Short Wave
Magazine
NOVEMBER 1988

STAMPS & RADIO
PHILATELIC HOVBOURS
WIRELESS

MORSE CODE 1936

CAYMAN ISLANDS

BHUTAN
10c

CHIP 'N' DALE

HISTORY OF COMMUNICATIONS

CHW COMMUNICATIONS YEAR
UNITED NATIONS

NEW ZEALAND
1862
1962

3p

CENTENARY OF TELEGRAPH
IN NEW ZEALAND

Build our Hi-Lo MW Antenna Matcher

What Receiver?

For The Radio Listener
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 blander, 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 blander, 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.
Cover: The story of radio is portrayed on stamps issued by many countries. Raymond Schuessler is a keen US philatelist and the stamps reproduced on the cover and in his article come from his collection. The final part of C. M. Lindar's Three-band SSB Receiver series has had to be held over.

Stamps & Radio 9

Eddystone 940 Receiver 10
Part 3

Introduction to DX-TV 14
Part 14

Behind the Scenes at Radio 21
Australia Part 2

Hi-Lo MW Antenna Matcher 25
Richard Q. Marris G2BZQ

First Word 2

Editorial

A Word in Edgeways 2

Your Letters

What's New 4

Latest News & Products

Grassroots 7

Club News

DX Letter from America 12

American News

Scanning 17

For the Scanning Enthusiast

Services 18

Important Information

Airband 22

Aeronautical Radio News

Starting Out 29

For the Beginner

What Receiver? 48

Technical Specifications

Book Service 50

Order Your Technical Books

Trading Post 52

Readers' Adverts

Amateur Bands Round-Up 33

Paul Essery GW3KFE

Decode 34

Mike Richards G4WNC

Info in Orbit 36

Pat Gowen G3IOR

Band II DX 38

Ron Ham

Television 38

Ron Ham

Long Medium & Short 40

Brian Oddy G3FEX

LW Maritime Radio Beacons 46

Brian Oddy G3FEX

GOOD LISTENING
I recently attended a Press Briefing held by the DTI Radiocommunication Division to launch their Consultative Document
The Use of the Radio Frequency Spectrum above 30GHz. Yes, that really is 30GHz - 30,000MHz! A trifle on the high side for today's scanners but then, whoever would have thought ten years ago that we would have receivers with the sort of performance we take for granted now.

However, the point of the exercise is for the DTI to try to collect as much useful information as possible, in short a space of time as possible, so that they can promote the use of this very intriguing part of the spectrum. I must admit that I find microwaves much more interesting than the almost d.c. parts of the spectrum below 144MHz but I had always thought that the frequency receiver would not be of much real use because of the very short range.

I was obviously mistaken as I had overlooked the re-use factor - especially around the oxygen absorption band at 60GHz. Here the fact that signals are very heavily attenuated means that the reuse factor reduces to a few kilometres, providing a natural filter that man will find very hard to beat. In the past radio amateurs have been at the forefront of technological advance, opening up frequencies that, in their day, were considered to be way above anything likely to be of practical use. Just think, even the s.w. bands were thought to be of no practical use in the early days of radio! Amateurs have pioneered new modes of transmission, opened up even higher frequency bands and sent signals over longer and longer paths on less and less power. What does the future hold above 30GHz? Well the amateurs have been allocated several bands above this frequency but I wonder how many amateurs will have the access to the equipment needed to produce working millimetric gear?

"Just a minute Fred, old man, I am going to use my new thin-film evaporating gear to modify this 40GHz front-end."

"How much did that set you back then, Bert?"

"Not much, Fred, I picked it up cheap at the club's jumble sale last month, but they cost a couple of million pounds new!" Still, in the past amateurs have always managed to get their hands on gear for seemingly impossible frequencies, so perhaps they will manage it in the future. I was also interested in some of the potential applications put forward for these frequencies. When I was very young the large Co-operative store in Luton had a fascinating overhead cable-car system which connected the lifts to a central accounts department. I found it fascinating to watch as the assistant put your money and the details of your purchases into a cylinder which was deftly hooked onto a steel carrier. A quick tug on a string and the cylinder sped on its way across the store, negotiating bends and junctions in a fascinating manner. A few minutes later and back it came bearing your receipt and change. More progressive shops had a vacuum pipe system - slightly less fascinating.

Now, it seems, these devices will be replaced by radio links using frequencies above 30GHz. Along with inter-office telephone links which will require no cabling, these systems utilise the very short range capabilities of the higher microwave frequencies for security and greater re-use capabilities.

I wonder whether, in forty years time the Editor of SWM will be mourning the loss of the systems of his childhood?

One of the problems facing the Editor of a magazine such as Short Wave Magazine, is how to fit the proverbial quart into the pint pot available. Each month I have to do a juggling act with the serials, trying to keep every reader happy while still presenting what I hope is a balanced and interesting magazine. This means that it often becomes necessary to miss parts of series and this month it is the turn of the final instalment of the "Three-band SSB Receiver".

Coming shortly in your favourite radio magazine - two new gripping serials! Starting in the January 1989 issue, well-known antenna authority, Fred Judd G2BCX, starts his series explaining all about antennas. Also starting sometime in the new year is a specially commissioned series aimed at the very raw beginner. George Dobbs G3RV, author of the well-known Ladybird Book on radio which is now sadly unobtainable, has written a series especially for those who are starting right at the bottom of the ladder. So if you are young in either years or radio knowledge then this series is for you.

DICK GANDERTON

A WORD IN EDG EWAYS

Sir
I wrote recently about tubing suppliers as I wished to construct a home-brew log periodic array, because the purchase price of a ready built is too expensive.

 enclosed is a picture of the finished article cost approx £33.00 (Inc. mast), a similar aerial made by a manufacturer advertising in your magazine is cost at £85.00. Should other s.w.is be interested in experimentation or construction of log periodic arrays, I recommend the relevant section in the VHF Antenna Handbook (ISBN 088006-7144) which can be borrowed from your local library.

A. J. HARDING
STEVENAGE
HERTS

Sir
G. Hewlett, in his article 'Tuning in the 1930's' asks who or what was G5SW? Perhaps I can answer his question.

G5SW was a short wave transmitter that the Marconi Company were instructed to build by the BBC. It was situated at The Marconi Company's works at Chelmsford, and opened on 5 November 1927.

This transmitter remained in service until 17 December 1932, as the Empire Broadcasting Service opened on 9 December 1932. It is interesting to note that in July of the same year, low-definition television signals were transmitted from this station on a wavelength of 25 metres and these signals were received in Australia.

NORMAN E. PILGRIM
LEICESTER

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO
AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS
USED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON
ANY SWM SERVICE

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

Antenna Details
Forward gain: 13.5dBi Front to back: 15.0dBi SWR: 1.8:1
Freq coverage: 100 - 650MHz Vertical beam width: 60 deg. Impedance: 50 ohms

Short Wave Magazine November 1988
Sir

Do you think that Tim Wright is trying to tell me something with his articles on the Eddystone 940? The 940 is my main receiver and I have two of them. The 940 was introduced about 1967 at around £135, and I purchased mine a couple of years later second-hand. It had, apparently, been used by an amateur transmitter, as a pair of wires had been attached to the stand-by switch, obviously to operate a relay. At that time it cost me £145 - a very good bargain indeed.

It is in constant use for around 10 hours a day, some 360 days of the year, in that time, apart from making three or four major valve changes, I have only had about five valves burn out. Other repairs required being a loose grub screw on the vernier scale and a similar adjustment to the grub screw of the theory great capacitor or two or three times.

The second 940 I bought for £25 to provide spare parts, and is actually in better condition than my "number one" set. It had been "out of order," but I found that the tuning coil inserts had been tampered with or removed. It has been brought back into partial service again.

I am still switching-on at 0400 UTC, with morning reception up to around 1030 UTC.

G E H WILLET

Sir

I have been very interested to read about Tim Wright's attempts to restore an ailing Eddystone 940 receiver. In my introduction to the now well-known G4DTG "Ultimate Hybrid" (Radio Communication, Dec 87 et seq.), I singled out this receiver as one of the all-time great achievements of exceptional performance despite its age and low intermediate frequency.

A simple test of the sensitivity of a receiver is one of the best diagnostic tools possible. Of course, it is not difficult to perform as follows. Disconnect the antenna and substitute a dummy load, e.g. a small 50-100 ohm resistor between the antenna socket and ground. Turn the a.f. gain to maximum and you should hear only receiver noise just disappears. Reconnect the antenna, remove the dummy load, and tune the set to an unused frequency. Any noise then emanating from the speaker must be antenna/cosmic noise. The louder it sounds, the better is the signal-to-noise ratio of the receiver. (The antenna should ideally present a 50-100 ohm impedance to the set.) If your receiver has no i.f./r.f. gain control then you should have bought one which has, since without one you cannot achieve an ideal gain distribution.

I would mention this test because the 940 passes it better than any other receiver I have tried provided one small modification is made: that is to remove the gain control line from the ECC189 r.f. amplifier. Disconnect the gain control line from R4 (150 ohm) and connect the bottom end of R4 to the chassis. The ECC189 produces exceptionally low noise but, unfortunately, the gain control reduces its gain earlier than that of V2, the 6BA6. The result is that the wanted signal, particularly if weak, is reduced more rapidly than receiver noise. This is of consequence in the 940 because it really has too much gain in the r.f. stages and should be operated with the r.f. gain backed well off and the a.f. gain set high. It is this excessive gain which causes frequency-pulling (actually "frequency-locking") which, despite careful design to obviate the problem, can only be expected.

However my suggested modification allows operation at reduced gain and immediately removes the problem. Although I agree that it is not good practice to apply a.g.c. to the mixer since it can alter possibly critical valve working points, its removal appears to have no effect on the pulling on strong signals. This seems to be due to some of the signal arriving at the local oscillator grid and causing it to "lock". I would warn 940 owners against diving into the receiver and replacing everything in sight. The 940 at this stage is still the only receiver to use original components except for one of the notorious screen-dropping resistors. I have tried valve replacement with no improvement, but I keep an eye on the general performance, re-aligning the set every few weeks. The practice of interchanging valves and changing circuits and alter the gain distribution. Extremely critical measurements would be needed, and complete realignment to decide whether valve was best. It looks, and sounds, as though it were from the factory. No leaky capacitors or faulty resistors have been detected. The low l.f. has caused no problems even at the highest frequencies and I believe that, with careful alignment, Eddystone's figure for image rejection can be bettered. The set is exceptionally stable, and dial accuracy incredibly good (although I, too, have fitted a very lightly-coupled buffer to drive a frequency counter).

Tim's fleeting reference to replacing all carbon resistors with metal film types might plunge the unsuspecting into many hours work. Most of them are totally inaccessible without taking the entire set apart, or cutting packs to pieces and I wonder if he actually attempted this task of micro-surgery. Also, I would not expect any significant improvement. With a non-ideal transformer, there are hardly any resistors in the signal path and most of those associated with the offending stages are solidly decoupled at r.f. Any improvement here is more likely to result from better thermal stability, but even this is difficult and where does one obtain 1W and 2W metal film resistors? It should also be mentioned that, as the mains transformer has 330V tapping, not 240V, all voltages will measure at least 5 per cent high and even 10 per cent in some places.

I would have liked to have seen further qualification of Tim's remarks concerning the tedious windings on the l.f. transformers. This is an established technique, not over-coupling the windings to broaden the response curve and seems to have no undesirable consequences.

Without wishing to sound too clever or hypercritical, I must add that I have never taken the "stenoide" circuit, almost certainly harmonic distortion into "phone" signals. The stenoide circuit attempts to restore tonal balance by removing the lower audio frequencies, but, at the same time, seems to emphasise the distortion products. In addition, tuning becomes extremely critical, demanding a much higher tuning ratio than the 940 possesses, and extreme frequency stability. If the receiver drifts into the sidebands the effect is nerve-grinding.

Tim's article is the first that I have ever seen on this receiver, although I have noticed since my original comments in Radio Communication that a few "wanted" adverts have appeared for it. It was my "control sampler" receiver during the development of the G4DTG "Ultimate Hybrid", while in practice both are limited by cosmic noise.

RAY HOWERGE GO4DTG CATERHAM SURREY
Solar Powered DMM

Whatever will they think of next? Solar powered calculators are quite commonplace but Universal Instruments have just introduced a pocket-size digital multimeter which uses solar power!

In case you are wondering what happens when you are deep in the dark and murky corners of your shack try throwing the voltage around a piece of sick gear, the HioKI 3242 has an internal rechargeable battery. You don’t even have to remember to leave the meter out of its case - the case is made from transparent vinyl so that the battery is recharged even when the meter is not in use. Presumably you have to remember not to put it away in a cupboard or drawer.

The HioKI 3242 is an auto-ranging instrument with a single rotary switch and a 3 1/2 digit liquid crystal display which shows, not only the measurement, but also the units and symbols along with polarity. All voltage ranges are fully protected to 50V and input impedances are greater than 10 megohms.

The instrument measures d.c. voltages from 0.1mV up to 500V in five ranges and with an accuracy of better than 1 per cent. Measurement of a.c. voltage is from 1mV to 500V in four ranges. Resistance is measured from 0.1 to 20 megohms in six ranges, along with both visual and audible continuity checking. All the resistance ranges are protected against voltages of up to 250V.

Measuring just 120 x 65 x 18mm including the fully enclosed test lead storage compartment and weighing in at around 110gm the HioKI 3242 costs $50.08 inc. VAT from Universal Instrument Services Ltd, Unit 62, GEC Site, Cambridge Road, Whetstone, Leicester LE8 5LH. Tel: (0533) 750123.

Peak Envelope Power Meter Kit

One of the most popular circuits designed by John Reiden GWS4AH and available, until about two years ago, at rallies and by mail order as a ready-made and tested p.c.b. was the peak envelope power (p.e.p.) meter.

Now arrangements have been made for Technical Software to produce the p.e.p. module. This board will convert any power meter to read p.e.p. instead of average power and is very easy to install and calibrate as well as being very effective and cheaper than paying a lot extra for a s.w.r. meter with a built-in p.e.p. capability.

The p.e.p. meter is an indispensable aid to the correct operation of an s.s.b. transmitter if you are to avoid overdriving the p.a. with consequent distortion and wide-band splatter.

The board is available, ready assembled and tested with mounting kit and full instructions for installation, calibration and use at a price of $12.00 inc. VAT and p&p from Technical Software, Fron, Upper Llandrindod, Caerphilly LL54 7ZF. Tel: (0226) 881886.

Godiva Award

The Coventry Amateur Radio Society have just introduced a new award which is available to all licensed operators and short wave listeners.

Called the Godiva Award, it is given for contacting G2ASF, G7ASF or any other special event station operated by Coventry Amateur Radio Society or at least two of their club members. You also have to work, or hear, a sufficient number of stations located within the City of Coventry boundaries to achieve the requisite number of points for the award. 20 points are required for any station located in the British Isles, 15 for other European stations and 10 points for stations outside Europe. You get 5 points for each CARs callsign worked or heard, 2 points for each CARs member worked or heard and 1 point for each Coventry station worked or heard. All contacts must have been heard after 1 January 1988 but there is no limit for the achievement of the award. Contacts via repeaters are not acceptable for the award.

The cost of the award, which is printed in three colours on high-quality paper for posting up on your shack wall, is $1.50. A full set of rules and further details are available, for a stamped addressed envelope, from J. Ward G4HHT, 3 Shirley Road, Coventry CV2 2EL

New Address for GB2ATG

Bob Andrews, who runs GB2ATG has moved. GB2ATG is one of the few amateur radio news broadcast services in the UK and Bob welcomes any item of amateur radio news for possible transmission by GB2ATG. Items of news about amateur radio data activity - RTTY, Amotor, packet and fax - are particularly welcome as GB2ATG is part of BARTG's service to its members.

GB2ATG is transmitted during the first and third Sunday of each month on 3.590, 14.090 and 144.600MHz. As it is operated by a group of volunteers its schedule is subject to change. However the most recent schedule is always published in Datacom, the quarterly journal which is sent to all BARTG members.

BARTG caters for all those who are interested in using data modes - RTTY, packet, Amotor and fax - with amateur radio and currently UK membership costs $8.00 per year. If you are into data communication then contact Mrs Pat Beedie GW6MJO, "Fynnnonias", Sailem, Llandello, Dyfed, SA19 7NP. Tel: (0558) 822266 who will send you forms and membership details.

Bob GB1IZZ is also looking for more amateurs to join his group of volunteers to transmit GB2ATG so if you are interested contact him at 52 Lint ridge Road, Erdington, Birmingham B23 7HX.

Connectors

If you are looking for low-cost, good-quality, audio connectors then Rendar of Bognor Regis have just added a useful range to their stock.

Jack sockets and plugs for general use in the three common sizes of 2.5, 3.5 and 6.3mm are available together with a gold-plated range for higher specification equipment use. Panel and p.c.b. mounting sockets are complemented by straight, right-angled and in-line plugs. DIN and Phono plugs and sockets in a comprehensive variety of body materials and designs are supplied. Connectors for d.c. power use are also included in the range. Other interesting items include a wide range of switches and audio cables.

For more information contact Gez Smith, Rendar Ltd, Durban Road, South Bersted, Bognor Regis, West Sussex PO22 9RL. Tel: (0243) 825811.
DTI Radiocommunications Division Information Sheets

The Radiocommunications Division of the Department of Trade and Industry has just issued three new Information Sheets.

The first one is the Current List of Information Documents. BR81 September 1988. This document gives you a complete list together with Information on how to order, of all the Information Sheets, Generic Publications, Licence Application Forms and Guidance Notes concerning the use of the radio spectrum.

The Radio User's Guide to the Law. BR97, is a new Information Leaflet which explains the regulations governing the use of radio equipment when it is used for civil communications in the UK.

Another new Information Leaflet is the General role of the Radio Investigation Service. BR98. This describes the role of the RIS and how to use it and includes a map of the UK showing the District Structure of the Service.

Radio Amateur Information Sheet No. 7. New Amateur Radio Licences. BR99, briefly deals with the recent major revision of the Amateur Radio Licence to be introduced on 1 January 1989.

These Information Leaflets are available free of charge from The Information and Library Service, Department of Trade and Industry, Radiocommunications Division, Room 405, Waterloo Bridge House, Waterloo Road, London SE1 8UA. You can also use their 24 hour Answerphone Ordering Service on 01-215 2072.

Cat's Wiskers Certificate

North Cheshire Radio Club are running their "Cat's Wiskers" award for received Morse at speeds of 14, 18, 26 and 30 w.p.m. Stations can, of course, pick any, or all of the above speeds and those who have just passed the Morse test can start at 14 w.p.m. and work their way up.

The starting date was Sunday 25 September 1988 on Top Band around 1,820MHz and on 2 metres 144MHz after the Slow Morse broadcast by the RSG. Approximate starting time is 7.30 p.m. clock time.

Your "Cat's Wisker" text should be sent, together with 50p to cover postage and packing, to North Cheshire RC, Morely Green Social Club, Mobyboat Road, Morley Green, Wilmslow SK9 5NT or you can deliver it personally.

Opening up the Millimetric Wavebands

The section of the radio frequency spectrum above 30GHz will bring a communications boom if industry grasps the opportunity, according to the DTI's consultative document The Use of the Radio Frequency Spectrum above 30GHz.

The DTI sees enormous potential for new types of services not yet catered for which will be made possible by exploiting the different propagation characteristics of these frequencies. Short-range television, very fast data transmission, cable-less internal telephone systems, electronic funds transfer at point of sale (EFTPOS), communications between buildings in line of sight and mobile services such as route guidance for vehicles or portable telephones are among the ideas being suggested. The DTI is calling for responses from users, potential users and industry on how best to exploit this opportunity to be sent to them by 31 December 1988.

At present there are but a few areas of this vast spectrum actually allocated or being used. Among these allocations are several amateur bands which, for obvious reasons, are rather empty at present. In the past, however, radio amateurs have paved the way to the opening up of frequencies which had been deemed impossible to use. Perhaps history will repeat itself here.

A maximum practical range of up to 10 to 15km for these frequencies would seem to be a disadvantage. However, for certain types of services this short range could be turned to advantage, allowing re-use of frequency allocations at short distances, increasing the information carrying capacity of the bands over the country as a whole.

Telecommunications policy allows short telephone links between buildings of the same business across gaps such a roads and line-of-sight millimetre links could provide this connection very effectively at a cost probably considerably lower than providing a wired or optical fibre link. Only a simple annual licence fee would be payable for the use of the frequency.

Industry Minister Robert Atkins said: "Efficient communications are so important to success that every new sector of industry and commerce is likely to find uses for this new area of the spectrum. I welcome publication of the report and I want to see imaginative schemes being put to us so that the Government can play its full role.

