

- **COVERAGE:** 150–29.999MHz, 76–108MHz
- **MODES:** a.m., s.s.b., f.m.
- **SENSITIVITY:** Input for 10dB (S + N)/N, a.m. 5µV, s.s.b./c.w. 5µV, f.m. 2µV for 6dB (S + N)/N
- **RESOLUTION:** 1, 3, 50 or 100kHz
- **SELECTIVITY:** narrow 5kHz at –6dB, 10kHz at –50dB, wide 6kHz at –6dB, 12 kHz at –50dB
- **IMAGE REJECTION:** 70dB at 7.1MHz, 26dB at 106MHz
- **IF REJECTION:** 80dB (1st i.f.), 60dB (2nd/3rd i.f.) at 7.1MHz, 70dB at 78MHz
- **SPURIOUS REJECTION:** 60dB
- **FREQUENCY STABILITY:** within ±1kHz after one hour
- **AUDIO OUTPUT:** 1.2W in 4Ω for 10% distortion
- **IF STAGE:** 1st 65.15MHz, 2nd 10.7MHz, 3rd 455kHz, f.m. 10.7MHz
- **FEATURES:** Available on second-hand market
- **REVIEWED:** Practical Wireless June 1984
- **PRICE:** Available on second-hand market

Grundig Satellit 650 International
Multi-band Portable Receiver



- **COVERAGE:** 148–420kHz, 510–1620kHz, 1.6–30MHz, 87.5–108MHz
- **MODES:** a.m., f.m., s.s.b. (u.s.b. & l.s.b.)
- **SENSITIVITY:**
- **RESOLUTION:** 1, 5, 10, 100kHz
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 15 watts
- **IF STAGE:**
- **FEATURES:** Sockets for external antenna, line in, line out, cassette recorder, external loudspeakers and headphones; clock; mains or battery operated; peak tuning meter and separate bass and treble controls.
- **REVIEWED:**
- **PRICE:**

Sony ICF-7600DS
Portable Receiver



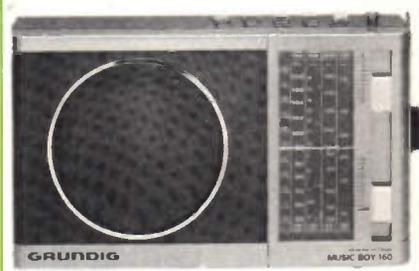
- **COVERAGE:** l.w.: 153–519kHz, m.w.: 522–1611kHz, s.w.1: 3.9–3.995MHz, s.w.2: 4.7–5.195MHz, s.w.3: 5.9–6.195MHz, s.w.4: 7.1–7.395MHz, s.w.5: 9.5–9.995MHz, s.w.6: 11.6–12.195MHz, s.w.7: 13.5–13.795MHz, s.w.8: 15.1–15.595MHz, s.w.9: 17.5–17.995MHz, s.w.10: 21.4–21.9MHz
- **MODES:** a.m., c.w., s.s.b., f.m.
- **SENSITIVITY:** l.w., m.w.: 37dBµV (999kHz); s.w.: 3dBµV, f.m.: 9dB
- **RESOLUTION:** l.w.: 3kHz, m.w.: 10kHz, s.w.: 5kHz, f.m.: 100kHz
- **SELECTIVITY:** l.w., m.w., s.w.: ±5.6kHz (–50dB); f.m.: 53dB (±400kHz)
- **IMAGE REJECTION:** 50dB
- **IF REJECTION:** l.w., m.w., s.w.: 68dB; f.m.: 40dB
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 450mW at 10% t.h.d.
- **IF STAGE:** l.w., m.w., s.w.: 55.845MHz & 455kHz; f.m.: 10.7MHz
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £180

Panasonic RXC34L
Portable Stereo System



- **COVERAGE:** l.w.: 148.5–285kHz; m.w.: 520–1610kHz; s.w.: 5.9–18MHz; f.m.: 87.5–108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** l.w.: 141µV/m/50mW output; m.w.: 79µV/m/50mW output; s.w.: 4µV/50mW output; f.m.: 1.8µV/50mW output (–3dB limit sens)
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 8W r.m.s. max
- **IF STAGE:** 470kHz, 10.7MHz
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £59.95

Grundig Music Boy 160
Portable Receiver



- **COVERAGE:** 150–260kHz, 510–1620kHz, 87.5–108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:**
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 1.5 watts
- **IF STAGE:**
- **FEATURES:** 3.5mm headphone socket
- **REVIEWED:**
- **PRICE:**

