Reviewed inside this issue...
Grundig Sennheiser International 400

Plus... Antennas Part 2
DX Letter from America... and lots, lots more

For The Radio Listener
IC-R7000, 25-2000 MHz, Commercial quality scanning receiver

ICOM introduces the IC-R7000, advanced technology, continuous coverage communications receiver. With 99 programmable memories the IC-R7000 covers aircraft, Marine, FM Broadcast, Amateur Radio, television and weather satellite bands. For simplified operation and quick tuning the IC-R7000 features direct keyboard entry. Precise frequencies can be selected by pushing the digit keys in sequence of the frequency or by turning the main tuning knob. FM wide/FM narrow/AM upper and lower SSB modes with six tuning speeds: 0.1, 1.0, 5, 10, 12.5, 25kHz.

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

IC-R71E, General coverage receiver.

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

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

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

Datapost: Despatch on same day whenever possible.

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

Icom (UK) Ltd.
Dept SW, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.
CONTENTS

March Issue On Sale February 23


Cover John Waite puts this receiver through its paces.

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SHORT WAVE MAGAZINE

DX Letter from America 7  Gerry Dexter
Introduction to DX-TV Part 16  10  Keith Hamer & Garry Smith
High Seas & Short Waves Part 1  15  Joan Ham
SWM Review
Grundig Satellit International 400 Receiver  20  John Waite
Antennas Part 2  25  F.C. Judd G2BCX

REGULARS

A Word in Edgeways 2  Your Letters
What’s New 2  Latest News & Products
Grassroots 5  Club News
Listen Out For 6  Special Event Stations
Rallies 6  Where to Go
Scanning 31  For the Scanning Enthusiast
Airband 34  Aeronautical Radio News
Subscriptions 35  Ensure Your Copy
Starting Out 37  For the Beginner
Advertisers’ Index 51  Find that Advert
Book Service 54  Order Your Technical Books
Trading Post 56  Readers’ Adverts

SEEN & HEARD

Amateur Bands Round-Up 39  Paul Essery GW3KFE
Decode 40  Mike Richards G4WNC
Info in Orbit 41  Pat Gowen G3IOR
Band II DX 43  Ron Ham
Television 43  Ron Ham
Long Medium & Short 45  Brian Oddy G3FEX
LW Maritime Radio Beacons 52  Brian Oddy G3FEX

GOOD LISTENING
**SIR**

With regard to R. Bradley’s query in the Sept SWM, I hope the following will be of interest:

The PCR receiver was manufactured in fairly large numbers for the British Army by Pye and Philips. It was designed as a general coverage broadcast band receiver. Four versions exist, namely PCR, PCR1, PCR2 and PCR3. No manuals were ever officially released.

The PCR has six Octal valves and includes an r.f. stage, two i.f. stages and a 6/6 output stage. There is a 5n internal speaker and coverage is 850-2000, 200-5500 metres and 6-18MHz. An external power unit is required to give 12 and 250V d.c. but some are fitted with internal a.c. mains power units.

The PCR first came on the market in large quantities in late 1961, reconditioned by REMC and sold at £9 with power supply. The PCR1 came on the market in 1966 at £11 including a.c. power unit, in grade two condition. The PCR2 was released at the same time as the PCR, priced between £5 and £7 without power units. There was no internal speaker.

The PCR3, the one photographed, came on the market in 1966, in grade one condition at £11 with a/c. p.s.u. There was no internal speaker and coverage was 200-5500 metres, 2.5-7 and 7-23MHz. Basically, the only difference between the various models were the exact band coverage and the provision of an internal speaker. The last one I handled was a PCR back in 1966, battered but still performing well.

**SIR**

I would like to bring to the attention of your readers the formation of a new Amateur Radio Society in Sevenoaks, Kent.

Meetings are being held initially in the Emergency Control Centre, Sevenoaks District Council Offices, Sevenoaks, Kent starting at 8.00 p.m. on the 3rd Monday in each month. The subscription has been fixed at £10 per year (£5 for students) plus 50p per meeting. Application forms can be had from: The Secretary, Barry Leggett G7CIC, SEADOCS, Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

The Society has been formed following an initiative by the District Council to train members of staff to become licensed radio amateurs after experiencing the valuable assistance afforded by RAYNET in the October 87 storm. The hope is that the staff and others involved will not only gain from the exchange of information, etc., but will be able to assist the Council and RAYNET in any future emergencies.

BARRY LEGGETT G7CIC
SECRETARY: SEADOCS & DISTRICT ARS

**WHAT'S NEW**

**Ratchet Driver**

Freitade (TEP) Ltd have announced a new ratchet driver set from Rodeo for comfortable and efficient tightening and removal of screws and nuts. The tool (part number 323244) comes complete with four screwdriver bits to fit straight-slot, cross-head and Pozidrive screw heads. These are made from high-quality steel and designed for long life. In addition, six sockets are included covering most popular sizes from 4 to 10mm. The ratchet driver set costs £2.93. Freitade (TEP) Ltd, Unit 15, Avery Industrial Park, Garrison Lane, Bordesley Green, Birmingham B9 4GE. Tel: 021-766 6142

**Butternut**

The Butternut SC-3000 has a frequency range of 30 - 12MHz, with gains of up to 7dB for u.h.f. and up to 3dB for v.h.f. The height of the antenna is 3.4m. The design uses "trombone" phasing. There are no coils or internal switches that can break. The entire radiator system consists of telescopic sections of drawn tubing operating at 1.5 million potential maximum. The circuit is fed by means of an adjustable gamma match to give the lowest s.w.r. at the required frequency. Resonant radials decouple the radiator and its supporting structure and feedline to suppress unwanted high-angle radiation. All hardware is stainless steel. The Butternut SC-3000 costs £63.99 and you can get more details on the Butternut range of antennas from: HRS Electronics, Garett Green Lane, Birmingham B33 0UE.
Catalogues

One unusual catalogue to arrive on my desk was The Modern Book Co. Computer Catalogue. There are 51-pages of books listed, catalogued by language (there are eleven major ones plus the miscellaneous ones), by topic (e.g. graphics, word processing, etc.) and by machine (Apple, Amstrad, IBM, etc.). Books can be ordered by credit card, FAX or by post and as many books are kept in stock they are sent by return, those that have to be ordered are sent via post. You can write or telephone for a free copy of the catalogue from: The Modern Book Co., 19-21 Prodi Street, London W2 1NP. Tel: 01-402 9176.

Continuing with the book theme, Camden Miniature Steam Services have sent me a copy of their latest Camden Book News. If, like me, you enjoy reading books on any aspect of engineering be it electrical, mechanical or any other branch, then this free list will really fire your imagination. I really had to padlock my cheque book otherwise I would have been heavily into the red!

Included among the books listed are some very interesting reprints in Lindsay Publications’ “Lost Technology Series”, of nineteenth century and early twentieth century American books on a variety of electrical subjects including Tesla Coils, Wimshurst machines, and other delightful lightning bolt producers. Each book in the list is described in a manner that makes interesting and amusing reading in itself. Camden Miniature Steam Services, 13 High Street, Rode, Somerset BA3 6NZ. Tel: (0373) 830151.

The C. M. Howes Communications Catalogue for 1989 contains details of receiving equipment, transmitting equipment and station accessories. There are details of a marine receiver, h.f. air band receiver, 80/160m “phone” and c.w. transmitter, a microphone amplifier and an active antenna amplifier, a sample of which is currently being constructed for review in a future issue of SWM. For more details contact: C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel: (0327) 60178.

Unitel has recently undertaken a considerable expansion of the range of pot cores, RM cores, E cores, toroids and accessories stocked. The full range is now covered in an 8-page, 4-colour catalogue. Not only will you find the full technical details in the catalogue, but also a useful applications guide. Unitel Ltd., Unitel House Fishers Green Road, Stevenage Herts SG1 2PT.

A new technical leaflet from A.F. Bulgin & Co features the extensive range of robust Buccaneer connectors. Twelve fully illustrated pages detail all the various options which are available. Copies of the leaflet are available from A.F. Bulgin & Co plc, Bypass Road, Barking, Essex IG11 OAZ. Tel: 01-594 5588.

Harris Electronics (London) Ltd have a wide range of panel meters both analogue and digital and to help you select a suitable model they have produced a catalogue showing full-size front views, together with mounting details of each panel meter in their range. For digital panel meters the information is given in tabular form. Harris Electronics (London) Ltd., Unit 3, GEC Estate, East Lone, Wimbley, Middlesex HA9 7PJ. Tel: 01-908 3556.

Technicad, who represent Emmerich of W. Germany, have just published a short form catalogue which outlines the design and performance features of the standard 1.2V NiCad cell and the unique double and triple cells of 2.4 and 3.6V. Included are details of their extensive range of high-capacity button cells, memory buffer batteries and batteries with standard solder tags, single as well as double p.c.b. pins. For further details contact Technicad Ltd., Unit 4C, Sunrise Business Park, Bardon, Dorset DT1 8ST. Tel: (0258) 59581.

Electromail have just sent me a copy of their November 88 to February 89 catalogue. If you are into home construction this is the catalogue to have. Make sure, however, that your bookshelves are reinforced as this book is heavy - the numbered pages stop at 1117, so it is going to take some of your shelves! The pages provided for notes are thicker than most other catalogues! It also gives extremely detailed technical details of each item and as such provides you with a very useful reference work. This catalogue gives you access, on a strictly cash or credit card number with order, to the enormous range of components, tools and instruments stocked by the stockists, at competitive prices, with a minimum order charge and even discounts for larger volumes. Your own copy will set you back £4.95 plus £2.00 post and packing direct from Electromail, PO Box 33, Birchington Road, Corby, Northants NN17 9EL. Tel: (0536) 204555.

Old Service Manuals

Are you looking for service manuals for old or obscure equipment? Then Mauriton Electronics think they may be able to help. They have a library of over 100,000 different makes and models of equipment with an extensive section on amateur and vintage radio. They produce a catalogue that is being constantly updated, so for details of this and their other services, contact: Mauriton Electronics Ltd, 8 Cherry Tree Road, Chinnor, Oxfordshire OX9 4QY. Tel: (0844) 51694.

Morsum Magnificat

The Autumn 1988 issue of Morsum Magnificat proved interesting reading, as always. There is a really interesting article on Earth Currents by Chris Taylor which is illustrated with some brilliant cartoons by GW3C0I (whose work is sometimes seen in SWM) as well as interesting snippets and articles. There is much in more the issue, but space isn’t available here to give more details.

Morsum Magnificat was first published in Holland in 1983 by Rinus Hellemans PA0BHN. Now published in London, it provides international coverage of all aspects of Morse Services, past, present and future. It’s for all Morse enthusiasts and a year’s subscription costs £2.50 (UK); £7 for Europe (including Eire); £7 surface mail and £8.50 air mail for other countries. Contact Tom Smith G4FAI, 1 Tash Place, London N11 1PA.

Illegal Radio Car Alarms

Quite apart from saving you from the worry and inconvenience of having your car stolen, fitting it with an alarm might seem a good way to help beat crime. But, the DTI warns, if the alarm you have chosen is one which uses radio, and it is not approved, you could be breaking the law yourself.

A large number of illegal devices are now being advertised and sold, most of them imported, and their use could land you with a prosecution and a fine on conviction of up to £2000, three months imprisonment - or both.

There are two types of car alarms which use radio: the “car theft paging alarm” and the “radio key”. It’s mainly the former which could cause the trouble, if you use it. But, the DTI warns, if the alarm is tampered with, they will alert you by transmitting a signal which is picked up by a small receiver you are wearing. But, for such alarms to be legal they have to be type Approved.

To be on the safe side the only alarm of this type at the moment that is legal is the “Page-Alarm”, made by C-COM International. All approved alarms must be marked to show that they are type approved and conform to the DTI specification. The “radio key” type uses infra-red and ultrasonic and so are not tied by the same restrictions.
GoldStar Counters

Alpha Electronics have available the first of a series of frequency counters from GoldStar. The model FC7011 is an 8-digit, single-channel, counter which measures directly from 1Hz to 100MHz. An 8-digit I.d. display is enhanced by switchable manual or automatic ranging and the ability to hold the last measured value. Direct measurements from 1Hz to 100MHz have resolutions of 0.1, 1.0, 10 and 100 seconds and a basic input sensitivity of 10MV.

Housed in an ABS plastics case and fitted with an adjustable tilt stand/carry handle, the 7011 has an input impedance greater than 1MW that can accept up to 150V r.m.s.

The FC7011 has a 10MHz crystal reference oscillator with less than 5 p.p.m. stability and an ageing rate of less than 8 p.p.m. /year.

The models 7012 and 7013 are both fitted with temperature compensated crystal oscillators with better than 1 p.p.m. temperature stability and ageing rate per year. The case material for the 7012 is ABS plastics and aluminum for the 7013. The 7011 is serviced by Alpha Electronics Ltd, Unit 5, Unstock Trading Estate, Wigan Road, Atherton, Manchester M29 0GA.

Tel: (0942) 873434

GB75CIS

The activities of GB75CIS on the Isle of Sark, from 17 - 20 July 1988, resulted in donations totalling £136.22, which has now been forwarded to the BBC's "Children in Need" appeal.

Total operating time was 31 hours 38 minutes, 417 QSOs took place and in all, 38 DXCC countries were worked.

The rig used was an IC-735 kindly loaned by Icom and the antennas were a 3.5MHz dipole and a 7MHz Delta Loop.

Bob G3UTX and Tudor GW4OYD would like to thank all operators for their forbearance and they regret that they were unable to make contact with all those who called due to the heavy pile-up.

QSLs have now been despatched but should any be outstanding, please forward details, together with an s.a.e., to Bob Ridley G3UTX, 9 Greenacre, Worlebury, Weston-super-Mare BS22 9SL.

Snippets from Radio Sweden

Alaska: Since November 6, English and Russian programmes from KNLS are as follows. All transmissions are towards the Eastern parts of Asia. The station no longer broadcasts to Europe and the European USSR.

English: 0800-0900 on 6.065MHz
1500-1700 on 7.355MHz
1800-1900 on 7.355MHz.

Russian: 0700-0800 on 6.065MHz
0900-1000 on 6.065MHz
1200-1300 on 6.100MHz
1700-1800 on 7.355MHz.

Burma: The Burma Broadcasting Service can be heard with a powerful signal on 5.040MHz 1230 - 1600 and 0100 - 0230. The programmes are partly in English and this is probably a new transmitter. Frequencies in parallel are 5.985 and 7.185MHz.

Cook Islands: Radio Cook Islands has been noted at 0300 on 11.750MHz, after Cuba closes on this frequency, with programmes in Maori and English.

Greece: The Voice of Greece has begun broadcasting in Swedish at 1540 - 1548 on 11.645, 15.360 and 17.565MHz. This follows the news in English, which now starts at 1530 instead of 1535.

Hong Kong: Radio Television Hong Kong is now broadcasting to Vietnam on 7.290MHz short wave. The transmission times are 1100 - 1300 and 2300 - 0100. Hong Kong has been a rare country on short wave, but according to announcements these transmissions are scheduled until the end of June.

The programmes are to explain the new screening policy for Vietnamese boat people refugees and the transmitter has a power of 30kW.

Hungary: A new 100kW short wave transmitter has recently become operational at Szekesfehervar in western Hungary. This relays Radio Budapest's Home Service Kossuth Radio to people of Hungarian origin in neighbouring countries. The frequency of this outlet is not known, but WRTFH lists a relay of Kossuth Radio with 250kW on 6.025MHz.

Portugal: Radiodifusao Portuguesa has made some changes in its European service. On 9.740 and 11.740MHz, there is Portuguese at 1930-2000, English at 2000-2030, French at 2030-2100 and Italian at 2100-2130.

ISWL

Jim May, who was the Honorary Secretary of the International Short Wave League, relinquished this position on 1 January 1989 in order to concentrate on the production of the League's journal Monitor.

All correspondence for the ISWL should now be addressed to: Yvonne Blain, 167 Wombridge Road, Trench, Telford, Shropshire TF2 6QA.

IRTS Yearbook

The Irish Radio Transmitters Society (IRTS) is the national society for radio amateurs and experimenters in Ireland. As such, it represents the interests of all Irish radio amateurs through the promotion of activities of interest to members and through the representation on amateur radio matters to the Department of Communication.

The IRTS Amateur Radio Yearbook contains all kinds of information: IRTS of 52s and 7MHz, but updater map and the EI QSL cardinal listings for 1988. So if you regularly work EI land, this book will probably be of use to you. The cover price is £2, but contact IRTS about postage rates.

IRTS Book Sales Manager, Mr D. Peyton, 123 Springhill Avenue, Blackrock, Co. Dublin, Eire.