If we are to see the maximum benefit to suppliers and users of millimetre waveband equipment, we need to begin the process of collaboration between these groups at the earliest possible time. We need to identify as many uses as possible and approach their implementation in an orderly manner.

"There is also a need to co-ordinate European harmonisation of frequency allocations within the range and the sooner we in the UK get our act together, the better the chance we have of taking a lead in the discussions now starting in Europe."

Copies of the consultative document are available from the The Information and Library Service, Department of Trade and Industry, Radiocommunications Division, Room 405, Waterloo Bridge House, Waterloo Road, London SE1 8UA. You can also use their 24 hour Answerphone Ordering Service on 01-215 2072.

Science Museum Radio Station GB2SM

The Science Museum in London has its own amateur radio station which operates under the special event callsign GB2SM. Here Geoff Volter G3JUL is seen at the console talking on the 144MHz band to the Rt. Hon. Cecil Parkinson MP during his visit to RSG Headquarters in Potters Barr on 9 September 1988.

Short Wave Magazine November 1988
Catalogues

A large number of catalogues are sent into the office covering all manner of items, interesting, useful and otherwise! Some of those received recently and which I felt are of interest are described here.

**Tandy**
The Tandy 1988-89 Electronics Catalogue is now available free from your local Tandy Store. The catalogue contains a full section by section show-case guide to the complete Tandy range of electronic goods.

- The 140 pages, in full colour, details the main features of the products which include audio and hi-fi equipment, radios and televisions, electronic toys and games and the Tandy Computers range of IBM PC compatible computers and peripherals.

- If you have difficulty in locating your copy write direct to InterTAN UK Ltd, Tandy Centre, Leamore Lane, Wallsall, West Midlands WS2 7PS.

**BareNco**
This catalogue, issue 6, gives details of a comprehensive range of antenna mast support hardware, connectors and cables.

- If you need any parts for your antenna mast, r.f. feeder cables or connectors then you need this small booklet. It will cost you 20p from BARENCO, 27 Park Road, Barnstone, Notts. NG13 9JF. Tel: (0949) 60607.

**Global Specialties**
This is the most comprehensive catalogue ever produced by Global Specialties. The 32-page booklet is entitled The Album and features the full range of products offered by the company including oscilloscopes, signal sources, power supplies, safety testers and voltage monitors, prototyping and training equipment and a wide range of logic test products and analysers. Information is also provided on wattmeters and multi-meters with a special section on frequency and time measurement counters and capacitance meters.

- The Album is available from Global Specialties, 2nd Floor, 2-10 St. Johns Street, Bedford MK42 0DH.

**Greenweld**
The 1989 Catalogue from Greenweld is the biggest they have ever produced. Inside its 100 pages you will find a wide range of electronic components - everything from plain resistors to complex instruments and audio equipment.

- If you are into home construction then you really must get a copy of this catalogue. It will cost you £1.00 from Greenweld Electronics Ltd, 443L Millbrook Road, Southampton SO1 0HX. Tel: (0703) 772501.

**Whinston**
The latest edition of The Whinston Catalogue has just arrived. Known as "The Cat" by regular customers this one is No 121 September 1988 and is an indispensensible item if you are into home construction - or even car maintenance, d.i.y. or, dare I mention it, model engineering.

- Full of items such as nuts and bolts, bearings, electrical items, raw materials such as alloy tube and rod, tools and a whole host of other goodies too numerous to mention - both new or surplus - you can get your free copy by writing to K.R Whinston Ltd, New Mills, Stockport SK12 4PT or phoning their 24 hour Answerphone service on (0663) 42028.

Low Frequency Antenna System

There is a demand for a simple, low-cost, l.f. antenna capable of being erected in the confines of the modern garden. Many stations make do with end-fed wires with an a.u.u. but such antennas can give rise to interference problems and in general are poor performers.

- Waters & Stanton have introduced their solution to the problem in the form of the LF-8040 dipole kit. This is an 3.5/7MHz (80/40m) dipole with a total length of about 21.3m. This length can be reduced by dropping the ends or installing it as an Inverted "V" system.

- The kit comprises a pair of 50OHM traps together with a dipole 50239 centre piece, end insulators, wire and full instructions. The completed antenna operates as an efficient dipole on both bands and can be used without an a.u.u. The feed impedance is 50ohms and by the use of the special coils the size has been reduced to about half-size on the 3.5MHz (80m) band. Price is £29.00 plus £1.00 p&p. from Waters & Stanton Electronics, 18-20 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206635.
GRASSROOTS

Lorna Mower

Poole RAS have a Review meeting and videos on November 25. Meet in Commander's House, Constitution Hill Road, Poole, Dorset at 7.30pm. Dave Mason G3PFM on Poole 674539.

Loughton & District ARS meet in Room 20, Loughton Hall, Rectory Lane, 7.45pm. November 4 is Club Social including the Film Show. John Ray G8DZV on Loughton 3434 after 7pm.

Yevoli ARC have the Full Wave Dipole G3MMV on November 3, Zener Diode Voltage Stabiliser G3MYM on the 10th. Product Detectors G3VMY on the 17th and a Natter Night on the 24th. Thursdays, 7.30pm at the Recreation Centre, Childwall. David Railway G4NHM at 7 Thatcham Close. Yevoli BA21 3BZ.

East Lancashire ARC have a Home Construction on November 1. 1st & last Tuesdays, 7.30pm at the Conservative Club, Castleton Street, Blackburn. Philip Drew G1CPR on Accrington 32936.

Grafton RS have RFI in Industry G3XE on October 28 and Night on the Air on November 11. 2nd & 4th Fridays, Holy Trinity Church Hall, Stapleton Hall Road. Todd G0UZ on Southport 8155.

Wakefield & District RS meet Tuesdays, 8pm in Ossett Community Centre, Prospect Road. November 1 is Practical Evening, the 8th a Pig & Pea Supper at G4OWV and the 15th is Members on the Air h.t. Contest by John Roberts G1WKF at 1 Pontefract Place, Gartforth, W Yorks LS25 2NL. Brethurst & TS meet Tuesdays, 8pm at Rudge Wood Community Centre, Parkwood Green, Rainham. November 3/17 are Natter Nights, the 10th is Simple RX by G3GJU and the 24th a Construction Contest. Trevor Cannon G0LYW on Medway 32153.

South Manchester RAS have Halloween f.d. Contest on October 28. Visit to TV Switching Centre on November 4 and their Annual Dinner on the 11th. Fridays, 8pm in Sale Moor Community Centre, Norris Road. David Holland G3WFT on Sale 1837.

Midland ARS have MAXPACK demo (provisional) on November 15. Tuesdays 7.30pm, classes from 7pm. Unit 16, 60 Regent Place, B'ham. Wednesdays is Morse. Thursdays is On the Air. Tom Brady G6GGA on 021-357 1924.

Mid-Warwickshire ARS meet 2nd & 4th Tuesdays. 8pm in St. John's Ambulance HG, 61 Emscote Road. November 8 is Video Night RGB and the 22nd is Technical Topics by members. Peter Brown G0HIH on 0603 370.

Derby & District ARS meet Wednesdays, 7.30pm at 119 Green Lane. November 2 is a Junk Sale. Kevin Jones G4FMY on Derby 669157.

Wirral ARS meet 1st & 3rd Wednesdays at Arpley Farm, Arpley Park, Wirral. Natter Nights Tuesday 2nd is a Chairman's Night. Brian G8LBK on Wallasey 1346.

Both & District ARS have VHF Night on November 9 and a talk on the 23rd. Alternate Wednesdays, 8pm at the Englishcombe Inn, Englandcombe Lane. Eric Otter G0EVE on Combe Down 832156.

Cheshunt & District AR meet Wednesdays, 6pm in the Church Room, Church Lane, Werrington. November 9/23 are Natter Nights and the 2nd is a talk by G3OUP. Peter Davies G1KAQ on Lea Valley 769630.

Wimbledon & District AR have Weather Satellites G4CYE on October 28 and The Noise Bridge and Its Use G3OWW on November 11. 2nd & last Fridays, 7.30pm in St Andrews Church Hall, Herbert Road. Tom Mansfield G3EHS on 01-4921418.

Norfolk ARC meet Wednesdays, 7.30pm in The Norfolk Dumpling, The Livestock Market, Harford. November 2/16 are Informals, the 3rd is Visits to TV Studios in the TV City video and the 23rd is G3AMF on Early days of SB.

Chelmsford ARS have a annual Junk Sale on November 1. 1st Tuesdays, 7.30pm at Marconi College, Arbour Lane. Roy Martin G3PMX on Chelmsford 35221 Ext. 3815.

Workshop ARS have Nighters on November 1/15 and Call my Buff (Mattby visit Workshop) on the 8th. Meet Tuesday, time and place from Mr C. G. Gee G4ZUN on Workshop 486614.

Vale of Evesham RAC meet 1st & 3rd Thursdays. Ann Josh and Terry (both from Shipston) on the 15th. Howells ARS meet 1st & 3rd Thursdays. 7pm in the Shipston Arms. November 7 is a Quiz Night and the 22nd another Natter Night. Meet at The Edge of the World by G4WBR. Mike G4UXC on Evesham 831508.

Thompson & District AR have a Quiz Night on November 8 and Natter Night on the 22nd. Meeting place and time from H. Cromack G0FAT on Thornton 411062.

Acton, Brentford & Chiswick ARC have trips to Korea G3XPC on November 16. Alternate Tuesday, 7.30pm at the Chiswick Town Hall, High Road. W. G. Dyer G3GEH on Acton 3778.

Verulam ARC meet 2nd & 4th Tuesdays. 7.30pm at the RAE Association HG, New Kent Road. November 8 is on Activity Evening and on the 22nd the Club holds its annual Great Egg Race - an interclub event. Mike G4YJG on St. Albans 59316.

Reading & District AR have Berkshire Downs Repeaters by G4CCC/G8DO on November 8. The 22nd is their AGM. Alternate Tuesdays, 8pm at the White Horse Pub, Emmer Green. Mike Anthony G4THH on Reading 774042.

Short Wave Magazine November 1988

7
Listen to the World on the
HF-125 SHORT WAVE RECEIVER

The HF-125 short wave receiver was conceived, designed and is "Made in Britain" for the DX enthusiast. Its ability to perform on a crowded band with strong adjacent stations was a major consideration in its design. The HF-125 is also easy to use, the controls being simple and sensible. Essential bandwidth filters which are often options on other equipment are fitted as standard. Unnecessary frills are not included and their omission is deliberate. The result is an affordable receiver.

The HF-125 has continuous coverage from 30kHz to 30MHz. Operating modes are AM, USB, LSB and CW. An optional board (D-125) adds FM and Synchronous AM. The HF-125 comes complete with a comprehensive range of bandwidths. For the Morse enthusiast a 400Hz audio filter is included as standard.

Operating the HF-125 is refreshingly simple. The controls are logical in use and a large back-lit liquid crystal displays the operating frequency.

Two buttons, one marked up, the other down, select the correct megahertz and you tune to the required frequency using a large heavy knob with a thoughtfully provided finger recess. The tuning rates relate to a simple design concept of two stations per knob revolution on each mode. As well as providing the optimum tuning rate whilst you are carefully looking for a weak signal, the HF-125 automatically increases its stepping increment as the knob rotation speed increases. The result is an extra rapid frequency shift to a new part of the band. There is also an optional keypad controller (K-125) for even quicker frequency selection.

To further enhance reception other facilities are included. A noise blanker is permanently in circuit to deal with vehicle ignition interference. 20 dB of attenuation can be switched in when required and an HF or LF cut control can be applied to the audio output. The HF-125 provides its owner with outstanding performance.

Connections are included for both 50 and 600 ohm impedance aerials (SO-239 and a terminal block). The receiver has jack sockets on the rear panel, one for an external loudspeaker and the other for tape recording. The HF-125 operates from 12 volts DC and, as such, is suitable for use from an external battery whilst caravanning or boatling. For home use an AC mains adapter is supplied with the receiver. For truly portable listening, in the garden or on a hilltop, an internal rechargeable battery, charger and active whip aerial option (P-125) is available as well as a tough protective carrying case with shoulder strap (C125). Operation on a fully charged Nicad pack is around 10 hours.

Compact and lightweight, the HF-125 is 255mm wide, 100mm high and 200mm deep, a portable high performance short wave receiver.

HF125..........................£375.00 inc VAT, carriage £8.00
D125............................£59.50 inc VAT, carriage £1.00
K125..............................£59.50 inc VAT, carriage £1.00
P125..............................£69.51 inc VAT, carriage £2.50
C125..............................£23.85 inc VAT, carriage £2.50

FREE

Send 50p to cover the postage and we will send you, by return of post, your FREE copy of "THE LISTENER'S GUIDE" (2nd edition), a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in a "good read" but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

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Short Wave Magazine November 1988
When the archaeologists of the future unearth our civilisation they will have a good idea of our culture from the stamps they find.

Amateur radio operators have repeatedly been honoured by having stamps issued highlighting their hobby. And why not?

When you hear some of the stories about the deeds of some amateurs you know that these “badges of honour” are well deserved. Like the New Orleans radio amateur who, on hearing a Columbia emergency call asking for a snake serum, relayed the call so that the serum could be sent from Miami, saving a boy’s leg from being amputated, or helping to save a whaling vessel crew which had struck an iceberg in the Arctic; or the Canadian operator helping to rescue four soldiers in Manitoba 2400km away.

Pioneers

Stamps commemorate the handful of pioneers in 1901 who, inspired by Marconi, the father of wireless communications, grew into an international fraternity with half-a-million members.

Those were the days when all transmitting and receiving apparatus had to be assembled by hand with few books and no magazines available on the subject.

Remember, it was an amateur who helped track the first man-made satellite, who discovered the value of short waves and who opened the way to TV and v.h.f. f.m. broadcasting.

The wartime stamps are well deserved because World War II saw over 25,000 “hams” in uniform designing “comms” equipment, setting up global networks and manning radar installations. They were indeed valuable wartime assets.

Israel honoured its amateur radio operators in 1987. The Palestine Radio Club was organised during the British Mandate and eventually became the Radio Amateur Association of Israel. These amateurs played an important role in laying the foundations of the Army Signal Corps, as well as the civilian communications network during the early years of the state of Israel. The association has 900 members, 700 of which hold official licences.

Ascension Island issued a stamp in 1982 showing King George V making his first BBC Christmas Radio Broadcast to the Empire, something which has since become a Commonwealth tradition.

Amateur Equipment

A variety of old amateur equipment is portrayed on some stamps adding to the collectable quality of such stamps. Even Disney’s Chip and Dale get into the act on a Bhutan stamp, featured on the cover, celebrating the “History of Communications”.

Ever since 1840, when the postage stamp originated in England, postal authorities throughout the world have marked great milestones in science, medicine, arts and history by issuing special stamps. Those receiving such an accolade have earned a permanent niche in world history, for stamps never perish.

If you want to start your own collection, consult a stamp catalogue in your local library (Scotts, Gibbons or Minkus). They list and/or illustrate all stamps with their official number and current value. The catalogues are revised annually to include all new stamps and price changes.

Subscribe to a good weekly stamp newspaper (Linn’s), also available at most libraries. Search their advertisements for dealers who specialise in the country whose stamps you are after.

New Issues

You can also subscribe to a “new-issue” service in which you will be sent all “ham” stamp issues as they are released.

Visit a local stamp shop. They may have a good selection or be able to fill in the blank spaces. Used stamps are cheaper than mint.

Storage

Stamps should be stored in 3-ring plastic sheets, with windows, to protect the stamps from humidity, dust and creasing. They can be kept in a loose-leaf notebook.

Profits

The greatest profits lie in stamps with printing errors. A man in London went into his local Post Office for a sheet of 100 stamps priced at 9p each. When he got home he found that no price had been printed on them. A stamp shop later bought the sheet from him for £600.

In 1918, the US airmail stamp of the Jenny plane was printed upside down. A sheet of 100 were purchased at a Post Office window. Recently, one of those stamps was sold at auction for $100,000.

Newsletters

Some amateur radio club newsletters have regular columns dealing with philately, while others in countries such as Canada, Sweden, Cuba, Czechoslovakia, Berlin, East Germany, Bulgaria, Belgium and Portugal, carry stamp news over the airwaves.

As an amateur, it should be easy for you to ask other ham-philatelists in foreign countries to send whatever stamps commemorating amateur radio their country has issued to add to your collection. Perhaps you could even trade your own duplicates in this manner.

Rewarding

Just as few hobbies are more rewarding and utilitarian than amateur radio, with its friends, fun and excitement, philately lets you combine your original hobby with a secondary one to give you twice the interest.

Tune in and see.
Remove the a.f. input terminals with the wiring to them on the back of the chassis and fit two BNC sockets in their place. One is to enable a digital frequency counter to be driven from the L.O. and is connected via a small 2.2pF capacitor in series with a 50Ω resistor to the grid of the triode section of V3 (pin 9) using RG174 coaxial cable. The other is for an i.f. output to drive other equipment and is connected via a 10pF 250V capacitor to V7 pin 7, again using RG174 coaxial cable.

The network (C107, R70, T1) feeding the PHONES socket on the front panel is removed and the socket rewired across the 2.5Ω winding of the output transformer for use with low-impedance phones. The loudspeaker terminals are removed and two ⅛ inch jack sockets fitted in their place. One of these is wired directly across the 2.5Ω windings of the output transformer. The other is connected to the “Tape monitor” output in Fig. 3.1 A 2W 30Ω resistor is soldered across the secondary terminals of the output transformer to prevent it “singing” when there is no load across it.

Squelch Circuit

The squelch circuit (Fig. 3.1) is built on a tagstrip which is attached to the rear bracket of the selectivity switch (S2). Remove the noise blanker front panel switch — it never was very effective — and fit the 10kΩ potentiometer used to set the squelch level (Set trip). This modification is great when you are monitoring an empty frequency, waiting for a transmission, as it removes unwanted background noise — very useful if you do a lot of listening on the aircraft or marine bands.

Stenode Modifications

Part of the stenode circuit modifications have already been detailed in Part 2. These concerned alterations to the switching arrangements of S2 around the crystal XL1. To complete the stenode modification cut the connection between the wiper of the AF GAIN control RV3 and the grid of V8A (pin 2). A parallel RC combination (2.2Ω & 150pF) is inserted as shown in Fig. 3.1. The rear section of the SELECTIVITY switch (S2c) is wired so that in the MIN position this RC combination is shorted out.

Antenna Sockets

I replaced the antenna and earth terminals with two 75Ω BNC sockets and a sub-miniature toggle switch used to earth the A2 socket for unbalanced use. A 10nF 250V blocking capacitor allows for d.c. voltages on the antenna feeder such as might be used to remote-tune Varicaps on a loop antenna. Two 10kΩ bypass resistors from each input provide a discharge path for rain static.

T. J. Wright G1BCR/G9BZW

The final part of this series covers modifications to add a tape monitor, local oscillator output to drive a digital frequency display and a useful squelch circuit. The stenode modifications are also completed. Finally, some performance figures are given.

Mains Voltage

In areas like mine, where the mains voltage is often above 240V, the mains transformer core losses, and heater voltages, can be lowered a few per cent. This can be achieved by putting the unused low voltage winding on the transformer in series with the neutral leg. Make sure it is wired the right way round, series adding, or it will make matters worse. Check this by measuring the output from the transformer, before and after the modification.

Dial Markings

If you wish, remove the dial glass and, using a water-soluble ink to allow for alterations, underline the various frequency allocation, e.g. broadcast in red, marine in blue, aircraft in green and amateur in black. This makes rapid band searching much easier.

Leave the set running continuously for at least a week to allow the components to settle down and give it a reliability test. Finally do a complete and thorough realignment as described in the Service Manual and test the performance.

Results

The end result is, I feel, well worth the effort spent. Since completion my 940 is rarely turned off, so that I don’t have drift problems after turn-on, or surges causing premature failure. It has been in use now for over twelve months, given me much enjoyment and proved very reliable.

Performance

The overall performance of the receiver is shown in the charts. However, there is a discrepancy in noise figure, taken at 20kHz. One value (7dB) was obtained by taking the equivalent noise bandwidth from the i.f. curve (5kHz) and using a c.w. signal to double the noise output; the other (6dB) by a direct method, irrespective of bandwidth, using a thermal noise source. The most likely reason for this difference is local oscillator sidebands having the effect of increasing the bandwidth. Another possibility is inaccuracies in the equipment used in the test set-up.

While listening to the Eddystone on 5MHz, a Drake 150W transmitter was in use on 3.5MHz, the antennas being some 15m apart; this did not seem to have any detrimental effect on the receiver. Out of curiosity an oscilloscope was connected to the antenna socket of the receiver and about 1.5V of r.f. at 3MHz was noted — thus demonstrating the need for good r.f. selectivity in some situations.