Matsui MR4099
Portable Receiver



- **COVERAGE:** 150–29.999MHz, 87.5–108MHz
- **MODES:** a.m., f.m., s.s.b., c.w.
- **SENSITIVITY:** for 12dB SINAD with 90% a.m. 2.4MHz–114dBm, 3.3MHz–113dBm, 4.9MHz–112dBm, 6.0MHz–111dBm, 11.8MHz–109dBm, 25.8MHz–109dBm, 800kHz–112dBm, 200kHz–98dBm f.m. with 45kHz deviation 96MHz–94dbm
- **RESOLUTION:** 1, 9, 10 or 50kHz
- **SELECTIVITY:** narrow ±2.3kHz at 6dB, ±8kHz at 60dB, wide ±4.7kHz at 6dB, ±10kHz at 60dB
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 1.2W for 10% distortion
- **IF STAGE:** AM1 55.845MHz, AM2 450kHz, FM 10.7MHz
- **FEATURES:** External antenna socket, sleep timer, b.f.o. control; l.e.d. signal strength indicator and 9 memories
- **REVIEWED:** Short Wave Magazine September 1987
- **PRICE:** £99.99

Panasonic RF-B40DL
Multi-band Portable Receiver



- **COVERAGE** l.w. 146 – 288kHz, m.w. 520 – 1611kHz, s.w. 1.615 – 29.995MHz, f.m. 87.5 – 108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** f.m. 2.5µV, l.w. 563µV at 281kHz S/N 20dB, m.w. 45µV, s.w. 11µV at 6MHz S/N 20dB
- **RESOLUTION:** 5 and 9kHz
- **SELECTIVITY**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT** 550mW (r.m.s. max)
- **IF STAGE** 459kHz (a.m.)
- **FEATURES:** Mains adaptor included; operation key lock switch; a.m. sensitivity switch; 27-station pre-set tuning and l.c. display
- **REVIEWED:** Short Wave Magazine September 1987
- **PRICE:** £139.95

Sony ICF-7600DA
Portable Receiver



- **COVERAGE:** f.m.: 87.5 – 108MHz, l.w.: 150 – 285kHz, m.w.: 531 – 1602kHz, s.w.l.: 3.050 – 3.565MHz, s.w.2: 3.7 – 4.215MHz, s.w.3: 4.65 – 5.165MHz, s.w.4: 5.8 – 6.315MHz, s.w.5: 6.95 – 7.465MHz, s.w.6: 9.375 – 10.010MHz, s.w.7: 11.525 – 12.16MHz, s.w.8: 13.375 – 14.010MHz, s.w.9: 14.975 – 15.61MHz, s.w.10: 17.475 – 18.11MHz, s.w.11: 21.325 – 21.96MHz, s.w.12: 25.475 – 26.1MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** l.w. & m.w.: 31dBµV at 999kHz, s.w.: 3dBµV, f.m.: 10dBµV
- **RESOLUTION:** 5kHz on s.w., 3kHz on l.w., 3/10kHz on m.w., 50kHz on f.m.
- **SELECTIVITY:** l.w., m.w. & s.w.: ±6.5kHz – 50dB, f.m.: 53dB (±400kHz)
- **IMAGE REJECTION:** 63.5dB on s.w. and m.w., 44.5dB on l.w.
- **IF REJECTION:** 50dB
- **SPURIOUS REJECTION:** 50dB
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 450mW at 10% t.h.d.
- **IF STAGE:** 10.7MHz, 455kHz
- **FEATURES:** digital and analogue display, clock and alarm, 15 memories, telescopic antenna
- **REVIEWED:** Short Wave Magazine August 1987
- **PRICE:** £159.95

Realistic DX-360
Portable Receiver



- **COVERAGE:** l.w.: 150 – 265kHz, m.w.: 520kHz – 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: 14.6 – 18.2MHz, s.w.6: 21 – 26.1MHz
- **MODES:** a.m., f.m.

WHAT RECEIVER?