College History

Are you an ex-student or ex-staff member of the former Wireless College in Colwyn Bay? If so, Alan Twelves GW4ZMG would like to hear from you.

He is looking for historical, descriptive, reflective, illustrative or even nostalgic material. Apparently the Wireless College, overlooking the sea, displayed an amateur call sign - a G2 plus 2 - Alan believes.

All assistance will be acknowledged and followed up says Alan. So, if you think you can help Alan, he is G7HR.

Publications: A copy of the review of the PC Text Teletex Adaptor can be found in the newly released Update 3.6 of the DXers' Guide to Computing, which is available, free of charge, from Radio Sweden. The new update also includes news about the ANARC computer bulletin board and radio clubs for Commodore and Atari users.

The 34-page 3rd Edition of the DXers' Guide to Computing itself is still available for £5 or £7C plus postage. The other updates are free.

Sri Lanka: The Deutsche Welle relay will use 15.300MHz instead of 21.500MHz for German language broadcasts to Asia at 1000-1400.

USSR: Radio Moscow says it will be carrying commercials on its external services. The station says enterprises, organisations and co-operatives can advertise their technology, goods and services in its foreign language broadcasts. Commercials for foreign firms have appeared on Soviet television.

Short Wave Magazine February 1989
WHAT'S NEW

Miniature Push-button Switches by Toko

Crikitt have introduced the latest Toko range of miniature push-button switches suitable for use in audio, radio, video and other consumer electronics equipment. These switches have a short button travel of 2mm and the terminal pins are arranged on a 2.5 x 2.5mm pitch grid intended for direct soldering to p.c.b.s. The contacts are rated at 0.1A at 30V d.c. with a maximum contact resistance of 20MΩ and a minimum insulation resistance of 100MΩ. Self-latching, non-latching and interlocking formats are available in 2-pole and 4-pole versions.

Revco Taken Over

As from 16 November 1988, Revco Electronics Ltd., has been under new ownership and management following the retirement of the founding directors Dennis and Patricia Reeves.

The new directors are Peter and Mary Longhurst of Startop Communications Ltd., but better known by its trading name of Garex Electronics.

The takeover marks the culmination of many years of collaboration between the two companies. It is anticipated that the two companies will continue to trade as separate entities, although there will be some logical rationalisation of their activities.

For further information and full technical details contact: Crikitt Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NG. Tel: (0992) 444111

GRASSROOTS

Lorna Mower

South East Kent (YMCA) Amateur Radio Club

Loughton & District ARS meet In Room 20 of Loughton Hall, Rectory Lane, 7.45pm. January 27 is Cellular Radio Update G4RKH and February 10 is Power Supplies Revised G8DZH. John Ray G8DZH on 01-508 3434 (after 7pm).

Ipswich ARC have Steam Engines by Mr. H. N. James on February 8 and a Morse Test at Ipswich on the 9th. Meet at 8pm in the Red Lion, 284 Bramford Road. Jack Toolthill G4IFF on Ipswich 464047.

YeoVil ARC meet Thursdays, 7.30pm at The Recreation Centre, Lawrence Road, Yeovil BA21 3SS.

G3MYD

February 1/16 and Natter Nights, the 8th is Packet Radio, a talk and demo (provisional), and the 23rd is Club Winter Project Update. Dan Edwards at 12 East Cliff, Dover, Kent CT16 1LX.

Wired ARS have a Presidents night on February 1 and Analogue/digital techniques G4EXI on the 15th, 1st & 3rd Wednesdays at Ivy Farm, Ancro Park Road. A. Seed G3FOO at 31 Withert Avenue, Bebington L63 5NE.

Mansfield ARS meet 2nd & 4th Fridays, 7.30pm at the Westfield Folk House, Westfield Lane. On January 27 they have a Junk Sale: Keith M. H. Ray G8DZH.

G3MYD

Halifax & District ARS have G3TQA/G4JKN Demo Packet on February 21. 1st & 3rd Tuesdays, 7.30pm at the Running Man Public House, Peillon Lane. 1st Tuesdays are Informal Noggin and Natter Nights. David Moss G3EDO, M.9 at Halifax 222216.

Edgware & District RS have Smith Charts by G3SJE on February 9. 2nd & 4th Thursdays, 6pm in the Waffling Community Centre, 145 Orange Hill Road, Burnt Oak. Ian Coop G4UZ at Hatfield 65707.

Todmorden & District ARS have their AGM on February 6. 1st & 3rd Mondays, 8pm at the Queen Hotel. Val Mitchell G1GZB on Todmorden 617572.

Coventry ARS meet Fridays, 6pm at Sycamore Close, 121 St. Nicholas Street, Radford. January 27 is their Annual Dinner, February 3 & 17 are Natter Nights on the Air with Morse tuition and the 10th is a Quiz Night. Jonathan Ward G4EHF at Coventry 610408.

Homsea ARC meet Wednesdays, 8pm at the Mill, Altwick Road. February 1 is Morokullen Adventure G4TV, the 8th is Telegraphic Communication G4GY, the 15th is 524 Kenya G1FTF and a Natter Night follows on the 22nd. Geoff G4GY on 01904 333331.

Norfolk ARC have an Informal/Committee meeting on February 1, Mast Planning Problems, Chas Mathews G8NUK at the RSG8 Planning Panel on the 8th, on Informal on the 15th and 18th with Air Traffic Control G8G0B on the 22nd. Wednesdays, 7.30pm at the Norfolk Dumpling, The Livestock Market, Hartford. Craig Joly G8G0D on Newark G4G0D.

Southgate ARC meet 2nd & 4th Thursdays, 7.45pm at Holy Trinity Church Hall, Winchmore Hill. February 9 is a Quiz G4UKR. Brian Shenton on 01-360 2453.

Workop ARS have a Magazine Sale on January 31, Natter Nights on February 7/8 at 7pm and a Junk Sale on the 14th. Meet Tuesdays, time and place from Carole Gee G4UON on Workop 488614.

South East Kent (YMCA) ARC meet in the Dover Ymca, Godwynhurst, Leybourne Road, 7.30pm on Mondays, 8pm on Wednesdays and 7.30pm on Saturdays.

Stourbridge & District ARS have a Natter/On-Air Night on February 6 and a Constructors Competition on the 28th. Meetings held twice monthly at the Robin Woods Centre, Beauty Bank. C. Brum GI1AW on Hagley 855622.

Basingstoke & District ARC have Packet Radio G1WKK (provisional) on February 6. 1st Mondays, 7.30pm at the Forest Ring Community Centre, Sycamore Way, Winklebury. David Dean GI3ZOL on Mortimer 332777 (home). Tounon & District ARC have a Radio Quiz on February 3 and a talk by member of the first class operators club on the 17th. 1st & 3rd Fridays at the County Hall (Emergency Planning Hq). Peter Robinson GI4EYR on Tounon 275973.

Derby & District ARS meet at 119 Green Lane, 7.30pm. February 1 is a Junk Sale, the 8th is an illustrated talk by Martin Byrne of GMT Communications, Beeston on Modern Telephones Exchanges, the 15th is a Night on the Air and the 22nd is a Vintage Railway Films - Mick GI4RXV & Kevin Jones GI4PR on Derby 669157.
\* January 29: The NARSA Northreck Radio and Electronics Exhibition (formerly held at Belle Vue in Manchester) will be held in 1989 at the Northreck Castle Exhibition Centre, Blackpool. Details can be obtained from: Peter Denton G6CGF. Tel: G51-630 5790.

February 26: The 2nd Taw and Torridge Rally will be held at the BAAC Halls, The Pill, Bideford in North Devon. These premises are larger than last year. The doors open at 10.10am with talk-in available on S22. There will be trade stands, a bring & buy, refreshments and a bar as well as ample parking. More details are available from: GOAYM. Tel: (0895) 23776.

March 4: The Blue Star Radio Rally, organised by the Tynneside Amateur Radio Society, will be held at High Gosforth Park, Newcastle upon Tyne. Racecourse. All the usual attractions as well as talk-in. To find out starting time and other details contact Terry G6VEG. Tel: (091) 2548196.

March 5: The Bury Radio Society Annual Hamfest will be held at the Castle Leisure Centre, Bolton Street, Bury. It's only 3 minutes from the M66 and there will be talk-in on S22. Doors open at 11am and entrance is by programme costing 50p. Refreshments are available. Contact: C.D.W. Mackroft G4JAG, Moses Centre, Cecil Street, Bury.

* March 12: The Trafford Rally, now also being called The Great Northern Rally, organised by the Trafford Amateur Radio Club, is moving to a new venue - G-MEX, the new Greater Manchester Exhibition & Event Centre. All the usual attractions including Free Draw, Bring & Buy, Licensed Bar, Hot & Cold Meals, lots of room on one floor and plenty of Parking. Talk-in on S22. All enquiries on 061-748 9834 or 061-881 3739.

\* SWM in attendance

March 19: Wythall Radio Club will be holding their 4th Annual Radio Rally at Wythall Park, Silver Street, Wythall, Worcs. This is on the A345 south of Birmingham. Doors open at 11.30am. There will be three large halls, the usual trade stands, a flea market, a large Bring & Buy, snacks available and a bar. Talk-in on S22 with more free parking this year. Admission is £5. For more details contact Chris GOEVO on G01-430 7267.

March 26: The Cunningham & District Mobile Rally will be held at Roach Way Youth Centre, Rochford, Essex. Doors open at 10.30am. More details from: Bob Low on (0563) 35738.

May 4: The Southend & District Mobile Rally will be held at Roach Way Youth Centre, Rochford, Essex. Doors open at 10.30am. More details from: Ted G4TUO. Tel: (0702) 202129.

* May 21: The "Hobbies Fair" is the first event in the Science Museum's Wroughton 1989 season. As well as radio, this event covers a wide range of interesting hobbies and also offers the rare opportunity to see some of the Science Museum's stock of aircraft and other transport items which are stored in the hangars. Wroughton Airfield is south of Swindon, Wiltshire and easily reached by road.

If you are organising a rally and would like it mentioned in Short Wave Magazine, then drop us a line, preferably as soon as you have fixed the date but no later than 6 weeks in advance (marking your envelope "SWM Rally Calendar") and we'll do the rest. Please make sure that you include all the details including such essential information as the venue, starting time, special features and a contact for further information.

LISTEN OUT FOR

Thinking Day on the Air

The Girl Guides and Brownies celebrate the birthday of founders Lord and Lady Baden-Powell as Thinking Day. For some years now the weekend nearest to Thinking Day has been of special interest to Guides and Brownies interested in amateur radio as many units and packs have activated special event stations as part of a world-wide Thinking Day on the Air event. This year the weekend is February 18 and 19 and it is hoped that there will be more stations on the air than last year when over 70 stations participated in the UK - an increase of 50 per cent over the previous year. One disappointment last year was the failure to co-ordinate TDOTA with the Canadian "Guides on the Air" particularly as Canada is one of the few countries to which UK Guides and Brownies can speak to others. This year it is hoped to get the act together.

The list of stations participating in TDOTA 89 is not yet known so it is not possible to give a complete run down here. Perhaps for next year any amateurs or guides who are running a station during Thinking Day on the Air might like to send details for publication in the magazine.

GB4VBP: The 7th Todmorden Brownies have been active during Thinking Day on the Air - their Brown Owl is none other than Jennifer Jackson GB4WWO who is the Co-ordinator for TDOTA!

GB4VBP: This station will be on the air during the weekend of February 18/19 to celebrate "Thinking Day on the Air". The 4th Verwood Brownie Pack, assisted by Short Wave Magazine staff, hope to be talking to Brownies and Guides the world over. A special QSL card is available for all contacts and reports.
DX LETTER FROM AMERICA

Gerry L. Dexter.

For short wave listeners who enjoy a little mystery and a dash of intrigue with their radio receptions there is nothing quite like the sudden appearance of a new clandestine station on the short wave bands.

Meantime, it seems that the on-again, off-again foreign service of Radio Nacional Venezuela is on again. It's been spotted at around 1115 in English, announcing that the broadcasts are for Latin America and "the rest of the world". The frequency is 9.540.

Another reactivated station is Radio Casino In Puerto Limon, Costa Rica, one of the relative few commercial stations in Central America still active on short wave and a station that has been around for a long while. Limon is on Costa Rica's Atlantic Coast and sits on the spot where Columbus landed on his last visit to the New World. At one time, Radio Casino had a regular schedule for English (0400-0600 and 1100-1200) but whether this still exists hasn't yet been determined.

Unfortunately, this fine and friendly little station too often finds its signal in a losing battle with those of the big international broadcasters.

Hong Kong is being checked off on more and more wave lists these days, even with the BBC relay having been on for sometime now. The appearance of Radio TV Hong Kong, with a regular schedule, enticed many to some early morning listening. The new "Vietnamese" service from RVTKH has been heard by many around 7.290.

Jordan, another tough one for many DXers here, has also been entered in a lot of logbooks lately, thanks to the appearance of Radio Jordan's new 500kW signals. North Americans are hearing this one in English at 1500 on 9.560. Bad comes with good, though, as the signal now covers that of the Voice of Ethiopia.

We are still awaiting the appearance of WWCR, the new station due on the air from Nashville, Tennessee and, barring still more delays, it should be on the air by the time you read this. Look for it between 0000-0200 on 9.19, 10.00-13.100, and 15.640 with broadcasts to Europe and eastern North America. Reception reports on this station go to WWCR, 3314 West End Avenue, Nashville, TN 37203. The format will be largely religious or entirely religious programming.

Also in the Department of New USA Short Wave Stations is WSHB, the third station in the Christian Science Monitor's planned short wave triad. This one, in Cypress Creek, North Carolina, was still scheduled to begin operations early in the year, using a duo of 55kW transmitters. Assuming that it did become operational sometime during the first half of 1988 it should follow this schedule:

0000-0200 on 11.980 and 13.760;
0200-0400 on 9.745 and 13.760;
0400-0600 on 9.455;
0600-1000 on 9.495;
1000-1200 on 6.150 and 9.495;
1200-1300 on 6.150;
1300-1500 on 6.150;
1400-1600 on 11.580 and 17.640;
2000-2200 on 15.225 and 17.750;
2200-0000 on 15.205 and 17.640;

Many North American DXers who use the country list maintained by the North American SW Association consider the once break-away Zairian province of Katanga as a separate radio country. The only target, the station on Lubumbashi, has been a tough one to hear. The 4751 channel doesn't seem to be active for the morning schedule. Nominal 7.205, actual 7.204, was audible at sign-off for about a minute before being covered by Radio Tirana's sign-on. Recently though, Lubumbashi has slipped to 7.203 so some logs have been possible, given a wind blowing in the right direction.

Readers who can find an excuse to be in the USA during July should certainly plan to also attend ANARCON-89, the annual convention of the Association of North American Radio Clubs. The affair will be held Friday through Monday, July 14-17, at the Dolphin Beach Resort which sits facing an 11km long white sand beach on Florida's west coast, near Tampa. Nearby tourist attractions include Disney World, EPCOT Centre, the Kennedy Space Centre, Busch Gardens and Sea World.

A steel band will entertain at a poolside opening night reception sponsored by the World Radio TV Handbook. The rest of the weekend will see attendance by several short wave broadcasters, exhibits by clubs, stations, short wave equipment dealers, plus seminars and other presentations on a wide range of DX topics. The annual banquet on Saturday evening, award presentations and the always popular WRTB Quiz will also be part of the weekend.

Full details and registration information can be had by writing to ANARCON-89, PO Box 272301, Tampa, FL 33688, USA.

That will do for this time. As usual, your comments, sent care of the Editorial Offices in Poole, are always welcome.

Best wishes from North America.

The foreign service of Radio Nacional Venezuela is back on the air. The station was sending out this QSL card in 1983.

Short Wave Magazine February 1989
When you are ready to graduate to real listening
Look to Lowe

The R-2000 from Kenwood
150kHz-30MHz. SSB/AM/CW/FM
VC-10 converter 118-174 MHz
R-2000 . . . . £595
VC-10 . . . . £162

The R-5000 from Kenwood
100kHz-30MHz. SSB/AM/CW/FM/FSK
VC-10 converter 118-174 MHz
R-5000 . . . . £875
VC-20 . . . . £167

The NRD-525 from JRC
Simply the best receiver you could buy . . . . £1095

What do I mean by "When you are ready to graduate"? Well, like all hobbies or pastimes, short wave listening is a progressive hobby, and many people come to it almost by accident when they hear an unusual broadcast station on their ordinary domestic radio, particularly if the radio has a short wave band. Interest is aroused, and before long the listener begins to wonder why there are some signals he cannot resolve. He may well turn to the pages of Short Wave Magazine for advice, and become familiar with terms such as SSB, RTTY, selectivity, propagation, and so on.