Noise

The receiver has enough sensitivity as the output of antenna background noise will exceed internally generated noise, even on
a small antenna. The system is therefore externally noise limited so no further improvement is possible, unless the shape factor of the i.f. passband is reduced or improved, or an antenna with some directivity is employed.

The work suggested here should only be carried out by those with a sound knowledge of radio, or by others prepared to write off the set! The relevant manuals must be obtained from the manufacturer, and of course this type of restoration work could equally apply to other secondhand receivers.

I have refurbished many different models of Eddystone and other similar communications receivers, and am willing to advise anyone contemplating or involved in such an undertaking.

---

**Abbreviations**

- a.f. = audio frequency
- BNC = type of coaxial socket
- c.w. = continuous wave (Morse)
- dB = decibel
- i.f. = intermediate frequency
- l.o. = local oscillator
- nF = nanofarad
- pF = picofarad
- r.f. = radio frequency

**Performance**

- Minimum detectable signal: -129dBm (0.9μV)
- Minimum usable signal: -117dBm
- S/N (NAD): 6 or 7dB
- Noise figure (see text): 7dB
- Third order intermodulation distortion (see Note 1): 9dB
- Fx ± 20kHz: 7dB
- Fx ± 100kHz: 5dB
- Fx ± 200kHz: 1dB
- 1dB gain compression (1kHz separation at 20MHz): -1dB
- Selectivity: 6dB above noise floor
- -6dB ± 2kHz
- -60dB ± 8kHz
- Image rejection: > -110dB at 2MHz
- -70dB at 10MHz
- -40dB at 20MHz

**Notes:**

1. Spurious free dynamic range for spurious products 3dB over noise floor.
As this is being written we are but a few days away from the date on which the United States Armed Forces Radio and TV Service is due to leave the short wave broadcasting bands. AFRS programming was carried over the facilities of the Voice of America which rented the time to AFRS. An increase in those fees is blamed for the loss of AFRS on short wave.

At this point it is generally expected that a great hue and cry will be raised when the world public finds out AFRS is no longer available to them since the AFRS audience includes untold numbers of non-military, non-US citizens around the globe. Many felt that AFRS, with its string of domestic network news feeds, pop music and play-by-play sports gave a better "feel" for life in the US than other stations in America.

Readers who want to appeal for a return of AFRS to short wave may write letters to the following. The Chairman, House Foreign Affairs Committee, 2534 Rayburn House Office Building, Washington DC 20515 and Chairman, Senate Foreign Relations Committee, SR-335 Russell Senate Office Building, Washington, DC 20510. Also to Lt. Col. Thomas Hanen, AFIS/AFRTS, 601 North Fairfax, Suite 360, Alexandria VA 22314 and to Mr. Charles Z. Wick, Director, US Information Agency, 301 Fourth Street, NW, Washington DC 20547. If enough letters are received perhaps this valuable source of short wave programming can be returned to the airwaves.

**WWCR Nashville**

WWCR, the new US short wave station based in Nashville, Tennessee, had to delay its planned September start-up. But if the new intentions went according to schedule it should be on the air about now. Actually, the revised start date was January 2. Check 7520 and 15690 for this one's appearance. Reception reports may be sent to 3314 West End Avenue, Nashville, Tennessee, 37203.

WRNO in New Orleans, through its sales representative for religious programming, Pierce International Communications, is offering a special edition QSL card for reception reports on any one of some 40 different commercial religious broadcasts aired on WRNO each week. If you verify at least 20 of these programs you can get what Pierce terms a "very special QSL card." Reception reports may be sent to Pierce International Communications at 10021 Torre Ave., Suite 320, Cupertino, CA 95014.

**Radio Kek'chi**

In Guatemala, Radio Kek'chi on 4845 has matched an increased operating schedule to a new 5 kilowatt transmitter with the result being much improved reception in North America. Indeed, Kek'chi dominates the frequency leaving the normally strong Brazilian there completely unheard. The former 0100 sign off now is at 0400 or even later. The programmes include many in the Kek'chi Indian language, religious songs and the like.

In Costa Rica, Radio For Peace International (RFPI) was using two new frequencies during the summer and fall months - 13660 in the 22 metre band was active from 0100 to 1000 and 21555 from 1800 to 0000 during the weekdays. The 22 metre band was reported by some to suffer from jamming. That wasn't noted in several checks at our midwest US location and it's difficult to see who would want to jam this station or why.

**Colombia**

Colombia has seen some fresh broadcasting activity on short wave of late. New is La Voz del Rio Arauca, a member of the Radio Cadena Nacional (RCN) network, broadcasting on 4896 from the town of Arauca. The call letters on short wave are HJR and the transmitter runs 3 kilowatts. Sign on is at 1000. The station's address is Calle 16 con Carreras 20 y 21, Arauca, Colombia.

Caracol Bogota now occupies 4755 24 hours per day. Some ten years back this frequency was used by Emisoras Nueva Mundo and the new activity is really the same station but using the Caracol network designation, as does Caracol Neiva on 4945. The two frequencies often carry the same programming from Caracol.

Radio Super in Bogota, main station of the Super Network has beenreactivated on its former 6035 frequency.

A rare Chilean station has been heard by a few North American DXers recently and perhaps will be logged by a few more if its frequency of 6030 is emptied of AFRS and the VOA does not place another service there. The station is Radio Santa Maria from Coyhaique, scheduled from 1000 sign on to 0400 close.

The Voice of Nicaragua is using 6100 again instead of its more often used 6015 frequency. The station airs two hours of English per evening (except Sundays) at 0200 and 0500.

In Venezuela there are reports of three stations planning to broadcast on short wave, though none have yet appeared. They are Radio Alto Lano on 5010 from Santa Barbara de Barinas; Radio Continental de Barinas to be at 4940 and Radio Cristobal at San Cristobal which says it will use 9570.

A number of DXers have complained about the frequent refusal of the Falkland Island Broadcasting Service to issue QSLs, even for highly detailed reports. An easier route may be to log the British Forces Broadcasting Service's programming on the FIBS transmitter and then send the report to FIBS, PO Box 1234, London W2. Most of BBS has been much kinder with replies. The FIBS 3368 frequency carries BBS programming at all hours of the day except from 1000 to 1215 and 1730 to 2130 when the programme are those of FIBS.

**HCJB in Hawaii**

Look for some short wave broadcasting activity from Hawaii a couple of years from now. HCJB (Quito, Ecuador) has applied to the American Federal Communications Commission for a license to build a station in the Hawaiian Islands. The station would improve HCJB's coverage of Asia. Most North American DXers look upon Hawaii (and Alaska, for that matter) as separate "radio countries".

**DX Publications**

Two limited circulation DX publications based in North America - Fine Tuning and Numero Uno - recently organised a joint committee tasked with several assignments. These include attempting to get the broadcasting administrations or private stations in countries not now using short wave to consider the advantage of adding a short wave service, encouraging stations which do not have schedules which make them hearable in North America to make one-time schedule adjustments or special broadcasts and other special on-the-air events. The committee, as yet without a formal name, is already working on some projects and seeks ideas and suggestions along the lines sketched above. Send your comments and suggestions to Mr. Richard D'Angelo, 2216 Burket Drive Wyomissing, Pennsylvania 19100.

**Frendx**

The North American Shortwave Association (NASWA) has long been the largest club on the continent and deals exclusively with short wave broadcast listening and DXing. The club's bulletin, Frendx, is undergoing something of a facelift under a new editorial committee and has included some excellent articles over recent months. Sample copies can be had by sending $2 to NASWA, 46 Wildflower Road, Levittown, PA 19057.

We are out of room for this time. Please send your comments in care of Short Wave Magazine. Be assured that your letters are very welcome. Until next time, best wishes from North America!
**NEW BEARCAT**

**IT'S HERE AT LAST!**

Bearcat's latest high technology scanner is now available in this country. It covers 10* mtr, 6* mtr, Airband, High Band, UHF and 950MHz. The UBC 200XT is the hand held scanner with the latest facilities - 850-950MHz in 12kHz steps, 200 memories in 10 Banks. Super LCD Backlight for discreet listening in the dark, detachable Nicad power pack & charger @ £240.00 (E5.00 P&P).

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**SHORT WAVE RECEIVERS**

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<td>Many more makes and models in stock - PLEASE CALL FOR PRICES</td>
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**ROYAL 1300 WIDEBAND DISCONE**

Following the huge success and popularity of the 25-1200MHz wideband discone antenna - Icom AH 7000 & Velco - Diamond D101 with transmit facilities on VHF-UHF amateur bands, Raycom decided to persuade a UK manufacturer to make a "BRITISH COPY" at a very competitive price!

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Lattice masts can be divided into two distinct categories: fixed and tilt-over. The former type is made up of sections, typically 3m in length, and the total height of the structure is determined by how many sections are bolted together. During the construction of the tower, the lower section is normally bolted to a firm foundation and the structure is then assembled vertically. For the amateur, this is fine provided vertigo is not a problem.

Tilt-over towers usually consist of several telescopic sections, thus allowing the structure to be extended, at will, to various heights. Generally speaking, a single winch is used for extending the mast and also for providing the lifting (tilt-over) facility for maintenance and access to the antennas. Tilt-over can only be effected with the lattice sections retracted. This type of mast is available from several manufacturers and is popular with many radio amateurs. A variety of height options are available and some designs of 18m and under are freestanding and do not require the complexity of guy-lines, etc. Various types of mounting posts are available too. Some of the smaller mast systems do not even require a concrete foundation.

**Advantage**

One bid advantage of a lattice structure over a pole mast is the improvement in accessibility. In the case of a fixed mast, it may be climbed to gain access to the rotor and the various antennas, although with a tilt-over type this may be carried out in complete safety at ground level.

The latter type can also be retracted during periods of inclement weather such as gales or heavy thunderstorms; most systems can be lowered manually within minutes by only one person. The fact that the smaller systems do not require guy-lines means that the system is more likely to meet approval from the planning authorities and the neighbours, but you must be prepared to spend a few hundred pounds for this privilege.

**Home-made Mast**

Some years ago, the authors and a couple of colleagues were able to obtain a number of second-hand triangular lattice sections at a cost of virtually next-to-nothing. The lattice sections were fabricated from iron and each measured 3m in length. The sections were secured to adjacent ones by means of three bolts.

The idea of a fixed structure was immediately ruled out because of the weight of each section of lattice. It was difficult enough for one person to lift a section off the ground let alone drag it vertically upwards to assemble the mast! It was decided that some form of pivot assembly would need to be designed for easily raising and lowering the mast. In theory, the whole erecting operation should be more predictable too when compared with the pole mast previously used because the rigid lattice structure would not sway and bend.

After the share-out, only two lengths of 3m lattice were available per person, so this meant that some form of extension would be required in order to attain a similar height of the original pole mast.

The extra height was achieved by adding a scaffold pole clamped centrally inside the mast by means of six heavy-duty clamps (see Fig. 1). At the top of the scaffold pole, the rotator was fitted. The rotator used was of the popular offset variety which accepted an antenna support pole of 1.5m diameter maximum. An alignment bearing was also fitted below the motor unit. The rotator conveniently provided a securing point for the upper set of guy lines—the lower set of guy lines were attached to the protruding top lugs of the lattice section. Both sets of guy lines share the same ground anchoring points, but it is important to note that separate turnbuckles must be used.

As with the scaffold pole mast described in Part 13, the guy lines were cut to length prior to erection. Similar hardware associated with the guying, such as turnbuckle and eyes, etc., were also used.

The mast was made of a number of heavy-duty clamps arranged to form a pivot and locking arrangement as shown in Fig. 2. A number of clamps were required which may at first seem rather extravagant when the total cost is taken into account, nevertheless, the mast base pivot arrangement has proved to be safe and reliable after eleven years, considering the weight involved.

Initially only a single section of lattice was clamped to the pivot bar. The lattice section was then manually raised and once vertically, the "U" bolts were tightened. Note that adjustment is virtually impossible once the mast is completely assembled because of the weight involved. Consequently, great care and accuracy was necessary at this stage.

As with a building, it is vitally important to have a firm and reliable foundation for a mast installation. One made of concrete is strongly recommended, since the downward weight of the mast may be quite considerable, especially in the case of an iron one.

For the type of mast described here, a hole measuring about 0.6 x 0.6 x 1m deep should be excavated. Dig carefully though, there may well be waterpipes or drainage systems present just below the surface. One slip of the spade and you could be up to your neck in it—literally!

Once the excavation is complete, explore around the immediate vicinity with a probe for water pipes which may be lurking a few more centimetres from the bottom of the hole. This important procedure is in preparation for later activities involving hammering in poles for supporting the mast pivot assembly. The hole will eventually be filled with concrete and to give extra strength, a few broken bricks can be added. If your previous arrays brought down the chimney stack during a gale then the remains could be used!

Four lengths of scaffold pole are hammered into the clay at the bottom of the hole. Getting the poles truly vertical and perpendicular must be done by means of a plumb line. If you attempt to align these by sight, you will have difficulties because looking down a hole can create the illusion that the poles are parallel when in fact they are not! Consequently, don't be too alarmed when the poles seem to converge yet the plumb indicates they are vertical.

To make concrete, a mixture of Portland cement and aggregate consisting of sand and coarse gravel should be prepared. When buying aggregate, obtain the type classified as "all-in" which has the sand and...
gravel already mixed in. The recommended ratio of ingredients is 1 part cement to 4.5 parts aggregate. These must be thoroughly mixed dry in sufficient quantity required to fill the hole. Once this has been carried out, small amounts of clean water should be added and, using a spade, turn the mix constantly until it is workable with no dry aggregate present. Eventually, the mix should be stiff enough to hold ridges formed with the edge of the spade but, remember, the mixture will begin to become unworkable after an hour or two. Once the concrete has been poured into the hole, the surface can be smoothed using a trowel.

At least a week should be allowed to give the concrete chance to dry and acquire some strength before fitting the clamps, etc. If possible allow a longer period because the drying-out process continues over many weeks.

When the lattice mast and associated conglomeration of accessories have been laid out along the length of the garden, it soon becomes apparent that great difficulty will be experienced in raising it to a vertical position, especially if the lattice is made of iron. If a willing army of volunteers is available all well and good, but a more elegant approach is to use a winch.

Winches are relatively inexpensive, but the main problem may be finding somewhere to buy one. In this respect, the authors were fortunate in that there was a local yacht chandler in business. A suitable type of winch is one that can take 1000lbs strain - despite this, it is surprisingly small. Suitable rope for hoisting the mast is relatively cheap too, and the type eventually chosen should be suitable for weights up to one tonne.

For the system described by the authors, nylon rope was used in favour of metal cable as a safety precaution in the event of the rope snapping while hoisting the mast. Metal rope could inflict a very serious injury, whereas with nylon rope the only people in any danger are those beneath the lattice mast helping to guide it vertically. Whilst on the subject of safety, it may be wise for all concerned to wear some form of protective headgear, just in case anything does decide to plummet to the ground!

Most lattice sections have protruding upper lugs to which the rope (and guy-lines) can be conveniently attached by means of a heavy-duty "D" shackle. The nylon rope is terminated with an eye and needs to be spliced. The authors were fortunate because the yacht chandler offered to do this rather skilful task which only took a couple of minutes to perform, producing an extremely neat end result.

The general winch arrangement is shown in Fig. 3, which also shows the method of attaching the nylon rope to the lugs of the lattice mast.

A firm anchorage point for attaching the winch is required. A length of aluminium scaffold pole knocked into the ground to a depth of about one metre is sufficient and the winch can be bolted to the face of the protruding upper portion. Remember to knock the tubing into the ground at a slight angle in the same way as for the guy-wire anchor points. The holes for the winch bolts are best drilled after the tubing is in position.

Without a winch, it could take seven or eight people to erect such a mast, but using this device the number is only four - one to operate the winch and three to help raise the mast to a sufficient angle for the winch to take effect. The greatest effort is the initial lifting of the mast, but once past a certain angle it's only a matter of guiding it to its vertical position and helping to keep the winch rope taut.

Once the mast has been erected and its base firmly secured using the heavy-duty clamps, the guy lines can be attached to their respective ground anchor points. Adjustment will be necessary in order to obtain true vertical alignment of the structure. In most cases, the alignment can be checked by comparing it with the corner of the house wall.

Once alignment is satisfactory, the winch rope can be removed and stored for use at a later date should the mast have to be lowered. If the rope is left attached, it may well deteriorate and become weakened. The winch can be unbolted from its support and stored in a safe place rather than being left out to rust. Such a move also prevents it from being stolen.

In practice the system works well. Antenna accessibility is better than a pole mast of similar height, although it’s not the type of structure you’d wish to lower on a daily basis! No doubt readers with a greater mechanical inclination would be able to devise a tilt-over system based on similar types of lattice section.

**Larger Antennas**

Should a more ambitious antenna system be contemplated in which very large arrays stacked in formation may be incorporated, a sturdier antenna support pole of larger diameter must be used. Consequently, a different type of rotator to the one described above will be required in order to turn the heavier load. This can be mounted inside the upper part of a lattice section (see Fig. 4), although the exact method of mounting will depend upon the type of rotator used. A little careful thought and experimentation should provide a solution. It will be necessary to obtain a
The lattice sections obtained by the authors were definitely in need of renovation, despite the single coat of pre-sale aluminium paint! Casually scraping away patches of rust soon indicated that the renovation would be both time consuming and extremely boring — but it had to be done. Fortunately, a hot week towards the end of May occurred and the task was undertaken. The wire brush attachment was duly fitted to the electric drill and the work commenced once the necessary protective goggles were worn. Don’t attempt to carry out this type of work without eye protection – it is dangerous. Similarly, there is plenty of dust created even when the job is done out of doors, so it’s a good idea to purchase a pack of disposable masks to prevent the inhalation of rust and old paint, etc.

The most difficult task is getting into the corners where the thin angular struts join the main vertical supports. When all the rust has been removed and the bare iron is on display, some form of rust treatment should be carried out, otherwise your precious time will have been wasted. A liquid preparation known as Jenolite was used for removing the rust and, surprisingly, a small amount goes a long way — so don’t be tempted to buy a gallon of the stuff! Follow the instructions carefully when applying it to the bare metal. A primer paint can then be used for the base coat. One containing a rust inhibitor is best. The primer used by the authors was called Rustodian, and it is classed as a “rust inhibiting calcium plumbate lead based primer paint.” An industrial or specialist paint supplier should be consulted for this product.

Applying the primer can be fun and there is something satisfying about watching it being “splashed” on. No matter how careful you are though there will always be a little bit you will miss, especially with having to treat the inside surfaces and all the nooks and crannies. Two coats are sufficient but you’ll have trouble seeing where you have missed a bit with the second coat!

Aluminium paint can be used for the subsequent top coats and it looks good when completed. It is advisable to store the sections for several days or even a couple of weeks to allow the paint to harden fully, otherwise the surface could easily be damaged causing water to penetrate, thus allowing the rust cycle to commence once again. Avoid climbing the mast for a month or two, if possible, for the same reason.

The mast used by one of the authors was originally renovated during 1978 and then again in 1987. The second renovation was an easier task because the few rust patches present were only superficial and complete renovation was not considered necessary. Eventually, it was decided that stripping the various layers and repainting would be beneficial and this time it only took three or four evenings to complete.

Routine Maintenance
It is advisable to periodically check any mast and antenna installation for wear and tear. There is quite a lot of weight involved with antenna masts and their demise can be extremely frustrating. DX reception is not the only thing you could lose — you could also lose a place to put the plants once the greenhouse has been demolished. Ideally, the system should be periodically maintained and frequent checks made for signs of slackness in the guy wires. It’s not much fun attempting last minute adjustments and routine checks of this nature during the early hours surrounded by a howling gale.

Antennas can sometimes be dismantled and the oxide removed from the elements and boom to make them look shiny and new again. The use of a soap-filled pad (e.g. a Brillo pad) dipped in warm water to clean aluminium tubing achieves shiny results amazingly fast. All electrical connections should be thoroughly checked (re-making the connections is a good idea) and if there are any signs of water penetration inside the antenna junction boxes, find out why. If penetration has occurred, be prepared to replace the whole of the coaxial cable since capillary action may have drawn in water along its entire length.

A MESSAGE TO ALL OUR SUBSCRIBERS

We would like to apologise to all our subscribers for the delay in the delivery of their October issue of Short Wave Magazine. Unfortunately the Post Office managed to lose the entire October subscription posting — only finding it four weeks later! Thank you for your patience and cooperation, particularly those who took the trouble to telephone and let us know as soon as their copy arrived through the letter box.
Pre-amplifiers

Bert Jackson of Leeds has written asking about adding a pre-amplifier to his scanner. He wonders how much of a difference one would make to the reception of weak signals.