Grundig Satellit 400 International
Multi-band Portable Receiver



- **COVERAGE:** 148 – 353kHz, 513 – 1611kHz, 1.6 – 30MHz, 87.5 – 108MHz
- **MODES:** a.m., f.m., s.s.b.
- **SENSITIVITY:**
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 3 watts
- **IF STAGE:**
- **FEATURES:** Automatic waveband scan; l.c.d. clock; sockets for headphones, external antenna, line in, line out and external d.c. supply and peak tuning meter.
- **REVIEWED:**
- **PRICE:**

Panasonic RF-B10
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 – 9.90MHz, 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.
- **SENSITIVITY:** f.m. 3µV, m.w. 100µV, s.w. 4µV
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 200mW
- **IF STAGE:**
- **FEATURES:** Operation hold switch; a.m. sensitivity switch; l.e.d. tuning indicator, carrying case and earphone included.
- **REVIEWED:**
- **PRICE:** £59.95

- **SENSITIVITY:** At – 6dB; 600kHz, 250µV; 1000kHz, 250µV; 1400kHz, 250µV
- **RESOLUTION:**
- **SELECTIVITY:** At 600kHz; 28dB normal 20dB limit; at 1MHz; 30dB normal 24dB limit; at 1.4MHz; 38dB normal 30dB limit
- **IMAGE REJECTION:** l.w.: 260kHz 36dB; a.m.: 1400kHz 38dB; f.m.: 106MHz 34dB; s.w.1: 5.5MHz 22dB; s.w.2: 7.4MHz 20dB; s.w.3: 10MHz 18dB; s.w.4: 14MHz 16dB; s.w.5: 18MHz 14dB; s.w.6: 26MHz 10dB
- **IF REJECTION:** l.w.: 260kHz 28dB; a.m.: 600kHz 28dB; f.m.: 90MHz 85dB; s.w.1: 4.5MHz 70dB; s.w.2: 6MHz 75dB; s.w.3: 8.4MHz 78dB; s.w.4: 11.5MHz 80dB; s.w.5: 15MHz 80dB; s.w.6: 21MHz 80dB
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 680mW
- **IF STAGE:** 10.7MHz
- **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; 115.15MHz – 223MHz (using supplied frequency converter)
- **MODES:** a.m., f.m., n.b.f.m.
- **SENSITIVITY:** l.w., m.w.: 42dBµV (999kHz), s.w.: 2dBµV (ext a.m.), – 4dBµV (ext n.b.f.m.), f.m.: 9dBµV
- **RESOLUTION:** l.w.: 3kHz, m.w.: 10kHz, s.w.: 5.50kHz, f.m.: 50kHz
- **SELECTIVITY:** ±3.8kHz/±6kHz (50dB)
- **IMAGE REJECTION:** 77dB
- **IF REJECTION:** 63dB
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 500mW at 10% t.h.d.
- **IF STAGE:** l.w., m.w. & s.w.: 55.85MHz, 455kHz; f.m.: 50kHz
- **FEATURES:**
- **REVIEWED:**
- **PRICE:** £350

Panasonic RF-B60
Portable Receiver



- **COVERAGE:** l.w.: 155 – 519kHz, m.w.: 522 – 1611kHz, s.w.: 1.615 – 29.999MHz, f.m.: 87.5 – 108MHz
- **MODES:** a.m. and f.m.
- **SENSITIVITY:** +21dBµV at 3MHz
- **RESOLUTION:** 5kHz steps on s.w., 9kHz on m.w. and l.w., 100kHz steps on v.h.f. f.m., 1kHz fine tune on l.w., m.w. and s.w.
- **SELECTIVITY:** 6dB at ±3.1kHz, 60dB at ±6.35kHz
- **IMAGE REJECTION:** 60dB
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 550mW
- **IF STAGE:** 450kHz, 10.7MHz, 55.845MHz
- **FEATURES:** S-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 – 1610kHz, s.w.1 5.95 – 6.20MHz, s.w.2 7.10 – 7.30MHz, s.w.3 9.50 – 9.90MHz, s.w.4 11.65 – 12.05MHz, s.w.5 15.10 – 15.60MHz, s.w.6 17.55 – 17.90MHz, s.w.7 87.5 – 108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** l.w. 126µV, m.w. 100µV, s.w. 1.4µV (average), f.m. 2µV
- **RESOLUTION:**
- **SELECTIVITY:**
- **IMAGE REJECTION:**
- **IF REJECTION:**
- **SPURIOUS REJECTION:**
- **FREQUENCY STABILITY:**
- **AUDIO OUTPUT:** 400mW
- **IF STAGE:**
- **FEATURES:** Operation hold switch; l.e.d. tuning indicator and external speaker/earphone socket
- **REVIEWED:**
- **PRICE:** £74.95

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