It is at this point that our worthy listener takes his first step in upgrading his equipment, and comes out of primary education into more advanced listening. Many people at this same point rush along to their nearest High Street multiple retail store and buy what they are told is a "Short Wave Radio", bristling with push buttons and coloured knobs. Sadly, the so-called "Short Wave Radio" is often no more than a domestic portable with a fancy front panel, and the performance when used for anything other than casual listening is no better than the old radio with which he started — in fact it's often worse.

So — these push button portables are excellent for taking on holiday, or carrying to the river bank during a fishing trip, but for real listening — no, no, no.

Our listener is about to graduate from the University of Short Wave Listening, and armed with the knowledge of what he really needs for his hobby will proceed to find a suitable receiver for his purposes. Now it is true that the cost of a properly designed short wave receiver will be higher than the domestic portables; but not so much higher as to be prohibitive, and by going to a specialist (and I mean a true specialist, not someone who talks about "Tranny Radios"), the listener will get good advice based on years of experience in the field, and access to not only new receivers but usually a range of guaranteed second hand units as well. The specialist will also stock and sell a full range of necessary accessories, ranging from simple aerial insulators to complex morse and RTTY decoders for more advanced enthusiasts.

You may get the impression that I am referring to Lowe Electronics when I talk about a specialist dealer, and of course I am. After 25 years of specialising, it is generally accepted that we are without equal, and this is re-inforced by the fact that we have been appointed by so many leading manufacturers to represent their products. As a final point, how many other companies in the UK have designed, built, and sold a real short wave receiver to 17 countries around the world. WE HAVE.

The receivers shown on this page are representative of the best in the world, and are on show at all our branches and at selected dealers throughout the UK. For full information on how to choose your short wave radio, just send off for our "Listeners Guide" (details below), or call and ask. We are happy to help, and we know what we are talking about.

FREE

Send £1 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.

LOWE ELECTRONICS LIMITED
Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482

Short Wave Magazine February 1989
I don't think there has been a more exciting time for the VHF listener than right now. With the leading manufacturers making VHF and UHF receivers, and using microprocessor control which would have been impossible even five years ago, the dedicated listener can literally carry in his pocket the kind of receiving power that used to take up a nineteen inch rack, and consume enough electricity to light a small house.

We at Lowe Electronics have made it our task to seek out the best manufacturers of these various radios, and bring them to you at attractive prices. We are the sole factory appointed importer for Signal, AOR, and WIN; all of whom represent the very best in scanning monitor receiver design and manufacture, and we show a small selection on this page. Not only do we stock and sell all these radios, we also offer you the best advice in the business, and we carry a full range of listeners' accessories from a humble egg insulator to RTTY and Morse decoders (and incidentally, we know our subject extremely well).

Let's start with what is acknowledged to be the finest wide range monitor receiver ever made; the AR-2002 from AOR. This receives in all modes, on frequencies from 25 to 550MHz, and also from 800 to 1300MHz, so there isn't much you cannot receive: airband both VHF and UHF, marine, amateur, FM broadcasts and TV sound, cellular radio, land mobile radio and so on. The AR-2002 is in use in professional installations all over the world, but is available at a price that the amateur can afford.

Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the Signal range is the R-535, which covers not only the VHF airband from 108 to 136MHz (also 136 to 143MHz), but also the UHF airband from 220 to 380MHz. No less than 60 memory channels can store any frequency within the range of the receiver, and scanning takes place at very high speed, so you don't miss any of the action.

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Signal also make the ideal starter receiver, the R-537S, which combines fully tunable operation for searching around the VHF band and two channel crystal control for spot-on accuracy when you need it. A special version of the R-537S is in use by most parachute clubs where the instructor can talk directly to a falling pupil — helps to advise them that they should have opened the 'chute.

Our most successful airband receiver has been without doubt the WIN-108. Designed to incorporate all the features asked for by UK users over the years, the WIN-108 is the most convenient, powerful, and feature packed dedicated VHF airband receiver ever made available. Simply cannot be described in this space, but details of the WIN-108 and all our other models are available on request, enclosing £1 to cover post and packing. You will also receive our "Listeners' Guide" and "Airband Guide" free of charge.

Send right away, and see why you should “look to Lowe” for all your listening requirements.

**25th Anniversary Prize Draw**

Anyone making a purchase of more than £5 during this month will have the chance to win our “Gift of the Month” from the following: — TM-221E, R-535, AR-800, HF-125, TH-215E. All mail orders are automatically included. All shop sales will be recorded on cards, given to you by the manager.
F2-Layer Reception

Long-distance television reception via the F2-layer is only possible during periods of high solar activity, which reaches a peak at 10 to 11 year intervals. Magnetic storms within the sun's photosphere radiate a tremendous amount of energy which is responsible for ionisation of the F2-layer. When sufficiently ionised, this layer is capable of refracting signals back to Earth. Such storms are visible as sunspots and regular observations will indicate whether their number is increasing. A very high sunspot count indicates intense solar activity and in these circumstances, the reception of broadcast television signals becomes a possibility. The solar cycles are assigned a number, the one that occurred at the end of the seventies was number 21.

Ionisation

The “F” region actually consists of two layers, the F1 and F2, although for all intents and purposes it is the latter one that plays the major role with communication over vast distances. Located some 350km above the surface of the earth, the F2-layer is the highest of the two. There are some variations in its height depending upon factors such as the time of the year, whether it is day or night, and the actual amount of solar activity.

The ionisation density of the F2-layer is higher during the winter daytime than in summer, when heat causes the gases within the layer to expand, thus reducing its overall density. It is during the winter daytime that the maximum usable frequency (m.u.f.) will reach its highest level with the possibility of long distance television reception.

From the authors’ own observations carried out during the last solar cycle, reception was more favourable during October, November and December rather than the first three months of the year. Some of the highest m.u.f.s were encountered during December 1979 and 1981.

Skip Distance

Since the height of the F2-layer is much higher than the E-layer, the skip distance will be considerably greater than for sporadic-E refraction. Indeed, the skip distance by F2 propagation can easily exceed 4000km (2500 miles). A comparison of skip distances are shown in Fig. 1.

Phenomenal Distances

So, what reception distances are we likely to encounter during F2 activity? Below are a couple of interesting highlights extracted from reception reports submitted to the authors by other DX-TV enthusiasts during the peak of the last solar cycles which occurred between 1979 and 1980.

This report came from Hugh Cocks who, in 1979, was resident in the UK. ‘F2 reception has been quite good lately with Australian channel 0 (45.255MHz) on January 10th and February 24th. The reception on the 10th was TVG-0 and ABMN-0 all mixed up. I made a recording of it and the TVQ square identification symbol can be seen. Gwelo (Zimbabwe) on channel E2 was in for two hours today on the chequerboard test card’.

Anthony Mann in Western Australia reported the following activity in December 1978, “channels R1 (45MHz) and R2 (the old French channel) reception is becoming commonplace here. There have been some 24 openings so far but the m.u.f. has never reached 45MHz again. The peak period seems to be 0900-1100UTC although the BBC lute has been heard as early as 0843UTC. A couple of openings have continued until 1200-1230UTC and France was heard as late as 1310UTC on November 22.

There were many other instances of amazing TV reception during the last solar cycle, but the two reports given above indicate just what can be achieved by F2 propagation using typical DX-TV equipment.

Characteristics

The quality of the pictures obtained via F2 propagation differ vastly from those experienced due to sporadic-E ionisation. Severe video distortion with multiple images is a characteristic of F2 propagation. At times it is difficult to decide whether a scene is static or moving, let alone be able to decipher captions! It goes without saying that identifying the source of a likely exotic transmission can sometimes prove to be tricky, even for the experienced DXer.

Back Reflection

During periods of high solar activity, a secondary effect known as “backscatter” can occur. This means that transmitters situated fairly close to the reception location may be received from the opposite direction. In 1978, the authors discovered a Czechoslovakian test pattern turning on channel R1 with the antennas directed to the south west! The signal was weak and distorted with a severe humbar or rambling effect over the picture.

Strong Signals

For most of the time, signals are by no means weak and can attain levels normally associated with sporadic-E reception. Polarisation changes do occur and experience has shown that a vertical antenna can give improved results, with greater picture clarity. During the onset of an F2 opening, signals tend to rapidly build up from zero level to a fairly constant maximum strength within a matter of minutes.

Reception Times

Refraction is most likely to occur when noon is approximately mid-way between the transmitter and receiving site. This means that signals from the Far East are more likely to be encountered during the early morning from, say, 0700UTC rather
INTRODUCTION TO DX-TV

than mid-afternoon. Likewise, signals from the West originating in Canada and the USA are more likely to emerge during the afternoon.

Early Observations

Television reception during the solar peak of the 1930s could not be thoroughly assessed since there were very few TV services in existence! The world's first high-definition service did not commence until 2 November 1936. However, there were early experiments into long-distance reception, and 405-line receivers were shipped from the UK to North America in the hope of receiving transmissions from the channel 1 transmitter at Alexandra Palace in London (transmissions switched to Crystal Palace on 28 March 1956). The experiment proved a success and at times both sound and vision signals were monitored at 41.25 and 45.5MHz respectively.

Rhombic Antenna

The signals were studied at Riverhead (Long Island) in New York between 1936 and 1939. The antenna used consisted of a horizontal rhombic some 45ft (14m) above the ground directed toward London. The length of each leg of the antenna was 300ft (122m). The major and minor axes were adjusted to give maximum response to a signal arriving at an angle of 60 degrees. The effective height of the antenna system was about 63ft (20m). Most of the observations took place between 0945 and 1130EST (Eastern Standard Time). This corresponded with the afternoon schedules of the BBC. On numerous occasions the transmissions continued until noon or thereafter.

Results

The images observed appeared to exhibit selective fading as the contrast of the picture would often change between wide extremes. Multi-path propagation would mar the picture in two ways. Firstly, it would cause repetition of the picture content and secondly, it would result in more than one set of horizontal synchronisation pulses making it impossible to obtain a steady picture.

Following Peaks

Three years later on 1 September 1939, the British television service was closed down for reasons of national defence and was not resumed until 7 June 1946, hence there was little opportunity to monitor the effects of F2 propagation during the late 1940s.

There were still very few countries operating a national TV service during that period, so experiences were virtually the domain of amateur radio enthusiasts. The peak of that particular solar cycle occurred during the winter of 1947-48 when m.u.f.s. above 50MHz were encountered. The sunspot count of 150 was considered unusually high at the time - much higher than the previous peak.

Fig. 2: Comparison of sunspot numbers this century.

Past Records

Sunspot numbers and solar behaviour in general have been carefully studied over the years and records date back over many centuries. The magnitude of the 1947-48 peak suggested that repeat conditions might only occur every 50 years or so. However, the sunspot maximum of the late 1950s proved to be the highest number ever recorded, with a count of almost 200!

Enter the DX-TV Enthusiast

Many countries throughout the world were now operating TV services, many with channels in Band I. Of greater importance was the earlier access to television receiving equipment for budding TV DXers to experiment with. Propagation via the F2-layer was a totally new experience as far as television reception was concerned for the novice to experiment with.

Fortunately, the United Kingdom had adopted some of the lowest frequencies for TV broadcasting throughout the world and this virtually guaranteed success. As we mentioned earlier, the UK channel 1 was located just above 40MHz. France also operated a TV channel at the lower frequency band of Band I, but the extremely wide bandwidth chosen for their 819-line transmissions meant that only the sound channel was located close to 40MHz (41.25MHz to be precise), whereas the vision carrier was 52.40MHz! As a result, examples of spectacular long-distance reception occurred regularly with sound and vision signals from the BBC Channel 1 Crystal Palace transmitter being received in Australia and in other parts of the world.

TV on higher Band I frequencies were propagated too, with Instances of European stations being received in the USA.

Less Spectacular

The sunspot maximum towards the end of the 1960s was less dramatic because the sunspot number count attained a maximum of 100 - only half the number of the previous cycle.

Results were extremely disappointing with fewer instances of long-range TV reception being encountered via this mode of propagation, at least in Europe.

Enthusiasts in other parts of the world scored much better because the lower frequencies used by BBC1 on channel 1 and France on their channel 2 were more readily propagated. Towards the end of 1968, daily reception of France, and the United Kingdom was possible over large areas of the USA. In addition to these, Spanish signals emanating from the Madrid transmitter on channel 2 were arriving almost daily in South Africa.

Mega-Spectacular!

Cycle number 21, which peaked during 1979-80, was spectacular to say the least! Although activity spanned four winters (1978-81), the sunspot number count only reached about 150, which is comparable with the 1947-48 peak.

Nevertheless, TV DX logs dating back to that period make nostalgic reading and the excitement of some of the more elusive reception still lingers on. The vast number of DX-TV enthusiasts around the world meant that Band I was being constantly scrutinised for signals.

World Wide Reception

Many UK DXers first stumbled across F2 reception in Band I during October 1978. One of the authors was fortunate enough to be able to recognise a couple of...
Russian test cards that were superimposed on the screen. Although both signals were smearable with resulting poor definition, the features of the two test cards could clearly be discerned.

Signals from the USSR, China, the Middle East, Africa, the USA and Canada were identified at some stage of the cycle. Australia was regularly visible and was identified at one stage by an enthusiast using a scanner.

In Finland, transmissions from East Malaysia were received via F2 propagation on channel R1. Reception occurred during November 1980 (the exact date is not known) at approximately 1000UTC. TV DXers in Australia reported F2 propagation occurring during the same months as in Europe.

Signals from BBC1 on channel B1 from Crystal Palace were resolved on numerous occasions with both audio and video present. Pictures from China and the USSR were frequently observed. Reports from channel R1 transmitters including that of Vladivostok. Transmissions from Europe on channel E2 were also in evidence. Via a combination of F2, TE (Trans- Equatorial) and sporadic-E reception, Australians encountered signals from China and Korea.

Latest Cycle

Most TV DXers feared that such incredible reception would never be repeated in any future solar cycle. This seemed to be based on the “you can’t have too much of a good thing” principle. Only a couple of years ago there were pessimistic predictions concerning solar cycle number 22, which, theoretically, should reach its peak around 1990-91. Now the predictions are more optimistic and enthusiasts in the United Kingdom have already received pictures from E2 and R1 from unknown transmitters to the East.

So far, the following examples of F2 reception have been observed on the lower Band I channels during 1988:

25 October: Channel E2 weak, smearable - programme from the East around 0852UTC
27 October: Channel R1 USSR test pattern 0850-1012UTC very strong signal
29 October: Channel E2 unidentified signal, very weak 0810-0835UTC
29 October: Channel E2 unidentified pattern with captions, very smearable 0850-0910UTC
30 October: Channel E2 very weak, smearable picture around 0900UTC
31 October: Channel R1 USSR programmes fairly clear at times 1150-1255UTC, Channel E2 some form of test pattern programmes very smearable 1235-1255UTC

It is interesting to note that the signals on 31 October were of an exceptionally strong nature and could easily be misinterpreted as sporadic-E propagation.

Unfortunately, the initial opening phase was missed but the fade-out was a rapid process which took approximately three minutes. Since the 31st, the lower end of Band I has seemed remarkably dead.

In other parts of the world, enthusiasts have been encountering signals since the end of 1987. In India, transmissions from China and Thailand were identified on various dates while in Australia, signals from USSR transmitters on channel R1 were noted last July.

Reception techniques and receiver system requirements are generally more demanding for successful F2 reception than for sporadic-E. Despite their relatively high-cost, scanners covering v.h.f. and u.h.f. frequencies are becoming popular with an increasing number of dedicated enthusiasts.

The extremely high sensitivity and selectivity of a scanner allows the monitoring of sound and vision carriers, which would go undetected by conventional TV receiver systems. Specific frequencies can be entered into its memory and quickly recalled. In order to check on prevailing propagation conditions during an opening, in the past, by carefully monitoring sound channel frequencies, scanners have helped DXers identify the source of extremely weak signals. To help reduce co-channel interference, some transmitters use what are termed as “off-set” frequencies, where the vision and sound carriers are offset from their nominal frequencies by a few kilohertz. A scanner can resolve this slight difference and by reference to published lists the most likely transmitter can be established with a high degree of accuracy.

Tuner Range

The thought of receiving Australia on ch.0, or New Zealand on ch.1, is no doubt attractive and given the right conditions will occur. Unfortunately, its frequency may lie just outside the lower Band I cut-off range of many Varicap tuners fitted to European receivers.