This is a bit of a tricky question to answer, as a lot depends upon the sensitivity of the receiver you intend to use it with, and your location.

Check your existing equipment, starting with your antenna. For example it is in a good location outside the house and close of nearby objects? Are you using the best coaxial cable that you can afford? If the answer to either of these two questions is no, then improve this aspect of your station before adding a pre-amp. The best addition to any station is a good antenna.

If you tend to listen to just one small band of frequencies, for example one of the Amateur or Air Bands then the best choice may be one dedicated antenna for that particular band. This is because most of the wide-band antenna designs only have limited gain across their frequency coverage. Dedicated antennas on the other hand generally have more active elements for a given size at the frequencies of interest, and so produce more gain.

However to fully exploit the frequency coverage of your scanner a wide-band design is required. The two main types of wide-band antenna are the discone, which gives all round coverage but with only about 1dB gain, and the Log periodic, which provides increased gain, but is directional and so requires the addition of a rotator.

After the antenna comes the coaxial connecting cable. If you have a cable run of more than 2 or 3 metres and are using thin UR43 type cable then replace it! The thicker UR67 type or better still some Rome Poly will make a big improvement, particularly at the higher frequencies. Beware of cables sold in CB shops as many of these are only intended for use on 27MHz and have a much thinner outer braid than their professional equivalents.

If you are interested in frequencies above 500MHz then seriously consider using Helix cable such as Andrews LDF 450 or its equivalent. Only after fitting the best antenna and feeder you can afford should you consider the use of a pre-amplifier.

However before rushing to fit one have a look around your immediate neighbour- hood. Do you live near any transmitting stations, radio amateurs or p.m.r. users such as taxi companies? If you live in a city the chances are that you will, in which case you could be asking for trouble if you fit an amplifier. This is because the increased gain brought about by the pre-amplifier, coupled with the strong local signal, can lead to overloading of the receiver. Although this will not cause any permanent damage it can create other problems. The most usual manifestation of this is the local signal appearing in the background on other transmissions. In really severe cases it can lead to the wanted signal being blocked out each time the local station transmits.

Of course, this situation can occur without a pre-amplifier in circuit, but adding one will make any small instance of overloading many times worse.

Assuming that you don’t run into these problems then adding a pre-amplifier may improve your station. A few guidelines first though. The best site for a pre-amplifier is at the masthead, just below the antenna, with as short a connecting lead as possible. Choosing this location helps to prevent any additional attenuation introduced by the cable worsening the performance of the system. This is because it boosts the very weak signals before they become reduced still further by the losses in the cable run to the receiver. Additionally it helps to prevent these weak signals from being masked by the noise present in the input stages of the receiver.

What should you look for when choosing a pre-amplifier? Well the most important parameter to look at is the noise figure. This is a measure of “goodness” and shows how much additional noise is introduced into the system by the pre-amp. Good figures for wide-band designs are around 1dB at 100MHz and 3dB at 500MHz. The smaller the figure the better, but beware of really low figures as these are generally only valid at one spot frequency.

Many people are misled into believing that the gain of the pre-amplifier is the most important figure. This is not so. In fact many commercial designs have too high a gain for use with the average scanner, which as I mentioned earlier can lead to overloading. If the pre-amp has an adjustable gain control of if you have a variable attenuator that you can put in circuit between the pre-amp and the receiver, then you can set the gain for an optimum value. Put the pre-amp in circuit and set it for maximum gain. Tune the receiver to a weak n.f.m. station – select one that you can just understand above the receiver noise. Now reduce the gain until the noise starts to become noticeably worse, this is the optimum gain setting. If the pre-amp is good it should not be introducing more than about 10dB gain at this point. Take the pre-amp and attenuator out of circuit and listen to the signal with the antenna connected directly to the receiver. Does the signal sound any worse? If it does then the pre-amp is making a difference. If it doesn’t then the receiver input stages are already as good as, or better than the pre-amp you are testing. The final point to watch for is the signal handling ability of the amplifier. This is particularly important with wide-band designs as they have to deal with many strong signals throughout their frequency range without producing spurious signals. The way in which this is specified is in terms of the 3rd order intermodulation products generated by the circuit.

The method by which this is determined is rather lengthy for this column but the figure to look for is greater than + 10dBm at the input. Beware of figures much larger than this as some companies quote the 3rd order product at the output of the amplifier making the specification look better. In this case the gain of the amplifier has to be taken into account.

From a user’s point of view I have found it advantageous to have some means of by-passing a pre-amplifier, for instance in order to check when I suspect overloading of the receiver. Some pre-amplifiers have this facility built in, but in other cases it may be necessary to fit coaxial relays to perform the function.

One other application for a pre-amp is as a distribution amplifier, permitting one antenna to feed several receivers with little degradation of the signals. This can be achieved with a TV antenna splitter fed from the output. Cheap resistive splitters will work, but for the best results use one of the low-loss ferrite types. As well as having lower losses through the splitter they also offer greater isolation between the receiver feeds. (Fig. 1)

With care a pre-amplifier can be a useful addition to your receiving station.

This month Alan starts his column with some advice on the use of pre-amplifiers. Icom R7000 memories are discussed with further information on mods to this scanner.
Icom R7000 Memories

A small problem with the modification to provide 100 extra memory channels I outlined in the May issue has been brought to my attention. Although this was based on an Icom drawing it does suffer from the drawback of discharging the receiver’s lithium memory back-up battery rather more rapidly than expected. However there is a solution to the problem which also has the advantage of making the modification easier to perform.

Please read the previous article before attempting any work as most of the details are the same as outlined before, except that IC8 Pin19 on the logic unit is now desoldered and pushed back through the board to the component side. This saves having to cut the p.c.b. track on the underside of the board. (See Fig. 2) The new 47kΩ resistor is now connected between the raised i.c. pin and the anode of D9 which is located just to the right of the multi-way connector used for the remote control option. It is advisable to sleeve the resistor leads before running them along the topside of the board. The lead to the switch is taken from the junction of IC8 Pin13 and the new resistor. You may have to desolder the lithium battery to gain access to this point so ensure that it does not short against the i.c. pin when it is refitted.

Band III Update

Many of the new p.m.r. allocations in the middle of the old 405 Line TV Band III (174-225MHz) are now buzzing with activity as the new networks take on more customers. Most of the systems are becoming fully operational and are now starting to offer regional coverage through interlinking or trunking of the base stations. In principle this is very similar to the cellular telephone system where the user is transferred from base station to base station as he moves around. All the handover arrangements are taken care of automatically by the system, the user being unaware of any changes. Signalling being achieved by means of a 1200 baud data burst at the end of each transmission. The advantage of this system is that it offers a much higher quality service than that obtainable from a single base station and additionally permits a greater number of users per block of radio channels. One other bonus for users is the improved protection against casual eavesdropping as a result of the changes of channel each time the user is handed over to the next base station.

Many existing p.m.r. users are expected to move to the new systems as the running costs are much lower than those associated with more traditional systems providing wide area coverage. I believe that over the next few years we will see many of the large radio communication users such as power industries, Water Boards and breakdown services re-engineering their existing systems to take advantage of the new technology.

New Products

By now the latest hand-held scanner from Uniden-Bearcat should be available from dealers. Called the BC-200XL it offers frequency coverage of the bands 66-88MHz, 118-174MHz, 406-512MHz and 806-966MHz. Other features include 200 memory channels, 10 priority channels, channel lockout, automatic search, scan delay and snap-on battery pack. It does however have the annoying feature present on most scanners originally designed for the American market — no manual mode changing, a.m. being selected automatically on the v.h.f. Airband with no means of changing from f.m. on the other bands. I am sure that this feature will affect UK sales, unless of course a modification is possible. The price should be around £249 with several dealers offering them, so check the advertisements for details.

The other new product should please Icom R7000 or Yaesu FRG9600 owners. This is a new version of the already popular Aircast Scanner Computer which has been available for use with the AOR 2002 for some time. It is a stand alone unit which connects to the scanner, and provides a whole host of additional features. The only additional items required are a 12V supply and a computer or terminal with an RS232 interface. The scanner computer can then be programmed to operate the receiver automatically, searching out new channels, logging channel occupancy on an external printer or switching a cassette recorder on when certain channels become active.

These are just a few of the tasks possible depending on how you programme the unit. A very interesting product I believe.

Contact Aircast Products, PO Box 78, Bournemouth BH1 4SP. Tel: (0202) 660233 for further details.

The end of another column — I am always interested in receiving your ideas and questions, so keep those letters coming in to the usual address PO Box 1000, Eastleigh, Hants SO5 5PB.

Until next month — Good Listening.

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SERVICES

Subscriptions

Subscriptions are available at £17 per annum to UK addresses and £19.00 overseas by Accelerated surface Post outside the Europe. For further details see the announcement on page 20 of this issue. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both Short Wave Magazine and Practical Wireless are available at £27.00 (UK) and £30.00 (overseas). Three year subscriptions are also available for SWM at £45.00 (UK), £50.00 (overseas).

Components for SWM Projects

In general all components used in constructing SWM projects are available from a variety of component suppliers.

Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit board for the SWM Audio Filter, July '87 issue, is available price £2.75. The printed circuit board for the SWM Active Weather Satellite Antenna, June '88 issue, is available price £4.20. Orders to Short Wave Magazine, Enfeco House, The Quay, Poole, Dorset BH15 1PP. Prices of p.c.b.s include VAT and P&P.

Back Numbers and Binders

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

Binders, each taking one volume of the new style SWM, are available price £3.50 plus £1 post and packing for one binder, £2 post and packing for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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25th ANNIVERSARY YEAR 1963-1988
Radio Australia in the 1980s

Radio Australia is a division of the Australian Broadcasting Corporation, the country’s national broadcaster. It is funded, by, yet independent of, the Australian Government.

The stations brief is to foster an understanding of the Australian nation and people and to reflect Australia’s views on the world and regional affairs. It also promotes regional awareness amongst neighbouring countries and provides an invaluable link back home for expatriate Australians. Priority is given to serving listeners in the Asian and Pacific regions, in particular China, Indonesia, Papua New Guinea, Malaysia, Singapore, Thailand, the Philippines, Vietnam, Japan, Burma, India, Pakistan, Sri Lanka, Bangladesh and the Pacific nations. This it does through its services in English, Indonesian, Standard Chinese, Tok Pisin, French, Thai, Japanese and Vietnamese. All of these services are carried on short wave, using some fifty frequencies daily.

The station’s output is to some extent regionalised, with language services targeted to specific areas for the peak listening hours. The studios in Melbourne are never silent, with around 340 hours of programming produced every week.

The Indonesian Service broadcasts morning, afternoon and evening sessions and provides an entertaining mix of news, information and entertainment. A daily English language course is one of the most popular programmes.

Chinese listeners have the benefit of standard Chinese programmes in the morning and evening and Cantonese during the evening too. Programmes have an emphasis on information about Australia, spanning music, talks, news and documentaries. There is also a daily English language course.

The Papua New Guinea Service broadcasts every evening in Tok Pisin and English, with the regular programming comprising talks, interviews and information programmes, together with the modern and traditional music of Papua New Guinea and the Pacific region.

The French Service transmits every day to the Pacific, Asia, Indian Ocean and African countries. There is an emphasis on lively music and programmes which focus on issues of importance to developing countries as well as those reflecting Australian life.

Thai listeners have a breakfast time service which focuses on information, particularly world news and current affairs with a strong emphasis on events in South West Asia. English lessons can be heard twice a week.

The Vietnamese Service is broadcast each evening with news, current affairs, topical talks and a segment devoted to Australia and Australians. A wide variety of music is featured including Vietnamese Opera.

The Japanese Service transmits two average sessions. The first of these is tailored to a younger audience, concentrating on music, whereas in the second broadcast, entertainment and music are balanced by news, current affairs and information programmes.

News and Current Affairs

All of Radio Australia’s programmes include news and current affairs, topical spoken work features and interviews and easy listening music. There is also regular and in-depth sports coverage.

The English Service transmits 24-hours a day, aiming to reflect and showcase modern Australia, its culture and issues, through music and spoken word programmes. It also provides a comprehensive news and current affairs service. The news room is manned 24-hours a day, providing a service to all the language sections, together with major bulletins in English every hour through the day and night. Several broadcasting organisations in the Pacific take some Radio Australia bulletins on relay and either record them for later re-broadcast or transcribe them for translation and broadcast.

Around 230 people work at Radio Australia, with about half born abroad. Language broadcasters are usually recruited from their home countries and work under three-year contracts. The largest single department is News and Current Affairs which employs around 50 people.

Radio Australia is located 18km from the Central Business District of Melbourne in East Burwood. The 18.2 hectare site will eventually comprise all of the ABC’s radio, television and administrative departments. The new Broadcasting Centre, which was completed at the end of 1982, replaced leased accommodation in an old factory in Central Melbourne. The new building has three levels with a gross floor area of 6800m², with the upper levels housing studios, programme departments and administration. Level One houses the workshops, storage, staff facilities and plant rooms.

Each programme department is virtually self-contained and in close proximity of the studios — most of which have an external view, a number overlooking the main entrance foyer. There are 18 studios, including 17 in one and two person configurations for presentation and recording work. There is also one multi-track production suite. The six “one-man-operation” studios are intended for live on air presentation and are operated by professional announcers/presenters. They, whilst presenting a programme, also control its signal levels via their studio consoles. Five suites of studios and associated control booths are provided for live on air presentation, or for production and recording of taped programmes. For convenience in presentation, most of the music played on Radio Australia is recorded on standard broadcasting cartridges, rather than each presenter using individual discs. Thus, there is a full-time need for transferring music from discs or tapes onto cartridges.

Radio Australia’s Master Control Room is a global reception and distribution centre. Every day, the station sends 50 hours of programme in its nine languages to its world-wide audience.

A computer controlled switching system with a capacity of 40 inputs/outputs is the core handler of all traffic, able to feed material into and out of the Radio Australia centre, as well as from point to point in the building. Sixteen Aussat lines come into Master Control, as well as terrestrial lines from Melbourne Sound Operations Centre and ABC’s Master Control in Melbourne. Twenty lines are available to service the transmitters around the country.

Voice reports from the world-wide network of Radio Australia correspondents are received and recorded in a Lines Room for distribution to the programme departments.

We continue our look at Radio Australia by coming up-to-date to see what they are doing in the 1980s and where they are heading in the future.
There's no need to dwell on the way in which the postal problems have taken their toll of this month's column but I'll try to catch up on all your letters when they finally arrive. Meanwhile here are some more descriptive 'goodies' to keep you going.

**You Communicate**

Some of this month's offerings from you were of necessity by 'phone! Tommy Menzies GM1EQ (Edinburgh) was until recently pilot of Proctor Cherokee G-ARYR but has changed to small high-wing Cessnas with the sale of his previous aircraft. Much of his flying is based at Fife (Glenrothes) which is also the site of an n.d.b. (G0) dah-dah-dit, dah-dah-dah, 402kHz). Another of Tommy's local airfields is Cumbernauld which has recently had an asphalt runway built and will now be increasing use for general aviation training (with an air/ground frequency of 120.6MHz). Tommy knows the cheapest place to uplift Avgas in Scotland; if you'd like to be let in on the secret then please write via the editorial address and, as in all exchanges of information with other readers, enclose both a blank and a self-addressed envelope (stamping each). In this case also tell me your aircraft or flying club details. If it's information you 're after then The Pilots' Database carries class IIA/B NOTAMS and more. To enquire about membership eligibility write to 85 Malthouse Lane, Earlswood, Solihull, West Midlands, B94 5RZ. Access when permitted is via telephone, modem, and terminal (for PC and emulation). Lucky owners of Prestel equipment will also find aeronautical information on pages 20970, 20971, 20972-20974 inclusive and 20973.

One of our regulars Geoffrey Powell (Tamworth) 'phoned in and asked about amateur use of radar. Marine radar would be annoyed too, as it is intended to help prevent collisions at sea. I'm not sure of the licensing requirements but if used in a built-up area its high-intensity pulses could cause serious interference to neighbours' electronic equipment. I'm not aware of any licensed amateur experiments as the regulations expect the frequency allocations to be used for stations to communicate with one another and not to simply bounce signals off inanimate objects. One effect that can be heard on v.h.f. amateur transmissions is aircraft flutter, a fortuitous event when an aircraft passes through the signal path and momentarily enhances received strength. Of course this gives no clue as to the exact position of the use not only general height or heading, but this is a repetition of the earliest experiments that first demonstrated the feasibility of radar.

Now a report from Sorrento, Italy, where Graham Whitling was on holiday. "QNH high, temperature high, visibility high." Sounds ideal! What about the aircraft? I always feel that the flight is an important part of a Mediterranean holiday.

**Frequency & Operational Information**

No apologies for repeating my plea about care at airfields. Don't go where you shouldn't - at Wycombe Air Park (Booker) some visitors transgressed and met with trouble. If you over-indulge your welcome, you will have the Air Navigation Order to thank rather than the much kinder law of trespass! And please don't be one of those annoying people who plays their radio loudly as if it's some kind of status symbol. Stick an earpiece in it. Lastly, don't smoke near aircraft, on movement areas or in the hangar. You might not hear the bang!

There are two new frequency changes in the 888 issue of the General Aviation Safety Information Leaflet from the Civil Aviation Authority (CAA). The Blackpool Approach frequency is temporarily replaced by Tower on 118.4MHz and Land's End has a new frequency of 130.7MHz.

Perhaps the subject of flight safety was invented, along with the hot air balloon, by the Montgolfier brothers. Here is the accident report.

**Aircraft type:** Mk 1 hot air balloon. **Power plant:** One open fire. **Location:** France. **Date:** 19/9/1783. **Purpose of flight:** Air test. **Crew:** 3 **Injuries:** 1 (fatal)

The three crew members (a sheep, a cock and a duck) embarked in the aircraft. On landing the cock was found to be dead. The investigation centred on the intrinsic safety of the aircraft. However, eye witness evidence stated that the sheep had been seen to kick the cock to death during the flight. The cause of the accident is therefore assumed to be due to the conduct of the crew rather than any pre-accident defect in the aircraft itself.

But I digress. At Biggin Hill the QTR/21L grass strip has been withdrawn. Ground movements control has been introduced at Coventry on 124.8MHz during summer weekends (0830-1900). Edinburgh now has an Association Terminal Information Service (a.t.i.s.) on 132.075MHz. The a.t.i.s broadcasts are very useful when trying to form a general picture of actual weather at various places (e.g. en route). The August "Airband" described the departures now in use at London (City). CAA Aeronautical Information Circular 72/1988 points out that route A is not just restricted to flights to Paris. Youth in the Air Year (1988)

The Royal Aero Club (President: HRH The Duke of York) are organising this project to enable individuals and groups of 14-21 year-olds to accomplish something aeronautically-related. Obviously that includes flying but there's no need to leave the ground; the project is very open-ended and other ideas include reducing tension in airport departure lounges, producing a newsletter (will it rival "Airband"?), or improving in-flight catering (not too difficult in some cases!). Now, I've offered to give any assistance that my Museum can provide, remember that here is a resource of technical aircraft equipment and instruments. If any participants need this assistance please 'phone me on 01-958 5113 (weekday evenings). More information about Youth in the Air is available from Andrew Healey (Aviation Publicity, Faroak Airport, Chobham, Surrey. GU24 8BH; telephone 0945 5670 in office hours). If any of the younger readers out there have an idea for a project, well, you now know what to do! And there are various prizes including a trophy. But hurry — there's little time left this year to send in your application.

**Some Theory**

Many references have been made in this column to the instrument landing system (i.i.s.) but a new improved microwave landing system (m.i.s.) is now being developed to supersede the older equipment and to provide greater accuracy, less susceptibility to distortion by terrain and other aircraft, and hence improve safety. The transmissions are around 5GHz and include at least the inevitable azimuth localiser and elevation glide slope. In some cases a flare commens signal is crossed in the path of the runway threshold and helps with autoland. The signal is encoded and sweeps across the beamwidth in time. Depending on which code the aircraft receives, the time relation of the signal can be worked out. If this is X milliseconds from the start of the sweep, the displacement of the aircraft from the sweep's origin can be worked out. Some of the British Airways Boeing 757s are currently monitoring an experimental m.i.s. set-up as they land on 27R at London (Heathrow).

Some other nav aids are also mentioned from time to time. Doppler is self-contained within the aircraft. A signal at 8.8GHz is transmitted with a typical power around 1W. Two beams are aimed fore and aft and left-right of the aircraft, both angled sharply downwards. The return echo changes frequency according to the Doppler shift and from this the speed and side-drift of the aircraft over the ground is worked out.