Over the years, the authors have experimented with a variety of Varicap tuners and the following types are known to have a lower range in Band I which extends down to these channels:

- Mullard ELC1042 (v.h.f.)
- Mullard ELC2000 (v.h.f. and u.h.f.)
- Toshiba EG522F (v.h.f. and u.h.f.)

The “de-luxe” versions of the D-400 DX converter, which will tune down to approximately 44-45MHz, although the lower scale calibration is channel E2.

Earlier versions, without Band I channels prior to 1986, were equipped with the NSF 47807 Varicap tuner unit which has a Band I lower limit of approximately 47-48MHz.

If a signal generator is available, it may be advisable to satisfy yourself that your receiving equipment will comfortably tune down to Australian channel 0 in preparation for the big day!

Antennas for F2

Although strong signals can frequently be encountered via F2 propagation, something more ambitious than a dipole is recommended in order to make the most of such a comparatively rare event.

Many wideband arrays in use by enthusiasts have their reflector cut to a frequency just below its lowest intended channel of operation. In most cases, this will be approximately 47MHz. Useful gain will still be available below this frequency.
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THE PMX PRESELECTOR

The PMX is not just another 'add on' for your receiver, not
another active antenna, but something just a little bit special. It is
an RF amplifier combined with an antenna tuning unit, having all
the virtues of both units (normally bought as separate items)
placed in one box, their circuits interlocking fully. The PMX was
first designed in 1964 and although the basic idea is still the same
the circuitry has been updated to meet today's conditions.

Tuning 1.8 to 34 MHz completely, the ATU is a Pi section,
whilst the pre-amplifier is a three stage FET and Bipolar.

Give yourself a treat now that the sunspot cycle is coming up
To peak. Will take co-axial fed antennas, long or short end wires
of any length, and tune them to the band in use.

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The idea of intelligence leaving a piece of apparatus in one room, and re-forming in equipment kilometres away, across the world, or even into the unlimited reaches of space by some invisible agency, has fired the imagination and occupied the thoughts of thousands, from school children to scientists, for more than a century.

In 1892, Frederick H. Schnell was born in Chicago, USA. As the nineteenth century drew to its close, scientific curiosity and experimentation was at an exciting phase. The famous early wireless pioneers, Heinrich Hertz, Edouard Branly, Sir Oliver Lodge and Senator Guglielmo Marconi were entrenching themselves in wireless history. Young Frederick Schnell went to school and grew up as Marconi formed his Wireless Telegraph and Signal Company, spanned the Atlantic ocean with three Morse dots signifying “S” and had his system adopted for ship-to-ship communications. Valdemar Poulsen produced an arc transmitter, J. A. Fleming made a two-electrode valve to detect wireless signals and Lee de Forest added another electrode and patented the first triode electrode valve.

The First World War found him, a Naval reservist, at the transcontinental receiving station at Belmar, where in 1917, he copied the first message from Italy to President Woodrow Wilson. Later in the Naval Communications Office in Washington DC, he copied during his watch period, the Armistice acceptance message from Nauen, the German station which had sent a Morse signal over 2494km in 1913. Schnell transmitted the very first message to Germany after the war, and was Chief on the George Washington carrying the Morse signal, amateurs have exhibited a healthy scientific interest in the transmission and behaviour of radio signals.

President to the peace conference. Returned once again to the peace-time Naval Reserve, Lt. Schnell was traffic manager of ARRL at Hartford, managing the transcontinental relays and establishing a 6½ minute record round trip for a message. He was the first American amateur to make trans-Atlantic contact with Nice, France and to copy the South American amateurs.

The American Navy, meanwhile, was dragging its anchors over fleet communications. Although the Secretary of the Navy reported that it had “cognizance over all methods of communications in vessels of the fleet, including radio, visual, sound and carrier pigeons” and an extensive shore system, fleet communications were a very different story. “Though funds allocated there to have permitted but few improvements in material, progress has been due to greater and more satisfactory results obtained by operating personal, with the old and sometimes obsolete material.”

Skyborne Naval Unit

In 1924, the dirigible USS Shenandoo was built and fitted out with some high-frequency radio made at the Naval Research Laboratory. Her shake-down cruise was across America and back, and one can only imagine the reaction of people in middle America at seeing a sky-born Naval Unit! The Naval authorities found that her 3.2MHz transmissions could keep in reliable touch with the laboratory, although frequency stability left much to be desired. At San Diego, her transmissions were copied by the USS Canopus some 6758km away, and delighted amateurs throughout the country notched up highly desirable contacts. At the same time, communications with shore stations and those units on lower frequencies, using the usual fleet equipment were disappointingly unsuccessful. The radio officers were more interested in the high-frequency radio, probably contributing to the poor performance of the regular equipment. This was noted by an unsympathetic Commander-in-Chief US Fleet, who commented acridly that it was necessary for dirigibles assigned to fleet units to be able to communicate on standard frequencies, not to act as airborne laboratories! It was, however, the first time that high-frequency radio had been used in the fleet and it was still felt officially that it was of no use to the Navy.

Pacific Cruise

In 1925, the fleet was preparing for a Pacific cruise to Australia and New Zealand. The Fleet Radio Officer, Commander S. C. Hooper, was among those doubting the use of shorter wavelengths for Naval traffic, and there was little interest among radio officers generally, so Frederick Schnell was borrowed from ARRL and assigned to active duty to conduct experiments. Aboard the flagship USS Seattle, was a 5.7MHz laboratory transmitter and receiver; in addition, Lt. Schnell was “permitted to install his personal transmitters which covered a wide frequency band.” The ARRL arranged for world-wide co-operation by amateurs; official traffic was to be handled at the Naval Research Laboratory. During the entire period of the cruise, Lt. Schnell maintained satisfactory night-time communications between the flagship and the Laboratory, convincing the Commander-in-Chief that high-frequency equipment should be installed in capital ships. During that voyage, the Kennelly-Heaviside theory was also confirmed, and despite the recommendation that higher frequencies than 9MHz “not be utilised”, the Laboratory realised that day-time frequencies needed to be higher. The 5.7MHz equipment was a turning-point in radio communication in the US fleet, but some interesting amateur achievements were also recorded, which will be mentioned later.

After the successful cruise, Frederick Schnell was elevated to the rank of Lt. Commander. A civilian reservist once more, he put his considerable talents at the disposal of the Chicago Police Depart-
Part 1

The station of 2OD at Gerrards Cross.

ament as their Radio Engineer. Many old QSL cards of the period list among their station equipment "Schnell 0-V-2 RX" evidence of the popularity of his circuit design in the amateur radio world.

During the second World War, Capt. Fred H. Schnell (one of the few US Naval Reserve Officers to attain that rank), served the Ninth Naval District headquarters as District Communications Officer.

Gerald Marcuse

A contemporary of Frederick Schnell, born in 1896 in Sutton, Surrey, was Gerald E. Marcuse. He, too, became a radio amateur before WWI, and "EGX" was the proud possessor of a spark coil and crystal detector. Radio signals in those distant days were few and eagerly sought, and like most others of his time, Gerald listened to ship-to-shore stations and the Eiffel Tower time signals. He could send to a distance of 8km and greatly envied such stations as M6X, who could communicate over 161km with kilowatts of spark. The outbreak of the war was noticed when he heard Norddeitch comment that "the greatest excitement prevails in Germany". The next piece of excitement was a Post Office van which collected all his precious apparatus, and Gerald went off to war service.

1919 saw the return of his equipment and the beginning of one of the most famous callsigns wherever the British flag flew, 2NM which was soon listening via a "wonderful" valve receiver. Gerald, then an engineer in Bristol, combed Government Service depots, trying to obtain "oddments suitable for our purpose", and obtained permission to carry out tests on 300kHz on both c.w. and telephony. The demands of aircraft soon pushed him up to 680MHz, and by this time, he had become ensnared by long-distance broadcasting. A newspaper article by him on the use of short wave peered into the future.

"If we come to consider telephony, the question becomes more interesting and in the last two years it would seem to have been definitely established that by the use of short wave lengths the only real means of transoceanic radiocasting will be found, with ultra short waves it may yet be possible regularly to hear radiocast programmes from Australia, and judging from the success which my own station has attained I am confident that in the near future we shall be able to enjoy world radiocasting."

He now knew that they must look to frequencies of over 6MHz for such transmissions, and recognised that "we are at the beginning of a new era."

Amateurs concentrated their experimental work on short wave as a world wide method of communicating during the early 1920s with some notable trailblazers. The Atlantic was bridged by amateurs, and in 1922 under the auspices of the RSGB, a special station, SWS, was the first 1.5MHz British callsign to be verified in the USA. The following year, Mr Deloy in Nice arranged 3MHz tests with the ARRL, and his strong signals were received in Hartford, USA. Two-way contact on this frequency was established by Mr J. A. Partridge 2KF, London, with IMO at Hartford, USA on 8 December 1923 and his was the first British station to do so. By March of 1924, British amateurs were received on the Pacific coast of America, and before the end of that momentous year, 2OD at Gerrards Cross successfully sent a signal to Mr Bell 4AA, in Waehemo, New Zealand above 3MHz.

In 1925, two-way communication was established between Great Britain (2OD) and Mr Maclurcan of Sydney, Australia, on 14MHz, and on this same frequency, NKF, the United States Naval Research station at Anacosta was working several amateurs in the UK.

Intrepid Explorers

Gerald Marcuse's world-probing signals crossed oceans to the Antipodes and reached into regions where only intrepid explorers had been able to go. The newspapers in 1924 reported his successful link with the Hamilton-Rice Expedition, many kilometres into the Amazon jungle and long out of touch with their sponsors, the Royal Geographic Society. It was the first time a field expedition had enjoyed direct communication with base, and Gerald could not resist sending the message, "Wireless one second - Post nine weeks." That one second, as far as the expedition was concerned, was achieved despite drying out equipment...
from overturned canoes, a small generator that could only deliver 500W to plates rated at 1000V, the reduction by various accidents to a mere one valve, and an antenna input of 13W to "a one wire 'T' antenna, 12m in length and 15m in height in dense primeval forest". This short wave "stuff" is truly remarkable." Gerald was able to convey an official report from the expedition leader to the Royal Geographic Society, and transmit their reply to Hamilton-Rice.

It was during a QSO with Jack Orbell in New Zealand, that he was asked, "Have you heard Schnell on American Pacific Fleet NRRL? He's very good here and is using a crystal controlled outfit on 7.8MHz approximately".

**World Record**

Gerald needed little prompting, and soon established contact with the USS Seattle. His world record telephone conversation with Fred Schnell, then 1257km distant, was praised around the globe, from the American Department of Commerce radio expert, to the world's Press: but he had only just begun a remarkable series of contacts. World broadcasting at that time was his overriding enthusiasm, and the next feat was a concert programme broadcast to the Seattle from 2NM. The warship was in Wellington harbour, New Zealand, but records of Caruso, Heifetz and jazz were "all heard excellently aboard the American warship" boasted the New York Times. So successful was the utilisation of the short wave path, that a spontaneous press conference was held between Commander Crosse on the Seattle and reporters at 2NM in Caterham. Contact was established in less than a minute, and a mere 0.5kW of power carried the signals across the 22526km of land and oceans for this very first long-distance interview. It was unbelievable at the time that clear two-way voice communication could be conducted over such a vast distance. Commander Crosse did not at first believe he was listening to a signal originating 29km South East of London, and thought a New Zealand amateur was playing tricks. He was not the only doubter. Gerald was aroused from his bed by a belligerent American during that week, who told him plainly that he did not believe that he had been in communication with the Seattle, and if he cared to prove it, would he ask the ship four questions. The doubting American was conducted to the shack, where 2NM called Schnell, asked the questions and immediately received the answers! As Gerald put it, "The Yankee faded back to town!"

Lt. Schnell sent a message to the Evening News, "The tremendous strides and progress of amateur radio are clearly shown by the successful transmission of voice and music which has been received for the past five days aboard the Seattle in Washington Harbour, NZ. Heartly Congratulations to 2GNM."

Another 1925 Marine test was carried out by A. E. Hay GZKG, and H. T. Longuehaye GZKC, aboard the RMMS Aorangi GDVB, of the Canadian-Australian R. M. Line. She had experimental equipment aboard for working 6 to 16.6MHz. GZKN was often heard in the Pacific by the operators, who sent him a card and a request for a QSO.

Like the American Navy, the Royal Navy was not enamoured of the short waves, "they were so prone to fading and disappearing. They did not believe in them," Gerald recalled. One man, later Chief Engineer at Rugby, told him, "my station will keep communication with the world long after you have finished with short waves." How wrong he was! One visionary, however, was Admiral Sommerville at the Admiralty, who was also interested in amateur radio. Stonecutters wireless telegraphy station at Hong Kong had trouble at times in getting their signals out in spite of "great racks" of equipment, 2NM amazed them with his ability to make contact with them using small valves and equipment. In July 1926, W. G. H. Miles wrote from Hong Kong that he had "got stuck", as he had perfect communication with Horsea on 8.5MHz during the hours of darkness, and perfect communication with Singapore and HM ships on station for 4 hours in the evening, but was having technical problems. He could not hear many English or American stations, and could not read 2NM, although HMMS Ambrose at Singapore had received him well. He was trying to listen on a Naval BX, which he also drew. This was a more complex receiver with different antenna coupling and an inter-valve filter circuit. A new set built to the simpler circuit used by HMMS Ambrose improved matters, but there was still no reception of G2NM. Mr Miles asked Gerald to arrange a schedule and convey the message via Commander Murray.

Experiments were carried out with the Admiralty and the cruiser Yarmouth on her voyage out to Hong Kong, and as a result, Gerald built a two-valve receiver and shipped it out to Mr Miles.

"Your set continues to prove a great success", he wrote, "and it certainly made the Signal School experts open their eyes when they saw it, it is about a tenth of the size they consider necessary and yet gives results at least as good, and better than those of the old receivers. If I recently got a reply back from the Admiralty to a message of theirs within the 22 mins of their time of origin, and they sent out a special message of congratulations." Apart from official traffic with the UK, which was much better, he had contacted Singapore during the daytime on 12 and 14.6MHz and also heard R. M. Line, Malta, Gibraltar and the Philippines at night. He had worked amateurs in all countries, and told 2NM that 'short wave has been invaluable to me for handling traffic on the China station, as we have fitted all our ships - particularly during the Warsien show, when we couldn't have looked at handling it on long wave'.

Gerald despatched another receiver on the Durban and Mr Miles was very much looking forward to taking delivery. He sent logs of all the traffic handled by Stonecutters over a period of two years for detailed analysis. Gerald was to recall in later years, "used to keep on night school with Stonecutters every night around 6.6-9.3MHz. Never failed. There was no ORM. No interference. All to yourself." World exploration was what gripped the public imagination in those days, and far-off expeditions were an irresistible lure to those exploring the spectrum and the ionosphere with their wireless equipment. In 1925, Capt. Donald R. MacMillan led an expedition to the Arctic. Radio went too and once again the professionals looked to the amateurs to provide the expert John L. Reinartz of Connecticut was chief
electrician at a silk factory. He and M. J. Lee had already co-operated with the Naval Research Laboratory in studies of skip distances, resulting in the modification of existing wave-propagation theories by Drs. A. H. Taylor and E. O. Hulbert of the Laboratory. Explaining his choice of Reinaert for expedition radio operator to the Associated Press, Capt. MacMillan said, "Reinaert was an expert in radio and he as an amateur was familiar with the short wave lengths which are to be employed, but which have been little used professionally. On our last trip we cut off from the world, because the sunlight at the North Pole killed our radio. We have found that the short wave lengths to which the amateurs were restricted seemed to penetrate the sunlight better than the long waves which have been in professional use. Hitherto 1.6MHz has been considered fairly short; we shall use 14 and 7MHz lengths. For a time they were used only at night. This spring, the amateurs demonstrated they could get Europe and Australia at mid-day with the short waves." The professionals were represented by the Naval Station at Great Lakes, broadcasting on high frequency was from Bellevue Laboratory, Washington.

Evidence of the interest of ships' radio operators in receiving amateur reports and vice versa, is to be found in the QRA section of the August 1927 T & R Bulletin.

"Mr. C. R. Ponting MRS28, writes me that he has been in communication with the Radio Operator of KDQ SS Esparta, a ship belonging to the United Fruit Company USA and running between New York, South America and the West Indies. This ship operates on 9MHz and is regularly in communication with amateur stations, and the operator is particularly anxious to achieve contact with Europeans.