When you hear the Morse idiom of a beacon, its audio modulation is nominally
Departure from Edinburgh

Larger airports have laid-down standard instrument departure (s.i.d.) procedures for use on take-off. These are devised with not only air traffic control operations in mind but also noise abatement. A few years ago I followed the s.i.d. out of Edinburgh by sitting in the passenger compartment of a Trident 2 and using nothing other than the let-down plates, a reasonable (ex-diving!) magnetic compass and a pair of Mk.1 eyeballs (which didn’t work too well in the dark and with the low cloud base). There are two final points to aim for on these departures; a reporting point called GRICE to the north and, on my flight, the southerly point of TALLA which is a v.o.r. (TLA: dah, di-dah-di-dit, di-dah, 113.8MHz). The westerly runway’s departure is TALLA 1C but my flight is going out on the easterly TALLA 1D. The path curves away from the town itself, flying basically clockwise round its northern edge and throwing the noise back along the Firth of Forth. Only then does the clockwise track turn south, track 050° until the d.m.e. shows 7nm. Then, a right turn on to a magnetic track of 150° is made and the track followed until the Talla 029° (from) radial is intercepted. This radial is itself now tracked inbound to the beacon by making a further right turn on the 209°. By the time we are within 12nm of Talla (using its d.m.e.) the aircraft must be above 4500ft (QNH altitude) and there’s high ground ahead. Back with you again next month, probably with a backlog of your letters.

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>a.t.i.s.</td>
<td>automatic terminal information service</td>
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<td>CAA</td>
<td>Civil Aviation Authority</td>
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<tr>
<td>d.m.e.</td>
<td>distance measuring equipment</td>
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<td>GHz</td>
<td>gigahertz</td>
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<tr>
<td>Hz</td>
<td>hertz</td>
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<tr>
<td>i.l.s.</td>
<td>instrument landing system</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>m.l.s.</td>
<td>microwave landing system</td>
</tr>
<tr>
<td>n.d.b.</td>
<td>non-directional beacon</td>
</tr>
<tr>
<td>nm</td>
<td>nautical mile</td>
</tr>
<tr>
<td>PC</td>
<td>personal computer</td>
</tr>
<tr>
<td>QFE</td>
<td>height above airfield altitude</td>
</tr>
<tr>
<td>QNH</td>
<td>standard instrument departure</td>
</tr>
<tr>
<td>s.i.d.</td>
<td>tactical air navigation system</td>
</tr>
<tr>
<td>v.h.f.</td>
<td>very high frequency</td>
</tr>
<tr>
<td>v.o.r.</td>
<td>very high frequency omnidirectional radio range</td>
</tr>
<tr>
<td>VORTAC</td>
<td>v.o.r. with TACAN watt</td>
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</tbody>
</table>

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**BEHIND THE SCENES AT RADIO AUSTRALIA**

> **21**

Output from the one person studios goes directly to air via the Master Control and the transmitters. All transmissions to air are recorded in Master Control on a 16-21-track logging tape, covering all transmitter lines as well as the Telecom talking clock. Each spool can hold 24-hours of programme.

Master Control also houses an extensive monitoring system which can distribute material throughout the building from a variety of sources, including studio output, three short wave receivers, TV audio and f.m. and a.m. tuners.

Transmission supervisors staff Master Control for 24 hours daily. They are shift leaders, monitoring incoming and outgoing material and supervising the work of 12 operations officers. Outside business hours, these senior personnel are effectively in charge of the station.

**English Service**

On the air 24-hours every day of the year, the English Service of Radio Australia is one of the favourite stations for thousands of listeners throughout the world. With informal and friendly presentation which appeals to listeners young and old and a range of programming just about second to none. Radio Australia reaches out to bring some sunshine and warmth from down-under to the rest of the world.

**News**

Broadcasts about Australia, Asia, The Pacific and the world at large are heard every two hours from 0100UTC.

**International Report**

Is a half hour programme analysing and interpreting events from around the globe. It is heard every two hours from 0000UTC.

**Anything Goes**

Is with John Anderson with all types of musical delights on Sunday at 0300. Monday at 2230, Wednesday at 0230, Thursday at 0630 and Friday at 1730.

**Communicator**

Is a weekly media report with Roger Broadbent heard on Sundays at 0230, 0730, 1230, 1730 and 2030UTC.

**Boomerang**

Answers listeners questions about Radio Australia on Thursdays at 2345, Fridays at 1713, Saturday at 0913 and 1430 and Sunday at 0113.

**Monitor**

Is with Brendon Telfer looking at science, medicine and technology news from Australia on Saturdays at 0430, Sundays at 2330, Mondays at 1530, Tuesdays at 0730 and Fridays at 0130UTC.

There’s more to Radio Australia’s English language programmes than the brief selection shown here, full details are carried in the Radio Australia programme guide.

The station can be heard clearly in Europe during the morning and evening periods: try 9.655MHz between 0700 and 1030 and in the evening from 1500 until 2000 on either 7.205 or 6.035MHz.

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
Many of the better m.w. receivers have an antenna socket quoted as being a "nominal 400 ohms" with others being anything from 300 to maybe 1000 ohms at the AE and E terminals somewhere at the back. Unfortunately this impedance can vary over the band, although connecting your 50/75 ohm loop to these sockets will probably give quite good results in spite of the obvious mismatch.

Matching

If you intend to use a higher antenna impedance RX with a low impedance loop the usual arrangement is to make a wide-band, ferrite ring, matching transformer which can give quite impressive results. Again, this has some limitations over the whole of the medium wave band.

The Hi-Lo MW antenna matcher described here was designed to cover this general situation. It is nothing more than a simple variable CL matching unit to match low impedance loops to high impedance receivers. Consisting of a carefully designed inductance L and a 1nF variable capacitor all enclosed in a screened box, it has been used to match many low impedance loops to various high impedance receivers and gives that little essential extra needed on a very weak DX signal.

The Circuit

The circuit is shown in Fig. 1. The variable capacitor is a good quality, 500 + 500pF, 2-gang, air-spaced type with both gangs connected in parallel to give a total capacitance of 1000pF. A short length of coaxial cable is plugged into SK1 which is a phono socket. This cable should be kept as short as possible, certainly no longer than 150mm. The other socket, SK2 is the usual coaxial antenna socket used to connect the unit to the loop antenna, using coaxial feeder.

Most medium wave DXers use a good communications receiver with a loop antenna. Loops have a low impedance of 50 or 75 ohms and, while some m.w. communications receivers have a 50 to 75 ohm input allowing direct connection to the loop, many do not. This simple unit will allow you to match a loop into your m.w. receiver.

Construction

The inductance L1 consists of 47 turns, of 7/0.2mm pvc covered wire (1.2mm o.d.), close-wound onto a 10mm diameter ferrite rod 140mm long. The winding is started 12mm from one end of the ferrite rod, leaving a flying length of the wire at each end for connection purposes. The rod is held in two Terry Clips screwed to a length of dry wood 12mm thick and 140mm long, which is then fastened to the bottom of the screened box.

The dimensions of the metal box are not critical - the one used for the prototype measured 212 x 40 x 40mm and provided that there is plenty of clearance around the ferrite rod you could use any metal box.

Operation

Operation is simple. Just set the variable capacitor to the general search area to which the receiver is tuned, peaking it when the desired signal has been found. You will find that the effect on a weak signal can be quite dramatic! The original unit covered the frequency range 300 to 1580kHz i.e. the whole of the medium wave band plus the segment down to the h.f. end of the l.w. band.

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This might give you the impression that they're fairly exclusive. Far from it.

With prices between £69.95 and £299.95, Sony shortwaves cater for everyone, from the everyday business traveller to the most demanding enthusiast.

At one extreme you'll find the ICF 5100.

It may look like the standard tranny found in most people's kitchen. It's as easy to use as your average tranny. But don't let that fool you.

A flick of a dial and Radio 1 is replaced by stations from every corner of the World (and the top, bottom and sides as well). To reduce interference it has a dual conversion circuit, a feature usually reserved for the most expensive models.

Speaking of which, at the other extreme is the ICF 2000D.

It does everything an enthusiast could want. And quite a few things he didn't know he wanted but will soon swear he couldn't do without. Like a synchronised detection system for instance, something you'd only expect in professional equipment.

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For a free trip around the World (well, its radio stations anyway), ask your nearest Sony Shortwave Centre for a free demonstration.

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Edgware Electronics Centre, 194 Edgware Road, London W2.

Harrods Ltd., Radio & TV Dept., Brompton Road, Knightsbridge, London SW1 XJL.

Knightsbridge Electronics, 155 Knightsbridge, London SW1 7PA.

LeSet Ltd., 115 Fulham Road, London SW3.

PNR Audio Vision, 28 Tottenham Court Road, London W1P 9RB.

Welbeck Video Ltd., 26 Tottenham Court Road, London W1.

Selfridges Ltd., Radio & TV Dept., 400 Oxford Street, London W1A 1AB.

Wallace Heatson Ltd., New Bond Street, London W1.


Galaxy, 230 Tottenham Court Road, London W1.

Spatial Audio & Video, 29 Tottenham Court Road, London W1P 9RE.

Massey Radio Ltd., 117 Chiswick High Road, Chiswick, London W4.

David Ingram (Hi-Fi Centre), 42-43 Lower Marsh, Waterloo, London SE1.

Alvabond, 70 Ballards Lane, Finchley, London N3.

Goodwins, 7 The Broadway, High Road, Wood Green, London N22.

Southern England: Suttons Limited, Bourneemouth Sony Centre, The Quadrant, Bournemouth B1 2AB.

Milton's Audio Visual Ltd., Southampton Sony Centre, 29 London Road, Southampton, Hants. SO1 2AD.

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Visibly Sounder, 100 Union Street, Torquay, Devon.
Moss of Bath, 45 St. James Parade, Bath BA1 1UO.
Upton Electronics, 31 Torquay Road, Paignton, Devon TQ3 3DT.
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The intensity of the signals present at a receiving site may range from very weak to very potent and result in voltages at the antenna terminals of a receiver of less than 1 microvolt to well in excess of 100 millivolts! High gain r.f. and i.f. amplifiers will be needed in the receiver for the weaker signals, but the stronger signals will easily overload them unless the gain can be reduced. The provision of a suitable gain control is complicated by the fact that the strength of many signals varies in a random manner due to fading.

Manual Gain Control

If the effects of overloading are to be avoided the amplification in the r.f. and i.f. stages must be varied to suit the level of an incoming signal. This could be done manually by varying the bias on one or more of the transistors used in these stages, or in a valve receiver the bias applied to variable-mu valves could be changed by simply varying a common cathode resistor.

Varying the gain of the r.f. and i.f. stages will alter the audio output, so the control could also be used to maintain a comfortable listening level. Some care in its adjustment would be needed when tuning across a band however, because the low gain setting required for potent signals could easily result in the weaker signals being missed altogether, whereas the high gain setting needed for weak signals could well result in an unacceptable high audio output when a potent signal is encountered!

Although manual control of the receiver i.f. gain may be satisfactory while receiving a long or medium wave a.m. ground wave signal during daylight, some difficulty may well arise after dark because additional sky wave paths cause fading. The majority of short wave signals also suffer from some form of fading and continual changes in the state of the ionosphere result in widely varying signal levels, so manual control if the receiver gain is impractical.

Automatic Gain Control

In order to counteract the effects of fading and maintain equal audio output levels from all signals received, some form of automatic gain control (a.g.c.) is required which will vary the r.f. or i.f. amplification of the receiver in inverse proportion to the strength of an incoming signal. The way in which this can be achieved in practice will depend upon the type of signal involved. One system, which may be used with a.m. signals, is known as reverse a.g.c. because an increase in signal strength results in a decrease in the current flowing in the controlled amplifier stages which leads to a reduction in gain.

The basic circuit of the last two i.f. stages of a transistorised a.m. receiver using reverse a.g.c. is shown in Fig. 2. The a.g.c. will respond to variation in incoming signal strength will depend upon the time constant or product of R3/C2 in the a.g.c. filter – typically 0.2 to 0.5 seconds is required for a.m. broadcast signals.

To achieve maximum efficiency it is necessary to apply the a.g.c. potential to as many of the r.f. and i.f. amplifier stages as possible so that the majority of the receiver gain is controlled by the a.g.c. system. However, it is not good practice to apply the a.g.c. to the mixer stages since more efficient operation can be obtained by using a fixed point on the transfer curve. High gain at low noise is required in the first r.f. amplifier if a good signal-to-noise ratio is to be achieved, so the a.g.c. is often omitted from this stage too. Because of the limited signal handling capacity of many transistor r.f. stages a variable r.f. attenuator (0-40dB) is often provided in the antenna input circuit so that very strong signals may be attenuated manually before they can reach the input of the first r.f. amplifier.

The overall effect of the a.g.c. system will be to hold the receiver audio output reasonably constant despite wide variations in incoming signal strength – see curve "B", Fig. 1. Note however, that if the receiver is operating close to maximum gain when the incoming signal level is at its mean value, it will not be possible for the a.g.c. system to increase the gain sufficiently to maintain a constant audio output when the signal level falls, so it is important that there should be an ample reserve of gain.

One of the disadvantages of the system so far described is that even a very weak signal will be rectified when it reaches diode D1 and filtered by R3/C2 so as to create a negative d.c. control voltage which will vary in proportion to the strength of the incoming signal. It is then applied to the base of the bipolar transistor Tr3 in the preceding i.f. stage via R2, where it tends to oppose the positive fixed bias applied via R1 and causes the overall gain to be reduced. An increase in incoming signal strength results in a higher negative control voltage which will further reduce the fixed positive bias on the base of Tr3 and lower the overall gain. Conversely a reduction in signal level, such as during a fade or when tuning into a weaker signal, will reduce the control voltage and allow the positive bias on Tr3 to rise and so increase the overall gain. The rate at which signal at the output of the last i.f. stage Tr4 is sampled via C1 and then rectified by diode D1 and filtered by R3/C2 so as to create a negative d.c. control voltage which will vary in proportion to the strength of the incoming signal. It is then applied to the base of the bipolar transistor Tr3 in the preceding i.f. stage via R2, where it tends to oppose the positive fixed bias applied via R1 and causes the overall gain to be reduced. An increase in incoming signal strength results in a higher negative control voltage which will further reduce the fixed positive bias on the base of Tr3 and lower the overall gain. Conversely a reduction in signal level, such as during a fade or when tuning into a weaker signal, will reduce the control voltage and allow the positive bias on Tr3 to rise and so increase the overall gain. The rate at which signal at the output of the last i.f. stage Tr4 is sampled via C1 and then rectified by diode D1 and filtered by R3/C2 so as to create a negative d.c. control voltage which will vary in proportion to the strength of the incoming signal. It is then applied to the base of the bipolar transistor Tr3 in the preceding i.f. stage via R2, where it tends to oppose the positive fixed bias applied via R1 and causes the overall gain to be reduced. An increase in incoming signal strength results in a higher negative control voltage which will further reduce the fixed positive bias on the base of Tr3 and lower the overall gain. Conversely a reduction in signal level, such as during a fade or when tuning into a weaker signal, will reduce the control voltage and allow the positive bias on Tr3 to rise and so increase the overall gain.

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negative control potential resulting from a weak signal. The a.g.c. action will remain inoperative until the rectified signal voltage exceeds the pre-determined delay voltage.

The reverse a.g.c. system is also employed in many of the a.m. valve receivers still in use, but in most of the older circuits diagrams it was referred to as automatic volume control (a.v.c.) rather than a.g.c. The negative control potential is applied as a bias to the grids of variable-mu valves in the r.f. and i.f. stages and any increase in signal strength results in more grid bias, which reduces the gain, conversely a weaker signal results in less bias and increased gain.

Full advantage can be taken of high gain low noise amplification in the first r.f. stage of valve receivers without having to resort to a.g.c. to limit the gain, because the signal handling capacity of most valve r.f. amplifiers is superior to their modern transistor counterparts. To cater for very potent signals a manual control marked r.f. gain is often provided — this is simply a variable resistor in the cathode circuit of the first stage which enables the applied bias to be increased, thereby reducing the gain. The a.g.c. is not usually applied to the mixer stage(s) because the varying anode current could affect the stability of the associated local oscillator, especially when a single pentagrid or triode-hexode valve performs the dual role of mixer and local oscillator.

Although the reverse a.g.c. system is generally satisfactory in receivers using variable-mu valves, it is far less satisfactory in transistorised receivers employing bipolar and some types of field effect transistors. The main problem is that reducing the gain by lowering the positive bias on the base, decreases the current flowing through the stage to the point where its ability to handle the signal without distortion is severely impaired. In addition, reducing the current causes a rise in the input impedance of the stage — this will affect the i.f. selectivity, especially if the controlled stage follows a crystal filter. Fortunately the signal handling problems can be avoided by using a technique known as forward a.g.c.

In the forward a.g.c. system a reduction in gain is obtained by increasing the current flowing in the controlled stages! This can be effected by applying sufficient forward bias to specially designed transistors so that they are operating in the saturated region of their characteristics. A weak incoming signal will result in a d.c. control potential from the a.g.c. rectifier which will slightly increase the forward bias on the transistors and allow a high gain, but a strong signal will result in a high control potential which will drive each transistor deeper into saturation, thus reducing the gain considerably. It follows that the highest current will flow in each stage when it is required to amplify the strongest signal, so this system offers a distinct advantage over the reverse a.g.c. system as far as signal handling and distortion is concerned.

More Advanced Systems
Both types of a.g.c. system may well prove to be satisfactory in long, medium and short wave a.m. broadcast bands, but a more complex approach is often adopted in communication receiver designs. A wider dynamic range than can be provided by these simple diode a.g.c. systems may be required when certain types of m.o.s.f.e.t. are used in the r.f. stages and when the i.f. stages are designed around integrated circuits. A minimal loading on the output of the i.f. stage can be effected by using an a.g.c. amplifier to boost the signal sample prior to rectification — see Fig.3. This will also ensure that the a.g.c. diode is driven well into the linear region of its characteristics. The RC network following the rectifier provides a suitable decay time — see later. A d.c. amplifier raises the control potential to the required level.

More than one a.g.c. system may be used in some advanced designs. By taking an additional sample of the signal prior to the filter(s) used to restrict the i.f. bandwidth, an a.g.c. potential based on a broader response may be obtained. Strong adjacent channel signals, which will be outside the passband of the filter(s), will result in a control potential which may be applied to the early stages and help to eliminate splatter and cross modulation. Instead of obtaining the a.g.c. control potential from the i.f. signal the amplified audio output from the detector is sampled and rectified in some receivers, but there is really very little to choose between the two systems.

The provision of an effective a.g.c. system for use with a keyed carrier (c.w.) signal conveying Morse code or a single sideband suppressed carrier (s.s.b.) transmission presents a number of difficulties because there is no continuously available signal at the output of the last i.f. stage on which to base the operation of the a.g.c. system!

In many communications receivers a beat frequency oscillator (b.f.o.) is coupled into, or just prior to an envelope detector, so that incoming c.w. signals result in an audible beat note at the detector output — see page 32, SWM July '88. Unfortunately the b.f.o. output will also produce a large a.g.c. control voltage which will greatly reduce the sensitivity of the receiver, so it is necessary to disable the a.g.c. system by shorting the control line to ground. In these circumstances it is usual to operate the receiver with the audio gain well advanced and then control the r.f. gain manually.

By screening the b.f.o. and reducing the coupling so that its output only reaches the detector, it may be possible to reduce the control voltage arising from it to an acceptable level, but a better approach would be to sample the incoming signal at the output of the penultimate i.f. stage and rectify it so as to produce a control potential based purely on the level of the incoming signal. This may not be necessary when a product detector is used for c.w. reception because of the inherent isolation between the signal and b.f.o./c.c.o. ports — see page 37, SWM September '88.

Since there will be no signal during the key-up periods between the characters of each letter and between words it is necessary to change the a.g.c. time constant so that it decays slowly during the gaps in the signal so that the overall remains reasonably constant. Fast attack (2ms or less) can be obtained with low impedance a.g.c. detectors, but the long decay times required (0.2-1s) can be achieved by using a large value capacitor for C in Fig.3.

Similar problems arise in the a.g.c. systems used with s.s.b. signals because there may well be no output from the transmitter during brief pauses between words etc. Unless a long decay time is employed in the a.g.c. system the gaps between words will result in an objectionable surge of noise as the gain suddenly increases. However, a long decay time also implies that a large interference "spike" can effectively mute the receiver for a long period after it has gone, so special hang a.g.c. systems have been devised, which maintain a steady a.g.c. potential for a pre-determined period after the incoming signal has gone, but the rise and decay times are made very short. Receivers which cater for a.m., s.s.b. and c.w. signals often provide a choice of three a.g.c. conditions — fast, slow and off. 