There are two vessels of the same line who are hoping to get in touch with amateurs. They are:

SS Zacupu, radio call KLE
SS Carillo, radio call KDE

Mr. Ponting is also the first station to report signals from NN1NC (ex NNM3Y). This is a US Naval Station in Nicaragua, the QRA is Capt. F. E. Pierce, US Marine Corps. Observation Squadron no. 1, 2nd Brigade Marines, Managua, Nicaragua. Capt. Pierce's station operates on 9.06MHz and he called England every Sunday during July. Did anyone hear him? He is anxious to receive reports from England and is looking forward to a QSO. There are two coastguard cutters, the USS Modoc and the USS Tampa. Both of these vessels do ice patrol. When on duty both use the call NI6K, but off patrol the former uses the call NIVD and the latter ITC. Both QSO amateurs.

Amateurs themselves were not slow in taking their sets to sea in order to conduct experiments. In 1926, Eric Megaw G6MVU, obtained the co-operation and help of the directors and officers of the Ulster Steamship Company Limited, to install his experimental short wave station on board the steamers Lord Antrim and Carrigan Head to investigate transatlantic radio conditions and discover the extent to which low power short wave radio could be relied upon for ship-to-shore communication. He used a Hartley 50W transmitter and "ordinary" 2-valve receiver using PM3 valves. Antennas could not be erected in the available space and would suffer from screening, so the ship's antennas were erected. In spite of difficult reception owing to dynamo QRM, schedules were kept successfully all the way over the Lord Antrim and strong American signals were received, with similar results on the return trip on the Carrigan Head. Eric concluded that short wave radio was capable of keeping any ship in the north Atlantic in reliable communication with both sides, even under bad conditions, with the single exception of local thunderstorms, "which would render all radio apparatus practically useless." He also noted that 6-10MHz signals travelled better eastwards than westwards. Americans came in better in the UK than powerful European stations in the USA.

In 1927, a notice appeared in the T & R Bulletin that an expedition was going out to St. Anthony, Newfoundland, to establish radio communication with posts in Labrador, as the only means of communication owing to bad weather. It would operate on 6.65-6.97MHz using the callsign NU-WTG, and requested British amateurs to listen for it.

The South Pole was equally fascinating to the geographical and short wave explorers. Close to a spot where Captain Scott's ill-fated expedition had passed in the Ross Sea, was a Norwegian whaler, the Sir James Clark Ross and further south, the C. A. Larsen on which a scientific party were based. The Norwegian fleet were in their usual summer whaling area, and as early as 1925 to 1926, the Norwegian years, the ARRL had carried out experiments with them. The nearest radio station for three months of the year was the 321kHz distant Awarua Radio, New Zealand. Awarua, the USA, Phillipines and Australian amateurs worked the Ross Sea. In 1927 at Mill Hill School, Mr. C. W. Goyer G2SZ, a schoolboy with a success record of long-distance communication, crowned his achievement one Sunday morning, when working with a crystal controlled transmitter on 9.3MHz with 250W of power. He had been chatting to Christchurch, New Zealand and Melbourne, Australia, when a station identifying as AGQ called. Mr. Goyer replied and back came the answer, "here Norwegian whaler Sir James Clark. You are R7 here. Position here 76 degrees 31 degrees south: 170 degrees west longitude. I say it is fine business your signals here at the end of the world. Fine business old man. Please communicate this to Marconi, Oslo, Norway. Tell them all well OM. Hope to communicate again next Sunday."

The next over brought the information, "yes, position received OK. ARDI a few miles off OM. You are the first strong station heard here, if not the first to communicate with the Antarctic. At any rate the first British station heard you all the way down here." ARDI was the C. A. Larsen. The conversation had been overheard by LGN, a Norwegian station, who asked G2SZ to call AGQ for him, but the Norwegian was unable to hear the whaler. This record-breaking contact reported to The Times, was the 1927 equivalent of the Kettering School's brilliant location of the first Russian Sputnik satellite.

In part 2 Joan Ham continues the story with Barbara Dunn G2YL.

Barbara Dunn G2YL received this QSL card from SS Lituania in 1927. You can read the full story in Part 2.
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Short Wave Magazine February 1989
The International 400 represents one of the mid-range communications receivers from this famous marque. It boasts a very wide frequency coverage which, when combined with Grundig’s reputation for high audio quality, should prove to be very interesting.

The International 400 handles this situation with an external antenna socket which is mounted on the right hand side panel. The only problem here is that the socket is a 75 ohms type to DIN45325 which is a little unusual, but I understand that they can be obtained from Grundig so this is not a serious problem. One good point about this socket is that when an external antenna is plugged in, the internal antennas are automatically disconnected. This is particularly useful if you are using the set close to sources of interference such as televisions, computers, etc. In addition to these basic connections there are a couple of optional ones which are very useful. The first is a headphone socket for private listening; this comprises a standard 3.5mm stereo jack socket (mono only output) which can drive headphones from 32 to 2000 ohms impedance. The final external connection is a 7 pin DIN AUX socket which can be used either to record signals from the radio or for playback through the audio stages of the International 400. Another use of this socket would be to play the audio output of the International 400 through your hi-fi system with the appropriate lead.

One point to note here is that the output level from the AUX socket is in the region of 2 volts peak-to-peak. This is quite high and may well need attenuating before being suitable for your hi-fi or cassette deck.

Getting Started
The first thing to sort out is the power supply and this is very well catered for. If using mains power there is a built-in power unit which can be set to accept 110 to 240 volts at 50 or 60Hz which should cope with most eventualities both at home and abroad. Alternatively if you like to operate portable, the International 400 can be powered by 6 x C cells which fit in a neat compartment at the bottom of the set.

The final power option is to use an external 12 volt d.c. supply which is particularly convenient for use in a car or caravan. The connection for the external power source is of the now standard coaxial type. One of the many good features of this set is that both the internal battery condition and the external supply voltage can be checked. This is achieved by pressing the dial light button on the side panel and checking that the reading on the signal strength meter is within the marked limits.

One other power source which must be considered is the memory and clock back-up supply. This comprises three AA cells which are also mounted in the battery compartment in the base of the set. These batteries are required regardless of the main power source of the set as they power the clock and preserve the contents of the memories when the set is switched off. You are probably wondering what happens to the memories when the memory batteries have to be changed? The solution is quite simple, you power the set from the mains whilst the batteries are being changed and this procedure is described in the manual.

Having sorted out the power we now need to consider the antennas. As the International 400 is designed as a portable set it comes equipped with built-in antennas for the whole of its frequency coverage. These comprise a sturdy 1.15m long telescopic antenna for v.h.f. and s.w. reception, the other bands being covered by an internal ferrite rod antenna. These options are fine for portable use, but when operating from a fixed location reception of DX stations can be dramatically improved by using an external antenna. The International 400 comes equipped with an external antenna socket which is mounted on the right hand side panel. The only problem here is that the socket is a 75 ohms type to DIN45325 which is a little unusual, but I understand that they can be obtained from Grundig so this is not a serious problem. One good point about this socket is that when an external antenna is plugged in, the internal antennas are automatically disconnected. This is particularly useful if you are using the set close to sources of interference such as televisions, computers, etc. In addition to these basic connections there are a couple of optional ones which are very useful. The first is a headphone socket for private listening; this comprises a standard 3.5mm stereo jack socket (mono only output) which can drive headphones from 32 to 2000 ohms impedance. The final external connection is a 7 pin DIN AUX socket which can be used either to record signals from the radio or for playback through the audio stages of the International 400. Another use of this socket would be to play the audio output of the International 400 through your hi-fi system with the appropriate lead.

One point to note here is that the output level from the AUX socket is in the region of 2 volts peak-to-peak. This is quite high and may well need attenuating before being suitable for your hi-fi or cassette deck.

Manual and Extras
The operation manual is a multi-lingual, AS booklet covering, eight languages, including German, English, Spanish, Italian, and Dutch. Each language ended-up with about ten pages of instructions. Although this may not seem very much it is very well presented and when combined with the logical operation of the controls, proves to be perfectly adequate. There is also good use made of diagrams to illustrate some of the more unusual facilities like the dual time zone clock. A very useful short-form manual is also provided to act as a pocket-sized guide to all the features of the International 400. I thought this was very good and just the right size to pop into your pocket.

It seems to be common practice these days for short wave radio manufacturers to provide some sort of listening guide and Grundig are no exception. They have provided a 42 page, AS booklet which covers radio right from the manufacturer to the studio to the listener - quite an ambitious task! At first sight I had a job to find any English but soon realised that each double page had been divided into four columns each containing a different language! The coverage of this little guide is very good indeed and I think they have done extremely well to cover so many topics in such a small space.

Operation
The layout of the International 400 is very hi-fi with lots of push buttons and subtle flashes of colour. As with a lot of Grundig radios, separate bass and treble controls are provided which gives the user maximum scope for tailoring the sound to suit his or her ear. These two controls, along with the volume control, comprise the three sliders positioned in the middle of the front panel. The controls had a very pleasant feel to them and were not at all jerky, which is a common complaint about this type of control. Another common complaint with sliders is that there is often a large slot beneath the knob which attracts dust and ultimately causes the slider to become sticky. The International 400 uses an ingenious system which results in the gap being at the side of the recess and far less likely to cause any problems.

The power on/off slider switch has three positions instead of the usual two, this is because the internal clock can be used to switch the radio on at a pre-set time. This is a very useful feature, particularly for waking you up in the good old days of automatically turning itself off after one hour! The tuning options are an area where modern microprocessor controlled radios really score and the International 400 is particularly impressive. There are ten basic ways of selecting a frequency - manual tuning, direct frequency entry or memory selection.

Taking manual tuning first, this is fairly conventional in that you select the frequency band, i.e. v.h.f., s.w., etc., using one of the five buttons just below the
frequency display. You then tune to the required frequency using the 40mm diameter tuning knob on the right hand side of the radio. This knob is very pleasant to use and even has a small moulded finger-sized indentation which makes fast tuning very positive. As with most digital tuning systems the frequency actually changes in steps as opposed to continuously and the size of these steps was dependent of the band. On v.h.f. the tuning steps are 10kHz whilst on all the other bands they are 1kHz.

The second option, direct frequency entry, is very useful, particularly if you want to tune to a set frequency. With this option you simply type in the required frequency using the smart keypad on the front panel. The microprocessor software is very well sorted as you don't have to enter trailing zeros. i.e., to enter 12.6MHz you only type 12.6 and the radio adds the trailing zeros. The International 400 will also automatically change bands for you, for example if you are tuned to 10.1MHz on short wave and want to change to 88.4MHz on v.h.f., you simply punch in 88.4 and the band and frequency change as if by magic.

Another short-cut that's available is to jump straight to a short wave broadcast band. If you are tuned to 88.4MHz v.h.f. and you want to look for stations on the 30m broadcast band you just type 30 and the microprocessor does the rest! Once you have selected a frequency using the direct entry method you can do any fine tuning using the manual tuning control as this is always enabled.

The final tuning option is to use the 24 memories, which are ideal for storing your favourite frequencies, as they are retained even when the radio is turned off. Entering frequencies into the memories is very easy; you don't need to access a set of digits if you have selected a frequency using the direct entry method. Once you have selected a frequency the memory in use is automatically displayed. I have found the particularly good points about the memories is that you are clearly told whether a memory is free or not. This is achieved by either showing the frequency if the memory is in use or an empty (FREE) if it's empty. Also, if you want to locate a free memory you simply press a button on the front panel marked FREE and the display cycles through all the free memories.

Once frequencies have been stored in the memories you can easily step through them by using the SCAN buttons on the front panel. These enable you to either step up or down through all the occupied memories and saves having to enter digits. As with direct frequency entry, once a memory has been selected you can tune around using the manual control.

One last tuning feature is the up and down SEARCH which is enabled by pressing the appropriate search button on the front panel. This facility sets-up an automatic station search which stops as soon as it finds a station and automatic band changing is also used. The facility operates on all bands, but on short wave, where it is a little impractical, each press of the SEARCH buttons steps the frequency to the next highest or lowest broadcast band.

For the utility station enthusiast the International 400 is fitted with a variable beat frequency oscillator (b.f.o.). This is essential for interfacing c.w. and RTTY, etc. The b.f.o. is only available on short wave and is operated by pressing a small button on the right hand edge of the radio. The tuning for the b.f.o. comprises a 12mm diameter knob also on the side panel, which turned out to be quite easy to use.

The clock on the International 400 is quite interesting as it is capable of displaying two different time zones, known as Ti and Ti. It was rather like having two separate clocks sharing the same display. As mentioned earlier you can also use the internal clock to switch the radio on at a preselected time for a period of one hour.

On the Air

I was fortunate to have the International 400 on review for quite a long time and during that period it became very popular, particularly for broadcast station monitoring.

By far and away my favourite aspect of the radio was the frequency selection options which were a joy to use. I think a few other manufacturers could take a lesson or two from Grundig here. I found I was able to quickly move about the bands without having to refer to instruction books to find my way around. There were also some features I haven't mentioned yet that eased operation. First of all there is a useful chart on the top panel which shows the world time zones and the frequency ranges of the short wave broadcast bands. There is also a very neat pull-out plastics stick at the back which allows the radio to be laid back at about 30 degrees which is ideal for table or desk top operation. The only slight snag here is that the liquid crystal frequency display seems to be designed to be viewed either head-on or from above as the image is rather faded when viewing with the set tipped back. This is a shame as the display otherwise very clear indeed.

I used the International 400 with an external antenna and had great success. One problem that some manufacturers are faced with predominately plastics-based radios is that they can be rather susceptible to interference. I'm glad to say the Grundig has no problems in this respect and works perfectly satisfactorily right next to my computer and printer, providing an external antenna is used. I am fortunate in that I have room for a good sized external antenna but this can sometimes bring its own problems in the form of overload of the receiver. Fortunately the International 400 is fitted with an attenuator which is activated by switching from DX to LOCAL using the switch on the side of the radio. This attenuator proved to be very effective at reducing strong signals to manageable proportions.

Now to the audio performance, which on v.h.f. is superb and could easily be adjusted to suit a wide range of individual preferences. On short wave I thought that the audio had rather too much bass, even with the treble set to maximum and the bass to minimum. This is not really a problem when listening to DX stations but nevertheless worth noting. The medium and long wave performance is, again, rather muffled but this is not really a serious problem.

As the International 400 is fitted with a b.f.o. I decided to try out s.s.b. and some of the utility modes. Starting with s.s.b. the b.f.o. took some getting used to as the large, 1kHz main tuning steps meant that the stations are fine-tuned by the b.f.o. It is actually quite easy to jump either side of a station and often difficult to hit just the right tuning. The problem is particularly noticeable when trying to resolve very weak signals. Another problem with the reception of weak s.s.b. signals is that the resolved audio had a warbling or watery sound which is quite difficult to listen to for
any period. Fortunately both of these
problem are significantly reduced if the
signal is strong.
Moving on to utility modes I started
with RTTY reception, where, not surprisingly,
I hit the same problems as with d.b. I tried
receiving both amateur and commercial
RTTY/AMTOR broadcasts with the general
result that wide-shift (425kHz or greater)
signals were fine whilst narrow-shift (170kHz)
signals required a fair amount of patience
to resolve successfully. Reception of c.w.
signals is quite satisfactory but as with all
the utility modes the bandwidth of the
International 400 is optimised for
broadcast stations and utility modes are
generally narrow band modes so you
have to receive several stations at the
same time.

Summary
The International 400 proved to be a very
popular radio about the house, as it is
most successful as a broadcast station
receiver. The ability to resolve s.s.b. and
utility stations is obviously an advantage
even if the performance could be slightly
better. I would like to see the facility to
select a wide/narrow bandwidth which would probably improve the short wave
reception.
At the risk of repeating myself, the real
selling point of this radio must be the
frequency selection options which rate
among the best I have seen and are very
well thought out. Overall then this is a
good receiver which should find favour
with anyone interested in broadcast
reception.
The Grundig Satellit International 400
is available from any Grundig dealer price
£199.99. My thanks to Grundig UK for the
loan of the review model.

Specifications

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>l.w.</th>
<th>148kHz - 353kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m.w.</td>
<td>513kHz - 1611kHz</td>
</tr>
<tr>
<td></td>
<td>s.w.</td>
<td>1.612MHz - 30MHz</td>
</tr>
<tr>
<td></td>
<td>f.m.</td>
<td>87.5 - 108MHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tuning Steps</th>
<th>l.w., m.w. and s.w. 1kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f.m. 10kHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antennas</th>
<th>Telescopic whip 1.15m long Internal ferrite rod</th>
</tr>
</thead>
</table>

| Audio Output    | 6W peak                                         |

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>6 x C cells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 x AA cells</td>
</tr>
<tr>
<td></td>
<td>(back-up)</td>
</tr>
<tr>
<td></td>
<td>220-240V d.c.</td>
</tr>
<tr>
<td></td>
<td>110-127V d.c.</td>
</tr>
<tr>
<td></td>
<td>50-60Hz</td>
</tr>
<tr>
<td></td>
<td>External 12V d.c.</td>
</tr>
</tbody>
</table>

| Dimensions       | 304 x 180 x 70mm. |

| Weight           | 2.15kg without batteries |

INTRODUCTION TO DX-TV

but for anyone wishing to construct an
antenna specially for the 40 and 50 MHz
vision carrier frequencies, suggested
dimensions are as follows:
Element lengths:
Reflector (L1) 325mm (12ins)
Dipole (L2) 310mm (12ins)
Director (L3) 300mm (11ins)

Spacings:
Reflector-dipole distance (D1) 100mm (3ins)
Dipole-director distance (D2) 91mm (3.5ins)

Due to the greater skip distance
associated with F2 reception, signals will
travel at a smaller angle than those
refracted by sporadic-E propagation. As
a consequence, the height of the
antenna does seem to make a difference,
especially with extremely weak reception.

Amateur Band Listening
Monitoring the 40-metre amateur band
around 7MHz for signs of other continents
(such as South America) being worked
provides a good indicator that F2
conditions and high m.u.f.s are prevailing.

When F2 activity is present in Band 1,
various Russian "forward scatter"
communication networks can be heard
at high strength in the lower portion of the
band between 40 and 48MHz. Strange
tones and generally lots of weird noises
will also be heard around these
carrier.

Unfortunately, the m.u.f. doesn't
always rise high enough to cause TV
reception on frequencies around 50MHz
(namely channels E2 and R1) despite the
presence of tones etc, so close to the E2
vision frequency.

In all fairness, there are relatively few
channel E2 transmitters in operation when
compared with the number of R1 outlets
which seem to provide blanket coverage
of Russia and China.

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This unique manual covers the complete short wave range from 30 to 3000 kHz, plus the adjacent frequency bands from 30 to 150 kHz and from 1.6 to 3.6 kHz. Contrary to imperative publications it is built on real-time monitoring throughout the year around the clock. It includes details on all types of utility stations including facsimile, Morse, phone and teleprinter stations, the latter covering the entire spectrum from standard RTTY over SITOR to all those fascinating new ARQ, FDM, FEC, and VUTF systems.

The numerical frequency list covers 16280 frequencies of stations which have been monitored during 1988 thereof: 5% RTTY and 3% FAX. Frequency, call sign, name of the station, ITU country symbol, types of modulation and corresponding return frequency, or times of reception and details, are listed. The alaphabetical call sign list covers 2044 call signs, with name of the station, ITU country symbol, and corresponding frequencies.

82 RTTY press services are listed on 547 frequencies not only in the numerical frequency list, but also chronologically for easy access around the clock, and alphabetically in country order.

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- 72 seaport RTTY stations on 231 frequencies. 518kHz NAVTEX schedule.
- 924 marine and traffic broadcasting and satellite. 162 tele service codes.
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**ANTENNAS**

F. C. Judd G2BCX
Part 2

This month Fred Judd develops the “long wire” from the principles of the half-wave linear antenna described in Part 1. He also looks at more basic principles of long, linear antennas and starts to consider some of their operational aspects.

**Long Linear Antennas**

Such an antenna containing the equivalent of several half-waves, each having the same current and voltage distribution (see Part 1), is often called a “long wire”; the number of half-waves may be odd or even. Their ability is used for harmonically related amateur H.F. bands, which may be more easily understood from what follows, makes them popular with radio amateurs.

A 3.5MHz antenna resonant for, say, the 3.5MHz amateur band may be operated as a single-wavelength antenna on the harmonically related 7MHz band (two half-waves equal one wavelength), as a two-wavelength antenna on 14MHz (four half-waves equal two wavelengths), or as a four-wavelength antenna on 28MHz (eight half-waves equal four wavelengths). The original physical length of the antenna operated as a half-wave on 3.5MHz is about 40m, and this length remains approximately the same for harmonic operation on the other bands. The current and voltage distribution for long, linear antennas made up of 2, 3, 4, 6 and 8 half-wavelengths is shown in Fig. 2.1. Those marked “h” have a direct harmonic relationship with the single half-wave main, but “fundamental” linear antennas intended for harmonic operation can be fed from an open wire 600Ω transmission line, or via a quarter-wave stub from a low impedance transmission line - e.g. 50Ω current-fed coaxial cable.

They may also be directly “end-fed” via a suitable antenna tuner at the transmitter end, although in this case the antenna is “voltage” fed at high impedance. However, if this method is used there is no problem with high r.f. voltage being present in the shack; it is most unlikely to cause BCI or TVI, as is often imagined, but good isolation becomes necessary at the lead-out and, of course, at the far end of the antenna to prevent loss of r.f. The latter point applies even when harmonically operated antennas are used for receiving. In fact, they perform quite well in this respect, with the advantage that some “directivity gain” can be obtained when received signals are coming from a direction reciprocal to the direction of maximum amplitude from the main lobes. Readers will no doubt appreciate that harmonically operated antennas can be dimensioned to function for s.w. broadcast bands harmonically related to another at some otherwise fairly low frequency.

There is one important point to remember with linear antennas operated on a harmonic or fundamental frequency and when the antenna is functioning with an “electrical length” of two or more half-waves: the number of main lobes of radiation will always be one less than the number of half-waves. The radiation pattern is illustrated in Fig. 2.2, with four main lobes at the angles indicated by the polar grid and with respect to the axis of the antenna; each polar grid angle equals 10 degrees. There are no side lobes. The pattern in Fig. 2.3 is for the same antenna operated at four times the fundamental frequency, there are still four main lobes, but more half-waves have developed, and angles closer to the antenna, and also a number of side lobes. Much the same applies to the pattern in Fig. 2.4, which shows the same antenna operating at eight times the fundamental frequency. It can be said that linear antennas, one or more wavelengths long, are multi-directional. The directivity gain from each of the major lobes increases as the number of wavelengths increases, but the overall gain from the antenna remains the same.

**Radiation from Long Linear Antennas**

Linear antennas with electrical lengths of one or more wavelengths at the operational frequency have quite complex, but symmetrically similar, radiation patterns. Depending on the overall electrical length, a large number of different horizontal radiation patterns are possible. Those shown in Figs. 2.2, 2.3 and 2.4 are the patterns obtained when a 1/2 linear for an otherwise fairly low fundamental frequency is operated at higher and harmonically related frequencies, as already explained.

At fundamental frequency a 1/2 linear will have the cosine (figure-of-eight) pattern illustrated in Fig. 1.3 (Part 1) and will therefore be bi-directional. Operated at twice the fundamental frequency (2nd harmonic) the horizontal radiation pattern will be as in Fig. 2.2, with four main lobes at the angles indicated by the polar grid and with respect to the axis of the antenna; each polar grid angle equals 10 degrees. There are no side lobes. The pattern in Fig. 2.3 is for the same antenna operated at four times the fundamental frequency, there are still four main lobes, but more half-waves have developed, and angles closer to the antenna, and also a number of side lobes. Much the same applies to the pattern in Fig. 2.4, which shows the same antenna operating at eight times the fundamental frequency. It can be said that linear antennas, one or more wavelengths long, are multi-directional. The directivity gain from each of the major lobes increases as the number of wavelengths increases, but the overall gain from the antenna remains the same.

**Long Linear Antennas**

The physical length of multiple half-wave linear antennas operating at a specified fundamental frequency, or harmonically, is not quite the same as the electrical length, not only because of the velocity factor (see Part 1) but also “end-effect”. The latter is due to insulators and supporting masts, or other structures, at each end of the antenna. The necessary shortening required to offset end effect...
Vertical Radiation Patterns

In order to achieve optimum DX ranges on the h.f. bands via ionospheric propagation, maximum vertical radiation from the antenna should ideally occur at the lowest possible angle(s) with respect to ground (1). Note that the pattern of vertical radiation from any horizontal antenna depends on its height above ground in fractions of, or a small number of, whole wavelengths relative to the frequency of operation. However, few radio amateurs, or indeed s.w.l.s, can erect antenna systems for the lower portion of the h.f. spectrum at heights that would ensure reasonably low-angle vertical radiation. For instance, at 7MHz a good height would be between 0.5 and 0.625 of a wavelength, which means a physical height of between about 20 and 26m. From a practical point of view, and to avoid invoking the wrath of unsympathetic neighbours or getting a "take it down" order from the local planning authorities, a more likely height would be in the region of 10m; and even that height might be frowned upon. Fortunately, the effective height, in wavelengths or fractions thereof, increases as the frequency of operation is increased - even though the physical height remains the same. But there has to be a compromise as far as the lower frequencies are concerned, i.e., between about 2 and 7MHz.

Patterns of the overall radiation from v.h.f. and u.h.f. antennas can be plotted directly with reasonable accuracy, but in the case of h.f. antennas this would be extremely difficult. The alternative is to plot such patterns using appropriate equations, a long and laborious task - but one which a computer can cope with very quickly and accurately (without getting a headache!). Apart from displaying a radiation pattern on its v.d.u., it will also provide a printed copy (as those used in these articles (2)).

An accurately produced pattern provides a much better idea of how the vertical radiation from an antenna operating within the h.f. spectrum is affected by the ground beneath. As far as v.h.f. and u.h.f. are concerned we are more fortunate. Even though the physical height may be only 9m or so, the "electrical height" could be several...
wavelengths at the frequency of operation: a near free-space condition with vertical radiation at angles virtually parallel to ground, which is ideal for point-to-point communication over ground.

**Antenna Height - Operating Frequency**

As already mentioned, the electrical height of an antenna is effectively increased as the frequency of operation becomes higher, even though its physical height is constant. A physical height of 10m becomes an electrical height of about 0.125 wavelength at 3.5MHz, 0.25 wavelength at 7MHz and 0.5 wavelength at 14MHz. It is the electrical height above ground of a horizontal antenna that determines both the magnitude and the angles of the vertical radiation with respect to ground.

The vertical radiation pattern for a horizontal /2 antenna at an electrical height of 0.125 (one-eighth) wavelength above ground, and operating at a frequency of 3.5MHz, is shown in Fig. 2.5. The overall vertical radiation is, however, considerably attenuated and is maximum at 90 degrees with respect to ground. Although most of the radiation is going skyward, the magnitude is still great enough at angles between 60 and 80 degrees to produce good signals, even at relatively long distances, when propagation is via the ionosphere. To obtain a much higher overall magnitude of radiation at lower angles it would be necessary to raise the height of this antenna to about 30m. The electrical height would then be 0.375 wavelength and the vertical radiation pattern the same as that in Fig. 2.6. The same pattern would, however, be obtained from a horizontal /2 antenna operating at 7MHz and having a physical height of 40 x 0.375 = 15m. At this frequency an acceptable performance could still be obtained with the antenna at a height of 10m, although the vertical radiation pattern would be different.

The vertical radiation pattern shown in Fig. 2.7 is for an antenna at an electrical height of 0.5 wavelength above ground, with the angles of maximum vertical radiation at approximately 30 degrees - i.e. with the two main lobes at 30 and 150 degrees respectively. At an operational frequency of 14MHz the physical height of the antenna would be in the region of 10m. To obtain the same pattern for 7MHz this height would have to be raised to about 20m.

The examples given apply generally to the vertical radiation from long wire antennas for the h.f. spectrum and operated harmonically. Therefore when there is some restriction on physical height at which an antenna, or antennas, can be erected, so the magnitude and angles of vertical radiation will be bound by that height. The fact that the electrical height becomes greater as the frequency of operation is increased is an advantage as far as the higher frequency bands are concerned, as the lower angles of radiation allow longer skip distances when

---

**Fig. 2.5:** Vertical radiation pattern for a /2 antenna at an electrical height above ground of /8 at operational frequency.

**Fig. 2.6:** As Fig. 2.5, but for an electrical height above ground of 3./8.

**Fig. 2.7:** As Fig. 2.5, but for an electrical height above ground of /2. See text for details.
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For a free trip around the World (well, its radio stations anyway),
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Harrods Ltd., Radio & TV Dept., Brompton Road, Knightsbridge, London
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Knightsbridge Electronics, 155 Knightsbridge, London SW1 7PA.

LeSet Ltd., 115 Fulham Road, London SW3.

PNR Audio Vision, 28 Tottenham Court Road, London W1.

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

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

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


Galaxy, 230 Tottenham Court Road, London W1.

Spatial Audio & Video, 29 Tottenham Court Road, London W1.

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

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

Alvabond, 70 Ballards Lane, Finchley, London N3.

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

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Videovision, Kingston Sony Centre, 40 Fife Road, Kingston upon Thames,
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Whomes Centre Limited, 28 The Mall, Broadway Shopping Centre, Bexleyheath,
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Whomes Centre Limited, 32 The Mall, High Street, Bromley, Kent BR1 1TR.

Whomes Centre Limited, 84 Eastgate International Shopping Centre, Basildon,
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Hamilton Electronics Ltd., 35 London Road, Southampton, Hants.

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Tru-Fi Sound & Vision, 10 Church Street, Leatherhead, Surrey.

Lyles (Worthing) Ltd., 224 Findon Road, Findon, Worthing, Sussex.

Weybridge Audio, 5/5 Waterloo Terrace, Baker Street, Weybridge, Surrey.

Short Wave Magazine February 1989

28
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Waters & Stanton Electronics, 18/20 Main Road, Hockley, Essex.

Waters & Stanton Electronics, 12 North Street, Hornchurch, Essex.

Merrow Sound, 34 West Street, Horsham, Sussex.

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Merrow Sound, 22 Tunsgate, Guildford, Surrey.

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Tape Recorder & Hi-Fi Limited, Bristol Sony Centre, 8-10 Bond Street, Broadmead, Bristol BS1 3LU.

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Martin E. Payne Limited, 18 Union Street, Dundee, Scotland DD1 4BH.

Bruce Miller, 363 Union Street, Aberdeen, Scotland.

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McMichael Bros., 23/27 Upper Craigs, Stirling, Scotland. FK8 2OG.

In Hi-Ltd., 63 George Street, Edinburgh, Scotland.

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Radiocraft Sonus Ltd., 231 High Street, Swansea SA1 1NY.

Tele-Electrical Services, 9 The Brackla Street Centre, Bridgend, Mid. Glamorgan CF31 1DD.

Northern Ireland: F. Rea & Co., 24-30 Chichester Street, Belfast, Northern Ireland.

Laser Electrical Ltd., Unit 3, Abbey Trading Estate, Newton Abbey, Northern Ireland.

Audio Times, 85 Royal Avenue, Belfast, Northern Ireland.

Channel Islands: Reg Maugher (Sales) Ltd., 20 Halkett Place, St. Helier, Jersey, C.I.

Soundtrack, 1 Church Square, St. Peter Port, Guernsey, C.I.

C. R. Regent, 49 Halkett Road, St. Helier, Jersey, C.I.
NEW RECEIVERS AND MINI ANTENNA KITS!

Building and using your own equipment is interesting and offers a challenge and satisfaction missing with "black boxes". Our kits are designed to help you enjoy this aspect of the hobby. There are several new kits introduced in our latest catalogue, and hopefully there is one to tempt you! Have you chosen your winter project yet?

MBRX MARINE BAND COMMUNICATIONS RECEIVER

The new HOWES MBRIX kit is designed to enable you to build a receiver covering the whole Marine Band from 1.6 to 3.95MHz, including ship to shore, coastal stations, the 2.12B distress frequency, and the whole of the 160 and 80 Metre amateur bands. Modes covered are SSB and CW, although you can also use it for RTTY, FAX, etc, if you have a suitable terminal. Features include:

- Switched Input attenuator
- RF stage
- Balanced, Direct Conversion mixer
- 2 stage active SSB filter
- Stable FET oscillator
- Fine tune control
- Fast and Slow AGC
- 1W audio output
- Optional filters, signal meter, etc, are available. Requires two 385Gf or 500Ff tuning capacitors. A kit to build a real communications receiver with good facilities and performance at a sensible price.

MBRix kit: £29.90
Assembled PCB: £44.90

DcRx54 HF AIR BAND COMMUNICATIONS RECEIVER

So many customers have asked us how to modify our popular DcRx amateur band receivers to cover the 5.460 to 5.750MHz band, that we decided we would introduce a version of the kit for this application. The DcRx features a stable FET oscillator and a balanced, direct conversion mixer. Up to 1W of output is available for driving headphones or loudspeaker. This receiver is simple and easy to build, but you will be amazed at the performance! Suitable tuning capacitors are available at £1.50 each (you need two per receiver). Single band DcRx kits are also available for 160, 80, 40, 20/30.

Meter amateur bands.