---

**Fig. 3**

A diagram illustrating the principle of forward a.g.c. with a diode detector and RC control network.
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SHORT WAVE MAGAZINE NOVEMBER 1988

31
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Thanks to the postal strike, I have just three days in which to write, so, alas, rather than discussing the doings of contributors I will have to deal in the main with technical points.

Barry Smith (Stockbottle, Northumberland) has returned to the fold after some 25 years; he has bought the Sony receiver out of a shop 20 miles away and started logging the signals again. At first Barry used the telescopic whip antenna and then an aerial box and finally a dipole to an antenna comprising some 30 metres of wire. Since erecting this he has found that for much of the time he needs to keep the DX/Local switch at "Local" and wonders why.

At a guess, the DX/Local switch is almost certainly an attenuator fitted between the antenna and the first active stage of the receiver. Most modern rig manufacturers use such an attenuator, usually 10 or 20dB. The reason for this is that the input to the receiver is inherently the most wide-band, so that literally hundreds of signals appear at the base of the first transistor. Some of these are in the ammeter’s red hot range! When I am listening to, and some — usually the “Really Big Ones” are further away but still major, the signal size is so large after going through any a.t.u. and the first tuned circuit in the receiver.

Now, as long as the receiver stages are still in the linear range, the signal size is no longer operating linearly, and so it behaves as a mixer of sorts, mixing everything in sight and creating a whole new unwanted signal. The result of this mixing action is of course just plain noise — so many signals mixing result in broad-band noise and it is the one you are listening to, you may in fact note the sort of behaviour I used to call “plugging! I don’t think the result is to be seriously distressed. Should you be listening to a small signal, then as soon as you plug, the mixing increases and the non-linearity, the resulting noise swamps the weak signal totally. If you had an a.t.u. control, you would find that the meter needle moved away from the noise. Now, in the linear range, the noise will fall in volume along with the signal until this resulted in the “Big Ones” ceasing to overload the “front end” when suddenly, lo! the noise level drops to reveal lots of previously inaudible smaller signals for you to listen to. The noise has picked up more than the signal level at this point.

The practical situation is that you can either have an a.t.u. control, or an attenuator, or maybe both. Disregarding the attenuator and using the r.f. gain control, the side-effect is that the receiver’s “Noise Figure” tends to deteriorate somewhat. Thus an attenuator is considered a negative feature, and a r.f. stage base is a sightly better bet. Ideally one would like a fully variable attenuator, but anyone who has tried to make a practical variable attenuator can tell you it is one thing to design it on paper, but quite another to guarantee it does the job. Most of the cost of a precision step or switched attenuator lies in the cost of skilled individual adjustment of component positions as part of the test procedure. Hence a compromise: a receiver with a fixed r.f. attenuator and a separate adjustable r.f. gain control which usually acts by adjusting the bias conditions. In addition the receiver will probably be fitted with an a.v.c. line, which automatically backs the r.f. and i.f. gains down when a big signal reaches the detector.

The problem of course is that a.v.c. (or a.g.c. as it is more properly called) will only control the receiver gain when the wanted signal is the “Big One”; whereas we want to reduce the off-wanted signal which probably never gets as far as the a.v.c. stage. Ideally of course, one would have a lossless crystal filter connected between antenna and r.f. stage — but that would slightly limit one’s ability to tune around, to put it mildly. Thus the fixed r.f. attenuator, sometimes correctly labelled, sometimes called a DX/Local switch.

This, in simple terms, the story. However, when all is said and done, the stage that more often overloads first is in fact the mixer, but the argument doesn’t really change much as it is a fact of life that the mixer stage usually, by its very nature, overloads before the r.f. stage. Most of the difference in the design lies around the best balance of characteristics, bearing in mind the device characteristics — home constructed or an a.t.u. ‘sort through’ the box and select the devices to give the best combination, which is why you get so many viewpoints on this practical on a mass production line.

One other factor is that so many of the broadcast stations are using up to megawatt of power into, say a rhombic antenna to lay down a mighty signal — great for a listener to that particular broadcaster who has a lossy skywire, but a pain for the s.w.l. who has a good, but relatively small antenna to hand.

And, of course, if you happen to be in an area where the local noise from the broadcast stations is rather high, then you may get a reversal of direction as you tune up and down. This can be done with a g.d.o. and sensitive reflectometer or s.w.r. meter.

For the lower bands, about all you can do is hang up the proverbial “Best Bent Wire” and feed it to the receiver in conjunction with an earth, preferably through a t.a.u. of some sort. In these circumstances, the easy part is the antenna and the a.t.u. — but the key to success is the earth system. Here the station earth comprises a short (2 metres) and relatively useless earth spike, which is backed up by many radials as can be got down under the station and the lawn — just far enough down to avoid them fouling the mower blades is enough — coming to a point at the base of the mound. In addition I have a wire-mesh fence on each side of the garden all bonded together and to the earth, plus a couple of metal works which are also bonded. The result is a really good earth system.

Amateur Bands Round-up

The next three deadlines for your letters are: November 15, December 19 and January 16
Antenna Tuning Units

Antenna tuning units can be quite expensive to buy. If you have a dipole, properly cut and in the clear, or carefully resonated by g.d.o. and s.w.r. meter if not so clear, then you don't really need an antenna tuner. Either of us use one wire or one antenna for all bands, when an a.t.u. is decidedly useful — it makes a lot of sense as a couple of S-points or more on some frequencies. For a first trial, you can wind some wire on a toilet roll core, and connect a variable capacitor out of

an old transistor portable in parallel with the coil. The aim is to resonate the coil with the tuning capacitor on the chosen band, and to fiddle with the coil until you get about 1.5pF of tuning capacity for every metre of wavelength, 30pF for the Twenty Meter band for example, as judged by eye. Knowing how much RF maximum the capacitor is, and looking at the shape, a reasonable "gueستimate" is quite enough.

Now you can run a bit of coaxial cable between the receiver antenna terminals and the coil. Connect the braid to the rear panel end of the coil and one conductor to a croc-cro. Connect the antenna by way of a croc-cro. Now fiddle with the position of the croc-clips and tuning on whatever band you are trying. For example, you are trying to peak up 14MHz. Sit in the middle of the band with the receiver r.f. gain well up, a.f. at a reasonable volume, band open. Connect the croc-clips, tune the a.t.u. capacitor for a peak. If you have no joy, move croc-clips and repeat. When you get some joy, adjust the croc-clips and tune with more care for the best result.

You are aiming for a situation where the a.t.u. peaks the incoming signals, and not so sharply as to call for a slow motion drive.

You've just made an a.t.u. You had one here for years made like this, sat on a packet of envelopes on the window sill, with the wire laid straight through the wooden, opening, window surround. Of course, you can elaborate with a case and chassis, and a better former — or a lack of shell varnish — and make it cover two or three bands by winding the coil for the lower band, and then the higher one for the turns for a higher band. The principle is unchanged, though.

SEE & HEARD

Decoded on Wednesday 28 September 1988
Ruth Laura — congratulations to
Elaine & Mike Richards

Readers Letters

My idea of a tape containing sample RTTY text was a very popular move. Mr. M. Newbold of Derbys has written expressing an interest in these tapes to help him resolve amateur RTTY signals through which he doubts this will lead to a wider

interest in utility stations. His station currently comprises a Yaesu FRG-9600 receiver with an AEA PX-322 multi-mode terminal unit. The computer is a Commodore 64 and the antenna is a Danong active unit.

This international response to this column is still growing and this month John Dimond of Green Point South Africa has written describing his success with utility station QSLs. Since obtaining his copy of the Utility Address Handbook by Richard Klein-Arends in April '86 he has managed 98 successful QSLs which is pretty impressive. John hasn't sent me his full station details, but I can tell you that he uses a Kenwood R-2000 receiver.

I've only received one plea for help this month and that comes from Harold Pinkney who uses a Spectrum + computer with his Trio R1000 receiver to receive SSTV and FAX signals. Harold was hoping that we might be able to help him dump FAX images from his computer to his Citizen 102D parallel printer. If you can help please drop me a line.

My second international letter comes from Eric Billich in Ontario, Canada. Eric has been involved in radio since joining the RAF in the 1940s, though he has lived in Canada since 1946. One point he makes concerns equipment prices which are generally about half the UK price. Perhaps because of this, Eric operates a very simple 10-meter station decoding is achieved using the Infortech M-7000 multimode unit, which decodes FAX in addition to most of the RTTY modes.

The antennas in use are a 25m long wire, commercial taped dipole and a random length of wire in the loft. Of course, it's an approved and successful DX station, Eric has sent in a log with over 1000 RTTY loggings as well as a large number of FAX and ARQ logs! To complete the picture Eric is a member of the Ontario DX club which has a thriving utility section within it's membership of over 1000.

My last international contact this month is Colyn Brookes from Cape Town, South Africa. He finds utility station DXing "a dream" from his location as he has a clear run into the Pacific via Indonesia. He can even log fishing boats off the Philippines without too much trouble. He writes the utility column for the 34 DX Club, a club for those living on the 34 degree parallel. Hopefully I shall have the space to add a few of his loggings into future lists.

Frequency List

The frequency list seems to be very popular, so much so that I am not sure how to be patient. By the time you read this we will have our hands full with the newly arrived member of the VK and T series of the letters are caught up in the postal dispute. Hopefully, once the post is back to normal you should be getting your S.A.S back with the latest frequency list quite quickly. Don't forget, if you have even one logging that could be added to the list I am always pleased to hear from you also. Once you receive your copy of the list if you can fill in any of the blanks , like callsign, etc., please drop me a line so I can keep the list as up-to-date as possible.

PC-Monitor

I have just received news of a new public domain program from Simon Collings G4SGI. Simon has written the program to allow total control of a Yaesu FRG-8800 receiver with an IBM PC or compatible computer. The facilities included are quite impressive:

1. Keyboard entry of frequencies.
2. Tuning up the arrow keys with selectable step sizes.
3. One key mode selection.
4. On-board memories which can store mode and a fifty character comment.
5. Ten channel seven day timer.
7. On-line frequency usage information.
8. Integral logbook facility.
10. Optional Morse identification of modes.
11. Can also handle the optional v.h.f. and I.M. modules.

The logbook facility sounds very useful and can store date, frequency, mode, time, report and a 255 character comment.

PC-Monitor was developed in Turbo Pascal and should run on any IMB compatible that allows direct screen access.

The program is available in two formats, the first contains the executable and documentation files, which is all you need to actually run the program. This is available directly from Simon, by sending a double density disk tape together with a cheque or postal order for £2.50.

If you are interested in modifying the program to run with other receivers, Simon is prepared to release the full source code for £2.50, again you need to supply a DDS disk.

Computer Prices

During my recent visit to the BARTG rally at Sandown Park I thought I would check-up on current hand computer prices. This rally is generally very good for computers as it is aimed specifically at the data enthusiast. I found the exercise quite interesting as the spread of prices and value for money was amazing. These are the sort of prices I found:

- Aral 8000KL — £30*
- BBC B — £195*
- BBC Electron — £35*
- Commodore +4 — £20
- Commodore C16 — £30*
- Commodore Vic 20 — £25*
- Micrac IBM compatible — £410**
- Sinclair Spectrum — £70**
- Sinclair Spectrum + — £80*.

The ones marked with a single star have only a very limited amount of software support, whereas those with two stars are quite well supported. I haven't given the poor old Commodore a single star as I don't know of any RTTY software that runs on it. If you have a Commodore and don't know different, whether about this machine or any other, then please let me know.

Short Wave Magazine November 1988
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Weather Satellites

A new signal is to be heard on 137.4 MHz emanating from a brand new satellite from the USSR, stable called OKEAN-1. As may be guessed from the name, it is an Ocean Reconnaissance Satellite, not so much like the old COSMOS-1900, but one giving visible, microwave sounding and RADAR pictures! The view observed during the course of a pass can suddenly change from the normal definition weathersat type expected, complete with the usual cloud cover to one of very high definition and a complete absence of cloud. Our regular correspondent Lawrence Harris of Plymouth has obtained some very interesting pictures, which are reproduced here. Our first, Fig. 1, is assumed to be a microwave sounder, and was captured on 14 July 1988. Fig. 2 is of the same date, at 2032 UTC, and depicts the microwave image, the RADAR image (before enhancement), the phase bars and the “piano key” telemetry. Fig. 3 is the left hand side of a double picture, which was taken by Lawrence to be an image from the microwave sounder over the Gulf of Bothnia. Fig. 4 is the other half of the previous and probably a RADAR map of the same area of the Gulf of Bothnia.

He points out that the 137.4 MHz transmission is not continuous, but is on particularly for the eastern passes, i.e. those within range of the USSR, “it transmitted one of the first pictures at 2031 UTC on 14 July for some minutes” says Lawrence, “it included the ‘piano key’ telemetry plus two images, one of which appeared to be RADAR and the other a low visibility image. Since then I have seen a very good RADAR image of the Norwegian coast with an adjacent picture of the same area taken with another instrument, possibly a microwave sounder, but I am not sure how to interpret some of these images.”

The most recent set of Keplerian elements for this satellite read as follows:

- Epoch Year: 88
- Epoch Day: 192.929
- Inclination: 82.518
- Right Ascension: 91.6982
- Eccentricity: 0.0022022
- Argument of Perigee: 259.1511
- Mean Anomaly: 100.7431

Mean Motion: 14.73246649
Decay or Drag Factor: 4.6E-6
Rev. or Orbit Number: 80

This set, taken at 1954:10 on 30 November 1988 may have drifted a little since then, as in the long term the solar flux is rising fast and expanding the atmosphere. This elevates the drag factor, and reduces the period.

Based on this set of data, we can predict to within a few minutes a reference orbit close to the time you read this column to apply to those of you who prefer to use trackers, plotters, or even mathematical means to locate your satellites. OKEAN-1 should cross the equator northbound at 0015 UTC on 30 October 1988 when it will be at 53 degrees west longitude. The following orbit will cross 97.7 minutes later at 24.5 degrees west. For calculations on the day following, we find the first equatorial crossing occurring 26.1 minutes later than the prior day, and 8 degrees further west than the previous days, e.g. 0041.1 UTC at 61 degrees west longitude.

Acquisition of signals for passes on 30 October 1988 will commence at 0536 UTC at 4 degrees azimuth, at 0714 at

352 degrees, 0853 at 339, 1034 at 312, 1825 at 74, 1957 at 125, 2136 at 205, and 2316 UTC at 261 degrees azimuth. It would be as well to start looking well before these times to allow for the expected added drag factor with solar flux escalation likely.

The GM4HU “ecker” Spectrum computer program produced Fig. 5 which shows the expected sub-satellite points. They are marked by “S” at 0720 and 2000 UTC on 30 October, which will help identify any pictures received from the new satellite.

Chinese Weathersat?

Pictures from early September monitoring on 137.8 MHz show a strong resemblance to those received from the NOAA series, with similar edge markings and enumerations. At first it was believed that NOAA-11 was up and active at long last, but no indication has yet been given of this launch from source. It is now believed that the station came from a new Chinese weather satellite, for which no details of Keplerian elements are yet available. As soon as they are on hand, a set, plus some pass times, will appear in this column.
This rogue satellite, first reported some two months ago to be falling out of orbit at some 100 metres per day with its 50-kW nuclear power plant still attached, is now falling fast, descending at almost one mile per day in early September. The rate of descent is expected to be increasing very rapidly, so as it brake's further and meets denser atmosphere, the orbit circumference will reduce, thus bring it into even greater drag.

The "ROWSAT" USSR family of satellites, and their USA counterparts, monitoring shipping movements and probably in the worlds oceans, as they are purported to be capable of detecting the motion of submarines in deep water, by scanning, doppler shift and phase measurement of the surface wave created, COSMOS-1900 will undoubtedly re-enter close to the time that you are reading this column, and may have descended by late September or early October, but could equally well still be coming in, dependent upon several non-determinative variables. To help you attempt to track using your computer programs, the latest Keplerian element set for this threatening incoming cargo reads as follows:

Epoch Year: 1988
Epoch Day: 233 (6.85 - 7.28)
Inclination: 76.947
Right Ascension: 353.1053
Eccentricity: 0.020615
Argument of Perigee: 282.7903
Mean Anomaly: 77.1552
Mean Motion: 16.78746017
Decay or Drag Factor: 0.00074563
Rev. or Orbit Number: 4057

The decay rate will be going up rapidly with elevating solar flux, the mean motion increasing, the altitude decreasing, and in fact it may well have passed this critical point before this column is available to you to be able to use the latest information. The chances of it descending on a highly populated area are remote, as most of the earth is covered by oceans. At this point in time it is almost impossible to say where and when it will come down, and only that it will be somewhere between north and south latitudes 65 degrees, and at any longitude. The chances of "hitting" any one area are quite small, being that ratio of the area considered to that of the entire earth's surface between 65N and 65S. As the vast majority of that surface is open sea, the chances are that it will miss a land mass altogether. It may burn completely, and spread a diluted radioactive vapour over a wide area of atmosphere, or it may come down in large pieces, giving a highly dangerous concentration over a very small area.

A secondary automatic safety factor has been built in, that is sensitive to sudden changes of orientation, pressure and temperature, such as will occur when the satellite reaches between 115 and 124km altitude (according to atmospheric density at the time) as friction causes the spacecraft to tumble and heat up. At this point the system should boost the nuclear power source into a 800-900km orbit out of harms way for a good length of time. As radio contact and telemetry are lost, it will not be known if this last ditch safety measure has succeeded until after the time it is due to re-enter.

A reference orbit for 30 October 1988, it is still in orbit, is 0026 UTC at 31° degrees west. The dangerous periods for the UK currently appear to be from 1136 to 1140 and 1743 to 1748 on October 113 to 1113 and 1720 to 1725 on the 21st, 1030 to 1055 and 1658 to 1702 on 22nd, 1028 to 1032 on 23rd, 1005 to 1009 on 24th, 0942 to 0947 on 25th, 0918 to 0923 on 26th, and 0855 to 0902 on 27th, of October, plus, of course, those graphed times on adjacent days. The reduced period and lower increment in the last few orbits will alter the times given accordingly.

Space Missions

USSR Cosmonaut Vladimir Leyskov and Afghan visitor Mohmadall made a successful docking with the MIR space station, and were heard en route to the Soyuz module by many listeners to the Airbands, where their strong f.m. signal amidst the air traffic a.m. ones was very noticeable. This launch was quite interesting, as it was the first manned flight to MIR using a window normally reserved for the PROGRESS automatic supply depot missions. After a short stay with the existing long term crew of Vladimir Titov and Musa Manarov, Leykov and Mohmad returned whilst medical doctor Valery Polyakov stayed aboard to keep an eye on the health of the stay-on crew as they approach the duration at which problems of prolonged weightlessness began to tell on the previous crew. At this time all is well, the crew are in good health and spirits, and are busy studying high frequency radiations from other galaxies.

It was on the return of Leykov and Mohmad from MIR that a potentially more dramatic episode arose. While they were to fire the retro-rocket for a 230 second burn to commence the re-entry procedure, the computer switched off the propulsion system after only one minute. It would appear that the earth horizon sensor was unable to determine the true manning angle when the work ground was changed from sunlight to darkness, and thus automatically aborted the re-entry attempt, but this time the attitude was wrong, so the system had to be manually shut off by the highly experienced Lyul' to avoid inerception.

Following re-adjustment of the Soyuz attitude, a third and successful attempt was made, which brought the astronauts back safely to earth in Kazakhstan 24 hours after the intended landing.

The problem was not so serious as one might have been led to believe by the more sensationalist media, as after the landing, the mission was declared a success by the mission controllers, who were actually quite well. The astronauts were medically examined and managed quite well without computer control.

Leonid Laptinen VASCR, during a recent stay with G3OR reported that at this time there are no radio amateurs in the Soviet space crews, but, one cosmonaut is a keen short wave listener, who may be taking his licence examination soon as to permit a MIR "harn in space" mission.

PHOBOS Lost

Whilst PHOBOS-2 is functioning perfectly, all signals have been lost from PHOBOS-1, one of the pair of USSR exploration satellites that were supposed to explore Mars and its major moon. Informed sources relate that an incorrect piece of software was loaded to the satellite commanding both the turning of the high gain antenna away from earth, and also steering the solar panels, which was an important part of the power system. At this time no commands are possible, and no feed-in of commands is possible.
During the summer months we were receiving stations in Band II (88-108MHz) from the Middle East to Scandinavia via Sporadic-E, but now the 1988 Sporadic-E season has ended and any DX that we receive over the coming winter period will be mainly European caused by minor or major tropospheric openings. With this in mind, keep an ear on the band, an eye on the barometer and the TV weather charts for high pressure systems especially when they begin to move. It will add interest and scientific value for future reference if you include the atmospheric pressure readings for, say, noon and midnight, in the log each day, plus a few notes about your local weather at the same time.