DcRx Kit (all versions): £15.60 each
Assembled PCB: £21.50

AA2 ACTIVE ANTENNA AMPLIFIER

The new HOWES AA2kit enables you to build yourself a really compact HF reception antenna that can be accommodated in even the smallest QTH. Even if you have room for large antennas, you will still find this kit useful for building a rotary antenna for the lower frequency bands. Have you got a suitable Top Band antenna? The advantage in being able to "null" DRM with a miniature rotary dipole should not be discounted. The AA2 has facilities for both short single wire and dipole inputs. The antenna length can be varied to suit your requirements, but about 60 to 80 feet is a good maximum length. The PCB is designed to fit inside standard 1.5" waste water pipe, so making for easy weather proof construction if required. Direct or Coaxial powering can be used, so the unit can be located next to the receiver, or remotely on a mast, chimney, etc. It is also ideal for building a telescopic antenna for the homebrew portable. Features include a two stage amplifier with FET input, 50 Ohm coax output and two gain settings, it covers long wave to 30MHz applications.

AA2Kit: £7.50
Just three of our new kits are outlined above, we also have receiver kits from £14.80, and amateur transmitters from £13.80, plus a whole range of accessories (ATU, side-tone, calibrator, converters, transverters, filters, etc), so there should be a project to interest you in our new catalogue.

All HOWES kits come with full, clear instructions, good quality glass fibre PCB (drilled and tinned with screen printed parts locations) and all board mounted components. Delivery is normally within seven days. Help, advice and sales are only a phone call away (office hours), but please send an SAE if you would just like a catalogue, or specific product information sheets.

P&P is £1.00 per order.
73 from Dave G4KQH, Technical Manager.
Scanning
Alan Gardener

Icom Modifications

I wonder if ARK Communications got the idea for the ICR-7000 h.f. after "scanning" the July column in which I described the use of converters? Well whatever gives them the idea, the end result - a receiver with a frequency coverage of 20 MHz to 27 MHz is worthy of further mention. The extended frequency coverage is provided by an internally fitted converter and some clever switching circuitry. The new range is selected by pressing what was originally the display dimmer switch (the display now permanently on full brightness). This changes the display to show the correct frequency and the speech synthesiser, if you have it fitted, also speaks it correctly. This column also selects a new bank of 100 memories and additionally switches the h.f. antenna socket into use, originally the rear panel "spare" phono socket.

Performance is reported to be good with a marked improvement on strong signals being evident. Another common problem also seems to have been minimised by careful design - that is one of the signals present in the frequency range used at the UK end of the converter "leaking through" and causing interference to the wanted signals. This is particularly important as part of the f.m. broadcast band is used in the conversion process and could otherwise cause problems if you live near a high power f.m. transmitting station.

The only slight problem with this model becomes noticeable when you enter frequencies directly using the keyboard. To do this you have to remember to add one hundred to the wanted frequency. ARK Communications explains this problem, if it really is one, by programming the first 30 memories to cover the range 0-30 MHz. The nearest MHz to the wanted frequency is then selected with the memory knob and fine tuning achieved by use of the main dial.

If you are interested in ARK Communications offer a modification service, so this could be a cheap way of obtaining a good quality general coverage receiver with features normally only present in more up-market models. Contact ARK Communications Ltd, 6 Royal Parade, Hunger Lane, Ealing, London W5A 1ET, or ring 01-997 4476 for further details.

My spies have been busy again, this time they have spotted an interesting looking scanner in one of the Japanese amateur radio magazines. The receiver is being advertised under the Standard name, and is believed to be one of the first scanners to be produced by this company, normally known for its range of amateur radio equipment.

Apart from the normal lines, or in this case the rows of Japanese script, it would seem to include all the usual features including frequency coverage of 50-900 MHz along with one rather novel feature. This is a "local clock display" which gives a panoramic frequency display centred on the received frequency. It is not clear what sort of resolution the display can give but a span of 1 MHz seems a reasonable assumption. Just the thing if you want to keep an eye on activity over a small frequency range - an amateur ham's bread and butter for example.

I am not too hopeful with regard to its introduction into this country, as so many products which appear on the Japanese home market never make it to these shores. This receiver is a nice idea, but the product was decided on before deciding on large scale production. However, on the plus side it may give an indication to the trends we are likely to see when the next range of super-scanners becomes available.

What Can I Hear?

This is a question that I am frequently asked so I thought that each month it would be a good idea to examine various portions of the frequency spectrum and see who or what occupies each band. This month I take a look at the range 25 to 54 MHz which happens to be the lowest frequency band on many popular scanners.

At first sight, this band of frequencies may seem to be a little odd to be included on a scanning receiver for use in this country. You may be thinking that, apart from CB on 27 MHz and the odd amateur at 50 MHz, you never hear anything on this range. Let's take a closer look - starting at 25 MHz and working our way upwards the first group of users are likely to be the CB operators. These are officially limited to a frequency band centred on 27 MHz but many have heard to spread outside these limits using modified equipment in order to avoid the congestion present on most of the official channels.

Although not too much of a problem in the UK you have only to take a quick listen to many of the accents in order to determine which countries have major problems. Mixed amongst the CB channels you may hear "The odd sequence of tones or bursts of data, these are generally tone paging systems or model control transmitters. Both of these were allocated to this band in the UK well before the advent of CB and are now gradually being moved to new frequencies as existing equipment is replaced.

Reception of frequencies around 27 MHz is very much affected by atmospheric conditions, with low power long distance communications being possible at the height of an eleven-year sunspot cycle. The rest of the time conditions generally only permit local communications, but if you monitor long enough you may hear the occasional surprise.

28 MHz marks the lower edge of the 10 metre band and again propagation varies with the sunspot cycle but some form of activity can usually be heard most of the time. The frequencies around 28.2 to 28.3 MHz are assigned to beacon stations. These have many locations around the world and continuously transmit a Morse code call sign. By listening to these stations amateur operators can be quickly checked to see that they have taken advantage of the beacon they can tell with which countries it is possible to communicate. Most operators on the 10 metre band use Morse code or single-sideband, but some two signals all may be heard around 29.6 MHz as many amateurs have taken advantage of cheap CB sets modified to operate on 10 metres. Take care when listening to the many n.b.f.m. repeater stations that operate in this section of the band.

Many of the US stations have remote control facilities which allow the operator to speak into a low powered 2-metre handheld transceiver and be dispatched onto the 10-metre repeater. This allows them to talk to the world whilst walking down the street using just a few hundred milliwatts of power. Quite mind blowing when you first hear it!

The top end of the amateur band is at 29.7 MHz. Above this is a strangely silent region where the short wave bands start to behave more like the v.h.f. and u.h.f. bands the scanner user is familiar with. Under good propagation conditions frequencies in the range 30-41 MHz can be very interesting with many stations such as US police, air traffic control and being detectable. Which gives a clue to the reason this range is included on many scanners, as in the US many public service bodies use the low frequency v.h.f. bands for communications. Unlike the UK various locations around the world generally only permit to communicate.

Some UK paging signals may be heard around 31.7 MHz and a new model control allocation, strictly for model aircraft use only, has been established at 35-35.2 MHz, but again are not at the height of an eleven-year sunspot cycle. However, many European countries still use the band for TV broadcasting. Tuning around with a manual tuned receivers usually results in either vision or sound being heard.

One other user of this band you are less
The AOR 2002 scanning receiver is a popular choice for controlling with a home computer. Likely it is the military. The frequency range 30-76MHz is allocated internationally for military use, but of course this has to be slotted in-between the other users of the band. Most equipment uses 25kHz channel spacings and narrow band f.m. but careful use of equipment, low power operation, and frequent channel changing, makes detection tricky. The latest generations of equipment in service make this even more difficult by either scrambling the speech or by using some form of frequency hopping system where the operating frequency changes many times a second.

The frequency range 47.50MHz is new allocation in the UK and is designated for use by low power devices which do not require a licence.

Typical of these products are cheap radio controlled models, wireless intercoms and baby alarms, remote car alarms and the handset to base links for cordless telephones. This band is likely to become increasingly active as more products become available.

Another new allocation spanning 50-52MHz is the amateur 6-metre band. This is proving to be popular with many operators as it is in many ways similar to the lower frequency 10-metre band but with a few exciting characteristics of its own. Again, beacons occupy the lower portion of the band with most other activity being either Morse, s.s.b. or n.b.f.m. In the UK amateurs using this band have to use relatively low power and horizontally polarised antennas. This is in order to avoid interference with the TV stations in Europe still using this part of the spectrum. As most antennas used with scanning receivers tend to be vertically polarised you may find that the UK stations you hear could be fairly weak. This is due to the cross polarisation loss resulting from the differently polarised antennas. With longer distance stations this becomes less of a problem as the polarisation of the received signals tend to vary as a result of multipath reflections.

Finally, the remaining 52-54MHz. In the US this is a continuation of the 6-metre amateur band but back in the UK its use tends to be the same as the 41-47MHz allocation.

More next month as we venture further upwards in frequency.

Help Wanted
One of the more interesting aspects of writing this column is receiving your letters. These cover a very large range of subjects and often bring to my attention aspects of the hobby which I had not considered before. Many letters ask for further information on particular subjects and although I can help in many cases I am sure that many people reading the column may be able to contribute more knowledge on particular topics - perhaps you may be able to help the following readers. I will of course pass on any information I receive.

D. L. Miles of Ipswich is a keen sailor and was prompted to write to me after reading about the Decca navigation system mentioned in the October column. He uses an Amstrad PCW8256 computer on board his yacht for navigational purposes and wonders if it is possible to use the computer to process the received signals and hence determine bearings. I suspect that a large amount of signal processing would have to be done externally from the computer in order to avoid the plague of computer generated hash - especially at the low frequencies used in the Decca system. Being a "landlubber" myself this question is a bit out of my "depth" but I am sure that one of the many readers of this column may be able to "fathom" out a suitable hardware/software package - if one is not already available.

John Taylor of Wickham is interested in contacting readers who operate the Airscaler scanner computer or the AOR RC pack in conjunction with an AOR-2002 scanner and BBC computer. John is particularly keen to obtain information relating to software for the RC pack but would be interested in any general comments connected with the operation of either system.

D. H. Pickles of Burnley owns a Bearcat 100XL handheld scanner and wonders if anyone has modified this particular receiver for operation from an external power supply. In addition any way of providing manual a.m./f.m. switching would be appreciated.

Finally anyone who wants to exchange information with other scanner users. If you would like to take part in this scheme - drop me a line giving me an idea of the sort of information you would like to exchange, the scanner you own, plus any additional information you feel may be of interest. Enclose an s.a.e. and when I get a reasonable number of replies I will return a copy of the list to you. In the interests of crime prevention I am not too keen on including full postal addresses but just giving a phone number may be one solution. As usual all letters to PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - good listening.
GAREX ELECTRONICS

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Short Wave Magazine February 1989

33
The first news this month is that conflict alert is planned for use at the London Air Traffic Control Centre (LATCC). This Centre uses a multiple-redundancy IBM 9020D computer system, for preparation of跶, flight plans, printing of flight progress strips (on which the controller records the different stages that each flight has reached) and enhancement of radar displays. This last function includes code-to-call-sign conversion, where the squawk number received from an aircraft’s secondary surveillance radar transponder is actually displayed as flight number and destination – only possible if the computer knows which squawks have been allocated to which flights.

Conflict alert is an extra feature that examines the estimated future tracks of known radar traces and raises an alarm if it seems likely that any two aircraft are on a collision course. Unfortunately in the Terminal Maneuvring Area (t.m.a.) all aircraft descending for the same runway tend to be in conflict with each other, causing too many false alarms! Hence the system has not been implemented until now. Even so, the alert will only be applied to aircraft above FL250, south of the Manchester control zone and north of the London t.m.a. Although “live” date was originally set for 17 November 1988, it seems as though the system will now be switched on later than this.

While on the subject of radar, one more squawk code for your collection is the parachute dropping conspicuity code of 0033. Transponder usage is mandatory above FL100, an altitude from which it is not unknown for parachutists to be dropped.

Lesson of the Month

How does a Max Holste Brousard came to land on the runway in collision with another accident described in the Department of Transport’s Air Accidents Investigation Branch AAIB Bulletin 11/88 this was caused by oil on the windscreen obscuring the pilot’s vision. The cause of the oil leak, in this case loss from the hydraulic propeller pitch control mechanism, also meant that engine power was lost at the same time that visibility became obscured. Safety tip: extraneous oil, on the windscreen or elsewhere, might not look like much of a problem in its own right, but the source of the oil leak could catch you out in mid-air! On the subject of accidents these are investigated by the AAIB and not the Civil Aviation Authority (CAA) since the latter, being a regulatory body, is not considered impartial if there is ever any suggestion that different regulations could have averted the accident.

You Write

From Tamworth, Staffordshire, regular correspondent Geoffrey Powell reminds us that any frequency could carry distress traffic in an emergency, and cites 885kHz as an example. Of course signals on h.f. allocations such as this one could be received over a considerable distance.
short way. The antenna can be electrically separated from whatever it's tied to by using insulators of the "china egg" or "dog bone" pattern (don't try eating either type!) which are doubtless available from advertisers in this magazine. When not in use, the wire should be earthed as an anti-static precaution.

Alternatively, a permanently connected spark gap can make the earth connection and will not leak any significant amount of wanted signal away. Of course, there is one last piece of equipment to be recommended: an antenna tuning unit. These can be made relatively simply or purchased, in which case remember that you only need a cheap low power device for listening. Transmitting, in which you are not involved, would be a different matter. To answer your question, I was not previously aware of the Ontario DX Association of Canada. Hope all of this is some help.

I also think that some of the foregoing comments will be of interest to C.R. Wiltshire (Coulston, Surrey). I can't explain why Radio Moscow and Radio Finland break through on the v.h.f. of your ICF 2001D. I assume that you reconfirmed the frequency to which you were tuned and that the antenna connections were all correct. I can only suggest consulting yester-dealers from where the set was purchased. If the outcome has implications for all ICF 2001D owners, please tell me so that I can print it here.

**Frequency and Operational Changes**

Magnetic north is on the move as always and the magnetic headings of some runways have therefore changed. Blackpool's 08/26 is now 07/25; Rochester's 03/21 is now 02/20 and Seething's 07/25 becomes 06/24. London (Stansted) is to have new taxiways on its south side and some holding points have already been redesignated. At Falroaks 16/34 has been withdrawn; the Brooklands helipad has also gone.

From the frequency point of view, Luton Tower (originally 120.2 MHz) is now on 119.975 and the tower at London (City) changes from 119.425 to 118.076 MHz. Lastly, the CAA has published one recent change in the General Aviation Safety Information Leaflet 11/88: Prestwick has a new ground frequency available of 121.8 MHz.

That's it from me: it's parked on the blocks until next month. Thanks to all who write.

---

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>a.m.</td>
<td>amplitude modulation</td>
</tr>
<tr>
<td>CAA</td>
<td>Civil Aviation Authority</td>
</tr>
<tr>
<td>f.m.</td>
<td>frequency modulation</td>
</tr>
<tr>
<td>h.f.</td>
<td>high frequency</td>
</tr>
<tr>
<td>l.i.s.</td>
<td>instrument landing system</td>
</tr>
<tr>
<td>kHz</td>
<td>kilohertz</td>
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<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>s.s.b.</td>
<td>single sideband</td>
</tr>
<tr>
<td>t.m.a.</td>
<td>terminal manoeuvring area</td>
</tr>
<tr>
<td>u.s.b.</td>
<td>upper sideband</td>
</tr>
<tr>
<td>v.h.f.</td>
<td>very high frequency</td>
</tr>
<tr>
<td>v.o.r.</td>
<td>v.h.f. omnidirectional radio</td>
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Short Wave Magazine February 1989

35
**RX-4 MULTIMODE RECEIVE**

RTTY / CW / SSTV / AMTOR

This is the ultimate in software for the SWL. Just one program to receive all four modes, switching from one to the other at a single keypress. Extremely user-friendly, RX-4 has the facilities and performance you need to catch all the action on the bands as soon as you hear it.

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CW software filters and controllable autotrack for maximum performance up to 250 wpm! On-screen indicators tell you the level and tuning with a minimum of fuss.

SSTV has selectable scan rates in both directions and two modes of picture storage for maximum use of memory.

Text and pictures can be stored, recalled to the screen and dumped to a printer as well as being saved to tape or disc.

Please note that the AMTOR section only receives ARQ mode (mode A1) but this is the most common mode and covers a lot of commercial TOC stations, also.

Previously, people have paid over £30 for separate RTTY, CW and SSTV programs which do not have the performance, facilities and convenience of RX-4. Offering this amazing software for the low price of only £25 on tape, £27 on BBC or CBM64 disc.