Most readers know that in my office at home, I use an ex-military R216 v.h.f. communications receiver, fed by a chimney mounted Revcone for Band II, and when out in the car I frequently check the band with a Pliustron TVR5D and its own rod antenna. Also in the car I have an ex-RAF altimeter which gives my height above sea level and the prevailing atmospheric pressure. In addition, your scribe keeps an eye on the sky and horizon for possible weather changes that can bring DX, as in Fig. 1, or be dramatic, like Fig. 2 and produce heavy rain. This is sometimes electrically charged causing a temporary "shriek" in receivers with outside antennas (precipitation static) and/or thunder static. Fig. 1 is a weather change seen from the west of my home and I photographed the storm clouds gathering, Fig. 2, when I visited Trundle Hill, a beauty spot, overlooking Goodwood, on the Sussex Downs on July 13th. When clouds like those in Fig. 1 begin to appear after a prolonged clear period, I usually hear signals from Radio Telefis Eireann and the BBC and IBA stations in Wales.

**New Stations**

At 0220 on August 27, I received a strong signal on 98.8MHz saying, "This is Radio 1 PM testing", ready for their start on September 19 and in Arbroath, David Glenday heard the F.M. test transmissions for Radio 1 and 4, on 98.6 and 95.8MHz respectively, from

**TELEVISION**

On August 28, I had the pleasure of meeting John Woodcock (Basingstoke), while he was looking at the vintage television receivers in the Radio Exhibition at the Chalk Pit Museum, Amberley, Sussex. John has a special interest in the early sets made by Bush because he recently renovated one of their models for his TV DXing. I think that the mouths of many television collectors will be watering when they see the latest addition to the Museum's Radio Exhibition (Fig. 1). Yes, it's a 1937/8 HMV, Model 905, table television receiver with radio combined. The vertical/video dial, situated between the loud-speaker and the 7in screen, has the usual 3-wavelengths with a dual speed tuning drive and a spinning logging scale (centre right of dial) for the short-wave band. The larger knobs are for volume and radio tuning, the outer of the lower four are twin controls for brilliance/contrast and in/fade frame hold and the inner knobs set the radio wave-change and focus. This combined receiver, which retailed for £36.15s Od. (£36.75), has a fine polished cabinet, 16 valves including two rectifiers and an Emiscope 3/2 cathode ray tube.

Many pre-1939 receivers were put back into service after WWII when television re-commenced in June 1946 on 45MHz, with a range of under 50 miles, from London's Alexandra Palace. My archives contain a copy of the Daily Mail Television Handbook, which I think was published in 1949, price 1s. 5p. This book contains a map of the Home Counties and has concentric circles graduated from 10 to 75 miles centred.
on AP with the caption, "The concentric circles enable intending viewers to estimate how far they live from the transmitting station. The heavy circle of 35 miles radius encloses the main areas in which reception is generally satisfactory according to the BBC although in many cases excellent transmission is received well beyond this distance."

In spite of any limitations enthusiasts will always try for the impossible and in 1947, a friend of mine, Bruno Perfect, built a pre-amplifier, using two SP61 (ex-radar) valves, and received a programme from London, which he thinks was called 'The Queen's Hussars', Fig. 2. Bruno lived in Rothley about 10km north of Leicester and just over 160km from the transmitter. He used a pre-war Ultra set with a standard vertical 'H1' antenna, somewhat different to the domestic u.h.f. antennas in use today some 41 years later and 18 times higher in frequency. We are still DXing, hi.

In Bailey, W. H. Licence has made a start with a Yoko receiver and although he is too late for the 1988 Sporadic-E season, it is always worth checking around Chs. E2/R1 (48.25/49.75MHz) in the early mornings and afternoons during the winter months.

While DXing on June 16 and 27 Stephen Moore (Newquay) photographed a programme schedule from Ireland (RT2), Fig. 3 and news of the Airbus crash in France which was being shown on Spain's TVE1, Fig. 4.

Having seen test-cards and programmes from Andhra Pradesh, Hyderabad or Sri Lanka interfering with the local transmissions visible at his home in Taminadu, P. P. Guruprasad plans to add DX-TV equipment to his present short wave station and I will certainly look forward to having his reports in this column.

News from India

At his home in Meerut, India, L Col. Rana Roy received pictures from Dubai TV, Fig. 5, on Ch. E2 and the USSR, Fig. 6, on Ch. R2 during Sporadic-E disturbances on May 5 and July 5 and Lahore TV, Figs. 7 and 8, in Band III while tropospheric openings were in progress on March 6 and 15. Looking back to 1987, Rana's tropo log included a next day's programme schedule from Pakistan TV on January 9, Fig. 9 and Teletext from the low-power transmitter in Delhi on December 4, Fig. 10.

Band I

From the archives of Bob Brooks (Great Sutton) comes a photograph of news from the USSR which he logged in 1987. Figs. 11, note the TACC-TASS at the bottom) and during the latter half of the 1988 Sporadic-E season Mike Bennett (Sloough) received programmes and/or test-cards from Austria (ORF-FS1), Czechoslovakia (RS KH), Finland (YLE-TV1), France (Canal +), Iceland (RUV-Island), Italy (RA1-Televidio), West Germany (BR-Grunten and SWF-Baden), Holland (PTT-Ned1), Hungary (MTV), Norwegian regional (BAGN, Bremeranger, Gamlen, Hadsl, Hennses, Melhus, Steiggen), Poland (TVP), Portugal (RTPI), Spain (TVE), Sweden (Kanal 1-Sverige), Switzerland (PTT-SRG1), the USSR (TSS) and Yugoslavia (RTV-Ljubljana). Around 1045 on August 8, Mike logged five of the Norwegian regions in full colour and saw the Dutch PTT-NL AVVC letters over colour bars on Ch. E4 at 0750 on the 8th and 10th.

Stephen Moore received pictures from Spain and the USSR on July 20 and 23, Iceland and Norway on August 7 and 8 and Austria on the 14th.

David Glennay (Arbroath) reports an intense Sporadic-E opening throughout the afternoon of August 14 when he logged strong signals from Spain. At 1406 on the 23rd he watched a Soviet news programme and logged a test-card from Sweden (Kanal 1 Sverige) and test-cards from Spain and the USSR and programmes from Spain between 1000 and 1200 on the 25th. David added Finland (YLE-TV1), Norway (Steigen) and Sweden during the morning of the 26th.

In High Wycombe on August 24, Maurice Peal received a strong test-
More and more facilities are being offered by the receiver manufacturers the use of second-conversion frequencies and digital frequency displays are becoming commonplace and some of the more advanced designs have vast memory banks, memory scanning, band searching, clock/timers and even offer a voice synthesiser to announce a selected frequency. What will the designers think of next?

The stability of the more advanced receivers is so good that it is now possible to engage in a little DXing while asleep. It is simply a matter of tuning the receiver to a known station and setting the built-in timer to turn the receiver and a cassette recorder on for a pre-determined period before going to bed. The tape can be checked while enjoying breakfast and a reception report posted off to the station concerned while on the way to work!

Long Wave DX

Note: I.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC.

Although the frequencies in the long wave band have not been used as extensively by the broadcasters on a shared basis, some of their signals can only be heard via some of the sky wave paths at night. The longer dark evenings now provide listeners with a good opportunity to hear some of them without the need to burn the midnight oil.

Using a Trio R2000 receiver with a random wire antenna in the loft, Fred Pallant (S10rington) has been searching the band for DX for the first time. He logged all of the signals he could hear via ground wave paths during daylight and then re-checked the band after dark. A total of fifteen stations were heard. Eleven of them were received during the week, although the SIO ratings of six of them changed around dusk. The broadcasts from the I.B.-TV via Munich, W. Germany 207 (500kW) rated as SIO 233 during daylight, but they became inaudible after dark. Four additional signals were heard during the same period from Bravos, Romania 153 (1200kW); Kaliningrad, USSR 171 (1000kW), rated as SIO 150 and 220 during daylight and 130 during the night; and Konstanzow, Poland 225 (2000kW), SIO 33.

David Wraith has been checking the long wave scene in Cambridge and has sent along a log of thirteen stations for the chart. He checked the band first at 1515 and it is clear to see that there are many more wave signals from Alltou 171, Saarolus 183 and Junghinter 234 rated at the same level as those from Donbach 153, Omanenberg 177, Munich 207 and Kalundborg 245 were 344. He checked the band again at 2250 and found that the sky wave signals from Kaliningrad 171, Roumoules 216, Konstanzow 225 and Togolopa 272 rated as 444, but Kishinev 234 was only 222.

MW Transatlantic DX

Writing from Grimsby, Jim Willett says he found the reception conditions to be rather variable during the five nights he searched the band for transatlantic DX. His interesting log of some twenty stations gives a good indication of what to expect if one is prepared to stay awake until 0330! The signal from CQVY in St. Johns, Newfoundland 6701 during daylight proved to be the best, rated as 333 at 0130. The only other signal to achieve a similar rating stemmed from WINS in New York at 0203.

Other MW DX

Five broadcasts from W. Africa were logged by Fred Pallant between 1930 and 2000. Three were in Arabic from stations in Algeria. Aljazair 331 (300kW), rated as SIO 344; Les Trembles 549 (600kW), 444; Algiers 891 (600/300kW), 333 and two stations from Seville, Spain, rated as 233.

The signal from CQVY in St. Johns, Newfoundland 6701 during daylight proved to be the best, rated as 333 at 0130. The only other signal to achieve a similar rating stemmed from WINS in New York at 0203.

Despite the 1400km which separates Sheila Hughes in Morden and Radio Tirana in Albania, their 1000kW transmission via Lushnje 1395 rated as 3222 at 2130. Using a Vega 206 portable with a home-made receiver, Sheila has been listening to the religious broadcasts from TWR in Monte Carlo, Monaco 1467 (1000/400kW) and rated them at S4444 at 2150. Another 1000kW broadcast was also mentioned in her report, Radio Moscow World Service via Kaunas 1360 which is about 1300km from Morden. Their signal rated as 43443 at 2130.

Five broadcasts from Radio Finland via Por 963 were mentioned in the report from Cyril Kellam, he rated their signal in Sheffield as 444 at 2045. The programmes from AFN via Frankfurt, W. Germany 873 (150kW) have been attracting his attention during the evening, their signal peaks at 444, but suffers from deep fading. Some of the other broadcasts from W. Germany were noted in the reports including DLF via Neumunder 1259 (600kW) from Stuttgart, Germany, which was welcomed by Alan Curry in Stockton-on-Tees at 1815 and Radio Bremen 936 (100kW), rated as 333 at 2030 by Fred Pallant. The broadcasts from Radio Luxembourg on 1440 stem from a 120kW transmitter in Marnach and reach most areas of the UK very well at night via the 1440 medium wave path.

The sky wave signals from Mana Radio via Foxdale, Isle of Man 1368 (20kW) also reach many areas of the UK well after dark. They were rated as SIO 333 in Sussex by Fred Pallant at 2030 and reported as good at 2300 in Northumberland.

We welcome detailed signal reports and comments on their programmes and confirm them with an attractive QSL card. If requested, they may also be able to send a leaflet about the history of the station, which makes very interesting reading.

A number of signals from distant locations may be heard via ground wave paths during daylight. No doubt the long sea path helped the 20kW transmission from AFN via Stuttgart, W. Germany 1143 to reach Alan Curry at 0735, he uses an icon R70 receiver with a random wire antenna. Listening in Wootton, lo! George Millmore has been hearing a transmission from a BRT 2 station in Kuume, Belgium on 1188 during the day.

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<thead>
<tr>
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<th>Time (UTC)</th>
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<td>RG</td>
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<td>0000</td>
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</tr>
</tbody>
</table>
**AERIAL TECHNIQUES**

**FERNSEH-ANTENNA**
High Gain Wideband VHF
Band 3 Aerial for TV-DXING

The Autumn Tropospheric period should now have arrived. Aerial Techniques are again offering their High Gain Wideband VHF Band 3 Antenna at a very special price to all enthusiasts. The FERNSEH-ANTENNA model F1814 is a 14-element and covering all VHF channels in Band 3 from 520 to 720 MHz and a high front to back ratio of 26dB. For high resistance against extremes of weather, the aerial is gold lacquered for complete protection from corrosion, it also comes complete with a plated mast clamp which has a 2" maximum gap capability. The array is light and weighs under 30lbs, frequency coverage is a complete 175-2000MHz, a folded dipole is employed for peak efficiency. We are also offering the very popular Amphenol UP1300 amplifier at a special price. If purchased with the above Band 3 aerial, the price is only £16.30. This amplifier covers 40-2300MHz, which means it covers all Band 3 frequencies, the gain is 10dB, with a low noise figure of 2.5dB. This unit requires 15V DC @ 8mA from its power supply via the coaxial downlead.

**SPECIFICATIONS**
- High Gain Wideband VHF Antenna - £30.50
  - (Carriage & Insurance on aerial £5.50)
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- **ANTENNAE**: Matching 15V DC Power Supply (insulated) - £14.25
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- **SUPPORT BEARING**: for heavier rotator applications - £17.00
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Tel: Norwich (0603) 405611.
MW Local Radio DX

Following his report last month of test transmissions on 603 from the new BBC Radio Gloucester station, David Whittaker has been hearing their broadcasts at SIO 333 around 0925. He used a Philips D2999 receiver with a loop antenna for his first visit to the list for the chart, which included the 0.5kW transmission from BBC Radio Guernsey 1116, rated at SIO 333 at 0935.

Some remarkable feats of long distance reception during daytime were noted in the reports this time. Using a Trio RRA17 receiver and a point antenna, he was able to hear BBC Radio Bedford via Mangostep (3.0kW). Listening in Morden at 0815, Sheila Hughes heard BBC Radio Clwyd via Wrexham 657 (2kW) and noted their signal as 43333.

A casual RRA17 receiver enabled George Millmore to hear BBC Radio Nottingham via Clifton 1584 (1kW) for the first time. He also logged two stations which have proved to be rather elusive in the past, BBC Radio Leicester via Freeman’s Common 837 (0.7kW), last heard by January 86; and BBC Radio Cambridgeshire via Gunthorpe 1449 (0.1kW), last heard in March ’88. His extensive log for the chart was compiled between 0800 and 1130.

A very warm welcome to Mark Selby of Aldershot. He took up short wave listening as a hobby last year and has found it to be very informative and interesting. Having read of the achievements of other listeners in this column he decided to try local radio DXing, his first log certainly makes an impressive entry in the chart.

Short Wave DX

The 25MHz (11m) band is now in regular use by three broadcasters, Radio Norway International beam their programmes in Norwegian to Africa via Fredrikstad on 25 750 each day between 1100 and 1245. So far, no logs or reports have been received from regular contributors in S. Africa to indicate just how well the transmissions are reaching the target, but the reports on the amateur signals reaching S. Africa from time to time give an idea of the reception.

As noted earlier, the various (10m) amateur band suggest that reception will be excellent. On average, their signal rates as SIO 343 here, which is rather better than earlier in the year – however that is relatively meaningless as their broadcasts are not intended for the UK.

Radio Denmark now broadcast in Danish to S. Asia and Australia via Copenhagen on 25 850 between 1200 and 1255. Although no reports on their signal have been received from overseas readers, I am hoping to hear from Dave Mackle and John Ratcliffe in Southport, Queensland in the near future. So far, no reports on their transmission here, which rates as SIO 243.

The third broadcaster who has decided to make daily use of this excellent band is Radio France International, Paris. Their broadcast in French started on 25 000 at 1200 and 1250 and 25 820, but the target area is not known to me at the time of going to press. There were no mention of their transmissions in recent logs, but they rate at SIO 343 here. No doubt all three broadcasters will be glad to receive detailed reception reports from any location.

During the years leading up to and beyond the peak of the last solar sunspot cycle, both the BBC World Service and Radio Moscow could be heard in the 11m band during the morning. The BBC transmissions steamed from Daventry on 25 650 and could be heard between 0800 and 1300. Radio Moscow broadcast on 25 620 from 0930. It may be worth checking both of these frequencies for test transmissions or actual broadcasts during the coming months.

Another notable condition prevailing in the 21MHz (13m) band have been disturbed from time to time by solar flares, reception from many areas has been good and many powerful signals have been reaching the UK.

Some of the broadcasts to Europe were noted in the reports. Radio Moscow via Molav 21 659 (Eng, Sep 0700-0830), rated as 35444 at 0727 by David Whittaker; VOA Radio Dubai 21 910 (Ar, Eng 0615-1400, 44434 at 1030 by Sheila Hughes; Voice of Israel, Jerusalem 21 675 (Eng, Fr, He 1000-1100), 45444 at 1024 by David Whittaker; Radio RSA为您服务, S.Africa 21 590 (Eng, Fr, Ger, Du 1400-1800), 44444 at 1400 by Cyril Kellam; Radio Jamaica via Mozambik, Gabon 21 700 (Eng, Sep 1500-1700), rated as SIO at 1508 by Kenneth Buck in Edinburgh. Ken heard WHRI South Bend, USA 21 655 (Eng 1500-1700), noted as SIO 455 at 1502 by Andy Keddle. Radio BBC Northumbia via Mozambik, Gabon 21 700 (Eng, Sep 1500-1700), rated as SIO at 1508 by Kenneth Buck in Edinburgh. Ken heard WHRI South Bend, USA 21 655 (Eng 1500-1700), noted as SIO 455 at 1502 by Andy Keddle. Andy Keddle heard WYRR via Okefoboro, Florida 21 615 (Eng, Ger, Fr 1600-1945), rated as SIO 1155. Many of the broadcasts to other areas were logged by DXers, including Radio Prague, Czechoslovakia 21 705

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

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<th>Freq</th>
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</tbody>
</table>

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**DXers:**

A: Lee Bart, Sunderland.  
B: Alan Curran, Stockton-on-Tees.  
C: Sheila Hughes, Morden.  
D: George Millmore, Woodton, iW.  
F: Mark Selby, Aldershot.  
G: Jim Willett, Grimsthorpe.  
H: David Whittaker, Cambridge.
The most consistent signal from Radio Australia stems from their Shepparton station in S.E. Australia on 15.240 (Eng to S.Pacific Area 2100-0730). The DX programmes from the UK have become more popular with listeners around the world.

Solar events have also affected the conditions prevailing in the 15MHz band, but reception of the broadcasts from most areas has been good. The long distance paths have been open and some of the stations originating from Radio Australia have been reaching the UK at considerable distance despite the fact that they are intended for other areas.

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The most consistent signal from Radio Australia stems from their Shepparton station in S.E. Australia on 15.240 (Eng to S.Pacific Area 2100-0730). The DX programmes from the UK have become more popular with listeners around the world.

Solar events have also affected the conditions prevailing in the 15MHz band, but reception of the broadcasts from most areas has been good. The long distance paths have been open and some of the stations originating from Radio Australia have been reaching the UK at considerable distance despite the fact that they are intended for other areas.
The day. The report from George Hewlett notes their transmission on 11110 via Sheppton (Eng to S. Asia, Europe 0600-0630) as SIG 322 at 0400, rapidly improving to 433 by 0415, but from time to time he has heard ajammer on the h.f. side of their signal. Their signal at 0630 was rated as the best heard by Alan Smith, he uses an ITT Tautopour 220 with an a.t.u. and outdoor folded dipole. Their transmission frequency via Darwin was also noted by C. A. To C. Asia 2100-2200 was logged by Christian Pritchard as 24332 at 2100. The broadcast from Radio Sahara, Philippines 11.850 (Eng to S.E.A 0830-0930) were noted in the log from Sheila Hughes as 33323 at 0835, this may be due to one or two DX. Some of the other long distance signals noted in the reports stemmed from WWW via Ocechobee, Florida 11.580 (Eng to W. Africa 0700-0940), 433 at 0700 by Alan Smith; Radio HCJQ Quito, Ecuador 11.585 (Sp to 0700 by Robert Dan, Fr, Eng to Europe 0200-0830), rated as 33343 at 0821 by Leo Barri; Sheppton 9.565 commences at 0700. The primary target area for the 9MHz (21m) broadcasts from Radio Australia is Europe. Their transmission via WWW at 0630 was rated as 0700. George Hewlett quoted SIG 444 in his report at that time, but their signal usually deteriorates and fading occurs fairly rapidly. The 444 at 0800 and Philip Rambaut (Macclesfield) quoted SIG 111 at 1000, quite a fine signal and the excellent reception a few months ago.

Many of the broadcasts using this bandwidth are international programmes towards Europe at some time during the day. They include TWR Monte Carlo, Monica 9.610 (Nor 0700-0720), 0800 by Alan Smith transmits from Bahrain; John Nash using a Hammarlund HQ 180XE receiver in Blackpool (see Fig. 1); WCSSC Scotia Condor, Malhe 9.495 (Eng, Fr, Ger 0600-0755), rated as 44344 at 0730 by Leo Barr; Radio HCJQ Quito, Ecuador 9.610 (Eng, Fr, Ger 0730-0830), 44404 at 0800 by Philip Rambaut, Radio Yugoslavia, Belgrade 9.620 (Ar, Eng 1400-1500), 45444 at 1445 by Philip Rambaut, Radio Pakistan 9.540 (Ger, Eng 1800-1930), SIG 111 at 1711 by Julian Wood; Radio Beijing, China 9.820 (Ger, Eng 1155-1205), 42242 at 1205 by Kenneth Kiddie; Radio Baghdad, Iraq 9.770 (Eng, Ger 1800-2155), logged at 1800 by Alan Curty; Voice of Iran 9.022 (Fr, Eng, Sp, Fr 1845-2200), logged at 1948 by Ron Pearce using his receiver and rated SIG 322 by Kenneth Buck; Radio Cali, Eng 9.900 (Ger, Fr, Eng 1900-2245), noted as 33333 at 2130 by Christian Pritchard, RHC Havana, Cuba relayed via USSR 9.590 (Fr, Eng 2100-2300), 43333 at 2230 by David Wratten.

Some of the broadcasts to other areas were logged by DXers, TWR Monte Carlo, Pacific 9.800 (Eng 1500-1640), rated as 34342 at 1500 by Leslie Hollis; Radio Beijing, China 9.700 (Eng to Australia 0830-1025), 22222 at 0830 by Andy Keddie; Medi 1 Nador, Morocco Radio 9.575 (Fr, Ar to N.Africa 0745-2045), SIG 333 at 1215 by John Evans in Shawforth; Pyongyang, N.Korea 9.977 (Kor, Eng, Fr to Africa 1400-2150), 24332 at 1515 by Leslie Hollis; Voice of Greece, Athens 9.425 (Fr, Eng to USA 1500-1550), 44334 at 1540 by Sheila Hughes; Voice of Revolution Addis Ababa, Ethiopia 9.660 (Eng, Fr, Eng to Middle East 1800-1955), logged at 1650 by Ron Pearce using his receiver and rated SIG 333 at 18222 by John Evans; WWW to Taipei, Taiwan 9.955 (Russ to N.Africa, E.Europe 1515-2100), logged by 1700 he heard the BBC via Khajang, Singapore 9.575 (Eng to S. Asia 1615-1830) at a surprising 34543.

The broadcasts from Radio Australia via Carnarvon 6.035 (Eng to Asia, Europe 1530-2030) were monitored in several reports, Alan Smith rated their signal as SIG 333 at 1627, but by 1845 it had deteriorated to 322. A programme about farming in China, broadcast by Radio Beijing, China 6.955 (Eng to W.Africa 1930-2152) attracted the attention of Leslie Hollis as at 1930, he logged their transmission as 34543.

Abbrev Language
Ar Arabic
Beng Bengali
Bur Burmese
Chin Chinese
Cz Czechoslovakian
Dan Danish
Dutch Dutch
Eng English
Faro Farsi
Fin Finnish
Fr French
Ger German
Gre Greek
Ha Hausa
Heb Hebrew
Hin Hindi
Hun Hungarian
Ic Icelandic
Ind Indonesian
It Italian
Jap Japanese
Kor Korean
Nor Norwegian
Pa Pashto
Pols Polish
Port Portuguese
Rub Russian
Sp Spanish
Swe Swedish
Sr Sinhalese
Ta Tamil
Tur Turkish
Ur Urdu
Vie Vietnamese
Yi Yugoslavian
Numerous Maritime Radio beacons have been installed around the UK and many other countries of the world. They provide a navigational aid for yachtsmen, fishermen and other small boat owners, but they also attract a large number of DXers who simply log them.

All of the British beacons operate in the long wave band between 285 and 315kHz. The majority of them operate continuously throughout the 24 hours of each day on shared frequencies in groups, but a certain number are only operational during fog. A minority operate for a period of six minutes two or four times an hour.

They send a repeated identification signal consisting of a two letter call sign in Morse code for about 22 seconds, followed by a long dash lasting for 25 seconds. The call sign is then repeated once or twice for 8 seconds and a silent period lasting at least 5 seconds then follows. By using a receiver with a built-in directional ferrite rod or loop antenna and a compass, two bearings from nearby beacons may be obtained during the long dash period – where they cross when plotted on the relevant chart will indicate the position at sea.

Most DXers find it helpful to use a directional antenna with their receiver, but this is by no means essential. In order to identify the location of a station it may be necessary to visit your local library and refer to a copy of Reed's Nautical Almanac, however, a few of the stations are already detailed in the first beacon chart, which will appear quarterly.

Please note that this column will only be published quarterly. The next one will appear in the February '89 issue.

### LW MARITIME RADIO BEACONS

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

<table>
<thead>
<tr>
<th>Freq kHz</th>
<th>Call Sign</th>
<th>Station Name</th>
<th>Location</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>287.3</td>
<td>DG</td>
<td>Douglas</td>
<td>IsM</td>
<td>C.E*</td>
</tr>
<tr>
<td>287.3</td>
<td>FN</td>
<td>Wainey Island</td>
<td>off Lincs.</td>
<td>C.E*</td>
</tr>
<tr>
<td>287.3</td>
<td>PS</td>
<td>Point Lynn</td>
<td>Anglesey</td>
<td>E*</td>
</tr>
<tr>
<td>291.9</td>
<td>KD</td>
<td>Kinwards Head LH</td>
<td>Aberdeen</td>
<td>B</td>
</tr>
<tr>
<td>294.2</td>
<td>DA</td>
<td>Medway Light</td>
<td>Is of Arran</td>
<td>C</td>
</tr>
<tr>
<td>296.2</td>
<td>RN</td>
<td>Rocks of Islay</td>
<td>Is of Ilay</td>
<td>C</td>
</tr>
<tr>
<td>296.5</td>
<td>MA</td>
<td>Cabo Machichaco LH</td>
<td>N. Spain</td>
<td>A</td>
</tr>
<tr>
<td>296.5</td>
<td>FT</td>
<td>Cap Ferret LH</td>
<td>W. France</td>
<td>A</td>
</tr>
<tr>
<td>301.1</td>
<td>CN</td>
<td>Croydehead</td>
<td>IsM</td>
<td>C</td>
</tr>
<tr>
<td>301.1</td>
<td>PY</td>
<td>Point of Aye</td>
<td>IsM</td>
<td>C.E*</td>
</tr>
<tr>
<td>301.1</td>
<td>SR</td>
<td>Skerries LH</td>
<td>Anglesey</td>
<td>C</td>
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<tr>
<td>301.1</td>
<td>SU</td>
<td>South Rock LV</td>
<td>Co. Down</td>
<td>C</td>
</tr>
<tr>
<td>303.4</td>
<td>FB</td>
<td>Flamborough Head LH</td>
<td>E. Yorkshire</td>
<td>B</td>
</tr>
<tr>
<td>303.4</td>
<td>GK</td>
<td>Isle de Grain LH</td>
<td>NW. France</td>
<td>A</td>
</tr>
<tr>
<td>303.4</td>
<td>LM</td>
<td>May Island</td>
<td>Fife</td>
<td>B.D*</td>
</tr>
<tr>
<td>303.4</td>
<td>SJ</td>
<td>Souter Light</td>
<td>Sunderland</td>
<td>B.D*</td>
</tr>
<tr>
<td>303.4</td>
<td>YE</td>
<td>Ile d'Yeu LH</td>
<td>France</td>
<td>A</td>
</tr>
</tbody>
</table>

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

DXers:
A: Jean Yves-Camus in La Rochelle, France.
B: David Edwardson, Wallsend.
C: Bill Eyre, Stockport.
D: Glen Glen-Davison, Newcastle-on-Tyne.
E: Neil Wheatley, Lytham St. Annes.
**WHAT RECEIVER**

**Panasonic RF-B400L**
- Multi-band Portable Receiver
- **COVERAGE:** I w. 146 – 288kHz, m.w. 520 – 1611kHz, s.w. 1 615 – 28.995MHz, f.m. 87 5 – 108MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY:** I w. 2.5µW, I v. 65µV ± 281kHz S/N 20dB, m.w. 4.5V, s.w. 11V at 5MHz S/N 20dB
- **RESOLUTION:** 8 and 9kHz
- **SELECTIVITY** •
- **IF REJECTION** •
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT** 550mW (r.m.s. max)
- **FEATURES:** Mains adapter included; operation key lock switch; a.m. sensitivity switch; 27 station preset tuning and i.f. display
- **REVIEWED:** Short Wave Magazine September 1987
- **PRICE:** £359.95

**Grundig Satellit 400 International Multi-band Portable Receiver**
- **COVERAGE:** I w. 146 – 283kHz, 513 – 1611kHz, 1.6 – 30MHz, 87.5 – 108MHz
- **MODES:** a.m., f.m., s.w.
- **SENSITIVITY** •
- **SELECTIVITY** •
- **IF REJECTION** •
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT** 3 watts
- **FEATURES:** Automatic waveband scan; i.e.d. clock; sockets for headphones, external antenna, line in, line out and external d.c. supply and peak tuning meter
- **REVIEWED:** Short Wave Magazine August 1987
- **PRICE:** £159.95

**Sony ICF-PRO80**
- Portable Receiver
- **COVERAGE:** 150kHz – 108MHz, 115.5MHz – 222MHz (using supplied frequency converter)
- **MODES:** a.m., f.m., n.b.f.m.
- **SENSITIVITY** I w. m.w. 43dBμV (999kHz), s.w. 20μV (2kHz a.m.), 4μV (text n.b.f.m.), f.m. 5μV
- **RESOLUTION:** I w.: 3kHz, m.w.: 10kHz, s.w.: 5.5kHz, f.m.: 50kHz
- **SELECTIVITY** ±3kHz (6kHz) (50dB)
- **IMAGE REJECTION:** 11dB
- **IF REJECTION:** 63dB
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDIO OUTPUT:** 500mW at 10% t.h.d.
- **IF STAGE:** I w.: m.w.: 55.65MHz, 455kHz; f.m.: 50kHz
- **FEATURES:**
- **REVIEWED:** Short Wave Magazine March 1988
- **PRICE:** £390

**Sony ICF-7600DA**
- Portable Receiver
- **COVERAGE:** f.m. 87.5 – 108MHz, I w.: 150 – 289kHz, m.w.: 531 – 1602kHz, s.w.: 3.050 – 3.585MHz, s.w.: 2.3 – 4.215MHz, s.w.: 3.455 – 5.185MHz, s.w.: 4.5 – 6.315MHz, s.w.: 5.695 – 7.465MHz, s.w.: 6.875 – 9.615MHz, s.w.: 7.935 – 10.010MHz, s.w.: 11.525 – 12.106MHz, s.w.: 13.375 – 14.010MHz, s.w.: 14.975 – 15.611MHz, s.w.: 10: 17.475 – 18.111MHz, s.w.: 11: 21.325 – 21.966MHz, s.w.: 12: 25.476 – 25.161MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY** I w.: 0.1mV at 999kHz, s.w.: 30dBμV, f.m.: 100μV
- **RESOLUTION:** 8kHz on s.w., 3kHz on I.w., 3/10kHz on m..., 50kHz on f.m.
- **SELECTIVITY** I.w., m.w. B.s.w.: ±5.6kHz – 50dB, f.m.: ±53dB (400kHz)
- **IMAGE REJECTION:** 63.5dB (r.m.s.) and m.w.: 44.5dB on I.w.
- **IF REJECTION:** 50dB
- **SPURIOUS REJECTION:** 50dB
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT:** 45mW at 10% t.h.d.
- **IF STAGE:** 10.7kHz, 458kHz
- **FEATURES:** digital and analogue display, clock and alarm, 15 memories, telescopic antenna
- **REVIEWED:** Short Wave Magazine August 1987
- **PRICE:** £159.95

**Panasonic RF-B60**
- Portable Receiver
- **COVERAGE:** m.w. 520 – 1611kHz, s.w. 1 5.95 – 6.20MHz, s.w. 2 7.10 – 7.30MHz, s.w. 3 9.95 – 10.90MHz, 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** I.w.: 0.1µW at 2kHz, 30dBμV at 1kHz
- **RESOLUTION:** I.w.: 260kHz, 3dBμV, m.w.: 1400kHz, 380kHz, f.m.: 100kHz, 24dBμV, s.w.: 1: 5.5MHz, 22dBμV, s.w.: 2: 7.4MHz, 20dBμV, s.w.: 3: 10MHz, 18dBμV, s.w.: 4: 14MHz, 16dBμV, s.w.: 5: 18MHz, 14dBμV, s.w.: 6: 280MHz, 10dBμV
- **IF REJECTION:** I.w.: 260kHz, 28dBμV, m.w.: 600kHz, 28dBμV, f.m.: 900kHz, 85dBμV, s.w.: 1: 4.5MHz, 70dBμV, s.w.: 2: 8MHz, 75dBμ.v., s.w.: 3: 8.4MHz, 75dBμV, s.w.: 4: 11.5MHz, 80dBμV, s.w.: 5: 15MHz, 80dBμV, s.w.: 6: 21MHz, 80dBμV
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT:** 200W
- **IF STAGE:** Operation hold switch; i.e.d. tuning indicator, carrying case and earphone included
- **REVIEWED:** Short Wave Magazine May 1987
- **PRICE:** £170

**Realistic DX 360**
- Portable Receiver
- **COVERAGE:** I.w.: 150 – 285kHz, m.w.: 520kHz – 1620kHz, s.w.: 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 – 18.2kHz, s.w.: 6: 21 – 26.1MHz
- **MODES:** a.m., f.m.
- **SENSITIVITY** At – 6dB: 600kHz, 250μV, 1000kHz, 250μV, 1400kHz, 250μV
- **RESOLUTION** At 600kHz: 28dB normal 20dB limit; at 1MHz: 30dB normal 24dB limit; at 1.4MHz: 38dB normal 30dB limit
- **IF REJECTION:** I.w.: 260kHz, 36dBμV, m.w.: 1400kHz, 380kHz, f.m.: 10kHz, 24dBμV, s.w.: 1: 5.5MHz, 22dBμV, s.w.: 2: 7.4MHz, 20dBμV, s.w.: 3: 10MHz, 18dBμV, s.w.: 4: 14MHz, 16dBμV, s.w.: 5: 18MHz, 14dBμV, s.w.: 6: 280MHz, 10dBμV
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT:** 860mW
- **IF STAGE:** 70.7kHz
- **FEATURES:** telescopic antenna, low battery indicator, wide strap
- **REVIEWED:** Short Wave Magazine July 1987
- **PRICE:** £99.95

**Panasonic RF-B20L**
- Compact Portable Receiver
- **COVERAGE:** I.w.: 150 – 285kHz, m.w.: 520 – 1611kHz, s.w.: 1: 5.95 – 6.20MHz, s.w.: 2: 7.10 – 7.30MHz, s.w.: 3: 9.95 – 10.90MHz, 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** I.w.: 125µV, m.w.: 100µV, s.w.: 1.4µV (average, f.m.), 2µV
- **RESOLUTION** •
- **SELECTIVITY** •
- **IMAGE REJECTION** •
- **IF REJECTION** •
- **SPURIOUS REJECTION** •
- **FREQUENCY STABILITY** •
- **AUDI0 OUTPUT:** 400mW
- **IF STAGE:** Operation hold switch; i.e.d. tuning indicator and external speaker/earphone socket
- **REVIEWED:** Short Wave Magazine November 1987
- **PRICE:** £174.95
**WHAT RECEIVER**

**Grundig Yacht Boy 215 Portable Receiver**

- **Coverage**: 150 - 260kHz, 510 - 1620kHz, 5.9 - 21.9MHz, 87.7 - 108MHz
- **Modes**: a.m., f.m.
- **Sensitivity**: 87.5 - 108MHz
- **Resolution**: 1.2 Watts
- **Selectivity**: 5.9 - 21.9MHz, 10kHz
- **Image rejection**: 21.4 - 21.9MHz
- **Spurious rejection**: 3dB
- **Frequency stability**: ± 10kHz
- **Features**: Carry strap, 3.5mm headphone socket, 12 day clock and snooze and sleep facilities
- **Reviewed**: 1988
- **Price**: £39.95

**Uniden CR-2021 Portable Receiver**

- **Coverage**: 148 - 420kHz, 510 - 1620kHz, 1.6 - 30MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.s.b.
- **Sensitivity**: 1.2W output
- **Resolution**: 15 watts
- **Stage**: Features: Sockets for external antenna, line-in, line-out, cassette recorders, external loudspeakers and headphones: clock; mains or battery operated; peak tuning meter and separate bass and treble controls
- **Reviewed**: 1988
- **Price**: £59.95

**Grundig Satellit 650 International Multi-band Portable Receiver**

- **Coverage**: 150 - 260kHz, 510 - 1620kHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., c.w., s.s.b.
- **Sensitivity**: 136kHz
- **Resolution**: 10 kHz
- **Selectivity**: 5.9 - 21.9MHz
- **Image rejection**: 21.4 - 21.9MHz
- **Spurious rejection**: 3dB
- **Frequency stability**: ± 10kHz
- **Audio output**: 50mW
- **Features**: 3.5mm headphone socket
- **Reviewed**: 1988
- **Price**: £180

**Panasonic RXC34L Portable Stereo System**

- **Coverage**: 150 - 29.999MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.s.b., c.w.
- **Sensitivity**: 1228 SINAD with 90% a.m.
- **Resolution**: 2.4MHz
- **Selectivity**: 114dB
- **Image rejection**: 113dB
- **Spurious rejection**: 114dB
- **Frequency stability**: 114dB
- **Audio output**: 12W
- **Features**: External antenna socket, sleep timer, b.f.d.
- **Reviewed**: 1988
- **Price**: £59.99

**Panasonic RF1680L Portable Receiver**

- **Coverage**: m.w.: 530 - 1605kHz, s.w.1: 5.85 - 6.35MHz, s.w.2: 6.86 - 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**: 36dB, f.m.: 13dB
- **Resolution**: 10kHz, m.w.: 10kHz, s.w.: 10kHz
- **Selectivity**: ± 2kHz (-50dB)
- **Image rejection**: 2100kHz at ± 10kHz
- **Spurious rejection**: 100kHz at ± 10kHz
- **Frequency stability**: ± 10kHz
- **Audio output**: 100mW
- **Features**: 3.5mm headphone socket
- **Reviewed**: 1988
- **Price**: £99.99

**Sony ICF-5100 Portable Receiver**

- **Coverage**: I.F.: 433kHz, m.w.: 522 - 1611kHz, s.w.: 10kHz, 13dB
- **Modes**: a.m., f.m.
- **Sensitivity**: 36dB, f.m.: 13dB
- **Resolution**: 10kHz, m.w.: 10kHz, s.w.: 10kHz
- **Selectivity**: ± 2kHz (-50dB)
- **Image rejection**: 50dB
- **Spurious rejection**: 100kHz at ± 10kHz
- **Frequency stability**: ± 10kHz
- **Audio output**: 50mW
- **Features**: 3.5mm headphone socket
- **Reviewed**: 1988
- **Price**: £180

**Sony ICF-7600DS Portable Receiver**

- **Coverage**: I.F.: 420kHz, 510 - 1620kHz, 1.6 - 30MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.s.b.
- **Sensitivity**: 1.2W output
- **Resolution**: 15 watts
- **Stage**: Features: Sockets for external antenna, line-in, line-out, cassette recorders, external loudspeakers and headphones: clock; mains or battery operated; peak tuning meter and separate bass and treble controls
- **Reviewed**: 1988
- **Price**: £59.95

**Grundig Music Boy 160 Portable Receiver**

- **Coverage**: 150 - 29.999MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.s.b., c.w.
- **Sensitivity**: for 1228 SINAD with 90% a.m.
- **Resolution**: 2.4MHz
- **Selectivity**: 114dB
- **Image rejection**: 113dB
- **Spurious rejection**: 114dB
- **Frequency stability**: 114dB
- **Audio output**: 12W
- **Features**: External antenna socket, sleep timer, b.f.d.
- **Reviewed**: 1988
- **Price**: £59.99

**Matsui MR4099 Portable Receiver**

- **Coverage**: 150 - 29.999MHz, 87.5 - 108MHz
- **Modes**: a.m., f.m., s.s.b., c.w.
- **Sensitivity**: for 1228 SINAD with 90% a.m.
- **Resolution**: 2.4MHz
- **Selectivity**: 114dB
- **Image rejection**: 113dB
- **Spurious rejection**: 114dB
- **Frequency stability**: 114dB
- **Audio output**: 12W
- **Features**: External antenna socket, sleep timer, b.f.d.
- **Reviewed**: 1988
- **Price**: £59.99

**Short Wave Magazine November 1988**

49
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