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---

**technical software**

Fron, Upper Llandrindod, Caerarfon LL54 7RF. Tel. 0286 881886
Many listeners experience some difficulty in determining whether or not a receiver is accurately tuned to the frequency of an incoming signal. With this in mind, a number of visual aids have been developed over the years which enable the correct tuning point to be ascertained. The operation of some simpler aids is also described.

Tuning Indicators

To ease the problem, receiver manufacturers set about providing some form of tuning indicator. A number of ideas were tried, but one design became especially popular since it required just two connections, namely a neon bulb and a resistor! The design was based on the fact that the current flowing through an a.g.c. controlled i.f. amplifier falls with an increase in incoming signal level - see reverse a.g.c. on page 29, SWM/November 88. Although this indicator was used in valve receivers from the mid-1930s, the underlying principle still forms the basis of some modern tuning indicators, so let us briefly consider the operation of this simple device.

The basic circuit of an i.f. amplifier using a variable-mu pentode valve is shown in Fig. 1. Resistor (R1) and capacitor (C2) are the normal anode decoupling components. The value of the additional resistor (R2) is chosen so that under no signal conditions the voltage applied to the neon (N) is just below that necessary to make it glow. Any incoming signal will result in a negative a.g.c. potential being applied to the control grid of the valve, thereby causing its anode current to fall. The reduction in anode current results in less voltage drop across R1 and a rise in the potential applied to the neon, causing it to glow. An increase in signal level will further reduce the anode current and raise the a.g.c. potential applied to the neon, causing it to glow more brightly. The correct tuning point is therefore indicated by maximum glow. A special tubular shaped neon called a tuncow, with a cathode in the form of a rod, was used in this circuit in later receivers. The strength of the incoming signal and hence the applied potential determined the extent of the glow up the rod.

A more sensitive and accurate tuning indicator was subsequently developed by valve manufacturers. Known as a magic eye, it consisted of a miniature cathode ray tube combined with a triode valve amplifier in a single glass envelope. A luminous pattern appeared on a circular screen called the "target anode", which was viewed through one end of the valve. Magic eye tuning indicators with side contact bases (EM1) were fitted to a few pre-war receivers, but actual based magic eye indicators (Y63) were produced in large quantities during W.W.II and were employed in many post-war domestic sets until a much smaller B9A based magic eye (EM80) was introduced in the late 1950s. In contrast to the earlier types, it was mounted vertically and the display was viewed through the side of the tube. Many of the devices were manufactured for the then new BBC f.m. service included a magic eye (EM80) as an aid to tuning in the broad signal. The production of these receivers continued until the demise of the valve in the mid-1960s.

Quite a number of Dxers still use the famous wartime R1155 RAF communications receiver which included on the control based magic eye (Y63) tuning indicator, so the operation of the magic eye is worth mentioning here. In this device the a.g.c. potential is applied directly to the grid of the triode section of the valve, by means of a variable resistor controlling the anode current flowing through its very high resistance anode load (R1) - see Fig. 2a. The voltage drop across R1, hence the triode anode potential, therefore varies with incoming signal strength.

In the display section the electrons from the cathode are accelerated by the positive potential applied to the target anode and the target is connected to the triode anode. It causes a shadow with sharp edges to appear on the screen the position of which can be varied by altering the electrode potential. The absence of an incoming signal results in little or no bias on the triode grid, so its anode current rises, the anode potential falls and a white shadow appears on the screen - see Fig. 2b. When a signal is received, the bias increases, the anode current falls, the anode potential is raised, the width of the shadow is reduced - see Fig. 2c. In contrast, a fan-shaped display appears on the target anode of the latter (EM80) miniature magic eye. The display extends vertically upwards by an amount related to the level of the incoming signal, reaching the top of the target at maximum signal input.

Present day transistorised receivers frequently employ a light emitting diode (i.e.d.) as the tuning indicator. An i.e.d. consists of a p-n junction of crystal material made from gallium arsenide (GaAs), gallium phosphide (GaP), or a combination of them (GaAsP). When a forward bias is applied to the diode, a luminous glow appears around the junction, the colour of which is determined by the type of crystal material employed - red, green and yellow diodes are currently being manufactured. The intensity of the glow is largely determined by the current flowing through the junction, typically 10mA at maximum brilliance. Provided the maximum current is not exceeded, the life of an i.e.d. is likely to be in excess of 50 years.

In some types of i.e.d. the p-n junction is mounted in a small tubular plastic container. The two connections are brought out at one end and the light is emitted at the opposite end through a dome shaped cap. In a later type the junction is encapsulated within a rectangular diffused epoxy package, which provides a uniform lighted surface area measuring just 2mm by 5mm. The basic circuit of a simple tuning indicator
employing an I.E.D. is shown in Fig. 3. The emitter follower configuration has been adopted for the transistor (T1) because it offers a high input impedance which may be connected directly across the receiver a.g.c. line. It also provides a low impedance current source for the I.E.D. The resistor (R1) limits the maximum emitter current to a safe value for both the I.E.D. and the transistor when the latter is being biased hard into conduction.

The presence of an incoming signal will result in a potential on the a.g.c. line which will be applied as a bias to the base of T1 bias and cause it to conduct. The level of incoming signal and hence the resulting emitter current may be sufficient to cause the I.E.D. to glow. A rise in incoming signal level will bias T1 harder into conduction and the increased emitter current will result in a greater intensity of light from the I.E.D.

<table>
<thead>
<tr>
<th>Abbreviations</th>
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<tbody>
<tr>
<td>a.g.c.</td>
<td>automatic gain control</td>
</tr>
<tr>
<td>f.m.</td>
<td>frequency modulation</td>
</tr>
<tr>
<td>i.f.</td>
<td>intermediate frequency</td>
</tr>
<tr>
<td>I.E.D.</td>
<td>light emitting diode</td>
</tr>
<tr>
<td>mA</td>
<td>milliampere</td>
</tr>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>p-n</td>
<td>p-type/n-type semiconductor junction</td>
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In some of the more advanced solid state receivers a series of I.E.D indicators are arranged in the form of a bar graph to display the level of incoming signal. The a.g.c. potential is applied to the base of a series of Darlington pair emitter follower stages in an integrated circuit known as a bar driver which is used to control the point at which each ascending segment of the bar graph is illuminated.

A moving coil micro-ammeter is employed in some of the more expensive designs and in most communication receivers to enable the relative strength of incoming signals to be ascertained. A number of interesting circuits are used and the operation of some of them will be outlined next month.

Antennas

propagation is via the ionospheric "F" region and the prevailing critical frequency is favourable.(1)

Vertical Antennas for HF Operation

At the lower frequencies fully resonant verticals - i.e. without inductive loading to maintain the correct electrical length - would be so tall as to be impractical. For example, even a quarter-wave vertical tuned against ground for 1.8MHz would have a physical height in the region of 40m, as would a 1/2 vertical for 3.5MHz. In practice such antennas are inductively loaded so that smaller lengths of open conductor are required, allowing for more practical physical heights with the base of the antenna at ground level.

We will continue with these themes next time.

References


(2) Antenna Radiation Patterns Computerized by Dr L.W. Brown and F.C. Judd, Practical Wireless. Feb/March '87.

Abbreviations

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<thead>
<tr>
<th>Abbreviations</th>
<th>Description</th>
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<tbody>
<tr>
<td>B.C.I</td>
<td>broadcast interference</td>
</tr>
<tr>
<td>dBd</td>
<td>gain relative to a dipole</td>
</tr>
<tr>
<td>ft</td>
<td>foot</td>
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<tr>
<td>h.f.</td>
<td>high frequency</td>
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<tr>
<td>λ</td>
<td>wavelength</td>
</tr>
<tr>
<td>λ/2</td>
<td>half wavelength</td>
</tr>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
</tr>
<tr>
<td>r.f.</td>
<td>radio frequency</td>
</tr>
<tr>
<td>s.w.</td>
<td>short wave</td>
</tr>
<tr>
<td>s.w.l</td>
<td>short wave listener</td>
</tr>
<tr>
<td>TVI</td>
<td>television interference</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>ultra high frequency</td>
</tr>
<tr>
<td>v.d.u</td>
<td>visual display unit</td>
</tr>
<tr>
<td>v.h.f</td>
<td>very high frequency</td>
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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 Europe. For further details see the announcement on page 35 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 £28.00 (UK) and £32.00 (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, Enefco House, The Quay, Poole, Dorset BH15 1PP. Prices of p.c.b.s include VAT and P&P.

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Limited stocks of most issues of SWM for the past 10 years are available at £1.50 each, including post and packing to addresses at home and overseas (by surface mail).

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This is being written while contemplating the bank balance to the bank balance caused by Christmas; and it provoked the thought, "If I wanted to get started in the v.w.l. game but can’t afford one of these expensive new receivers, how do I do it?"

In answer, there are basically two ways to overcome a problem: first as a problem, and second as a problem. The first is a problem, and the second is a problem.

For a start, be aware that there are two routes need limit the DX you can hear. As I write, I have a receiver, a very basic receiver for 3.5MHz to a published circuit, and the main is a very basic receiver, because of the antenna lead, I have established beyond any doubt that the basic little receiver works. The one thing not to be missed is the simple crystal filter, used, which was far from ideal for s.s.b., although with care a suitable adjustment could be achieved. Once you have it set up for lower sideband and then upper sideband, you will notice a crystal signals by "slope detection" — something we found out when a few people tried narrow band but on the h.f. bands using a converter to the TV pipe. For example, to get you on to u.h.f. or v.h.f., you can then build or buy a converter. If you want to use your own, or if you get a corner of the living room, you can build a small receiver that is highly technical in the coordinated effort of the XYL doesn’t like it (I while knowing that it is also at least as good as the new shiny box of the chap down the road.

However, we must look at the bands and the letters.

The Bands

The winter solstice was on December 21, and marked a low point in the h.f. radio year. This is because the ionisation of the upper atmosphere, on which we depend occurs thanks to the action of the sun. Thus with third and third days, during these years and the elevation of the sun at noon, the layers don’t get so much done to them by the sun. In addition, in the Southern hemisphere, where it’s summer, they are suffering the summer stasis problem in essence, that’s why the sun and September Equinox times tend to be the best — everyone getting a fair crack of the sun and the seas! First letter from R. (1976, February) who spent £20 and a couple of hours making a two-transistor receiver. With it he logged, on 28MHz, K5RE, TASC, WD8WDE, W1CUX, WA4WDG, K1MBX, KP2A and VE2BYA; on 11MHz there were VK4NPM, K2JYR, K8VRX, K6OED, 14MHz yielded VPSGT, KC3RV, V3EJ, W2SW, WBBSIL, KL4R, while another on Top Band, product W1WRC. I think that Ron has a depth of lettering underneath.

Gordon Hudson (Stillings) has been using a deep cut 24MHz filter for the Top Band, with spectacular results; K6DEU, KBV4, K4EJ, N4EJK, W1BFT, NM1C, W1BIC all calling together, not to mention K5BLJW and BPSHT. Many DX stations use 24MHz s.s.b. (quite improperly) to work their QSL manager and the USA. Tuning to 21MHz, perhaps the star turn was PY7NE who had a dipole and five QSOs, UA0CMJ, J4OSG, JA3GCM, UL8CBWA, C3UGD and ZS6BDU.

A nice card from Cosmas Khalis GT4AHN/SV1XV (London W3) notes that J421FT mentioned in the December issue was in fact a special-event station from Thassalioksi, to celebrate the Internet. Janis has already held their next step. Cosmas was able to operate the station back in September 1985.

Turning to Ian Wye (BFPO 40) from Germany, Ian says he wonders where does one get hold of the address of a station from whom you require QSL, if he is a UK station, your first step is the operating frequency! Stick around the pile-up until he gives you the QSL Manager’s address or his own, as the case may be. If that doesn’t work, you can look in the UK Call Book (RSGB) for UK station addresses, or for a foreign station you can turn to the appropriate volume of the World Call Book, which is stocked and appears in the upper corner of each New Year. However, one wouldn’t want to bother with direct QSLs, we have the chap down the road doesn’t accept Bureaus cards. Far better for the run-of-the-mill reports to send them through the Bureau, which means, in effect, joining one of the above services. If you turn to the upper one, RSGB, for example, or ISWL, if one sends a QSL direct, with the regret, it always has the problem of obtaining foreign stamps to put on the s.a.e.

The majority of DX stations make use of a QSL Manager, to whom all the cards are directed; he receives the logs at intervals from the DX station and makes up the incoming cards. If the logs, fills up the details on the outgoing card and shoots them off. The answer in a box-long or a QSL sheet saying “A1ABC, QSL via B2DE.” Frankly, unless you are mad keen to obtain QSLs for wallpaper, the QSLs are not excessive unless you use the Bureau.

It is sometimes argued the Bureau is too slow; indeed, no Bureau can afford to be slow, or it chokes in cards! What happens is simply that, for example, you hear Joe Bow in Bangladeshi and send him a QSL. It reaches him fairly quickly, but he’s sitting on it! for weeks or months before sending off the return card. Alternatively, he fails to keep up with the Bureau and the cards therefore have to be ditched. Either way, you haven’t lost as much as the chap who encloses a s.a.e. and maybe a donation and all doesn’t see his return QSL!

Now turn to Philip Davies (Market Drayton, who refers to the US5VE/WRO mentions by D. R. Degg in the December piece. Philip is sure that this suffix said that US5VE was in fact portable in Molayda (RO or UO) which only has one Oblast. Had he been in an area where there is more than one Oblast (an Oblast is a sort of Russian province of a county) then he would have suffixed accordingly. In Russian callsigns, the location is explicit; the letters and number detail the Republic, while the first letter after the number tells you which Oblast he is in. Hence, if he is out portable he suffices his home call with the detail to establish which Oblast he is operating from — rather as, say, an American, out portable adds his call area digit as a suffix — as W6AM/6 for example. The method is quite helpful for the DXer or s.w.l. too — after all, a US5 is more or less QRM, but a US5/UO2C might be classed as rare or above.

Philip’s own listening has been quite productive, with Y7V7EM (Margarita Is), Y1OBF, G4LJF/V2A (Ian does get around) and KF5ZGZFE (Little Ceyman Is.), VK8AV (Northern Territories), DX1DBT (Manila, Philippines), and YS1EGB (In San Salvador, Philip, as G1EAL, has been heard to GF/BFPW on occasion.

This seems as good a place as any to mention prefixes; a s.w.l. would be well advised to drop a line to Geoff Watts, 62 Belmore Road, Norwich, NR2 2BP. Geoff produces his well known World—who Prefix List, and in addition a list of all the Russian oblasts, the relevant prefixes and other useful listenings. All are, if very cheap, absolutely up-to-date, and invaluable shock aids. If you write an enquiry be sure to enclose a s.a.e.
Readers' Stations

I thought it would be interesting this month to take a look at the kind of equipment different readers are using for decoding. This sort of information can be very useful to the newcomer who has part of their station and wants to know what else to buy. 

S23940 software is used by Martin Mauchlein, who has a Woodcom 4010 with a Kenwood RS000. One night he left the RS50 and the 4010 with a Brother printer set for dumping the pictures to a log file. He has to sort out what would happen. The next morning a pile of paper with weather information, locations, etc., and made very interesting reading - all whilst he was getting some sleep.

There are two receivers in operation in the J. Anderson household in Pontefract. There's the Yaseu 9600 Mk5 and the FRG-8800, both used with a wire antenna.

D. Raybuck in Hednesford uses a Realistic DX440 at the moment, but hopes to change to the Icom R7 1E as the 1kHz tuning increments of the DX440 are rather limiting. The antenna he uses is a half-size GSRV with a Matsui FX1000, he has chosen is the Technical Software RX4 program. The setup obviously works well as he is able to use the three stations included in his log proves.

An Edystone 730/4 with a BBC-B and pre-amplifier from a Japanese home runs Micro SSTV and the Technical Software RX4 in Scike-On-Trent. The biggest problem he has is finding stations to demod RTTY in the evenings when people aren't around. The most recent purchase has been an SEM QRM Eliminator which Martin describes as "excellent".

Phillips Smith In Pontpools uses a Yaseu FT-50B receiver along with a Spectrum 48K computer and a long wire. David has bought a unit for a while. He is now stuck with the Technical Software RX4 program. The setup obviously works well as he is able to use the three stations included in his log proves.

If Father Christmas has done his stuff, John Pritchett has ordered a TNC220 from Siskin Electronics. After the help they supplied, which included a visit to their London rep, he's got everything up and running now.

The G1FTU software is extremely popular with John Pritchett. Tuning the Down is another user. In his shack is a modified FRG-7 and 48K Spectrum as well as a Realistic 2004 scanner and the FRG-8800.

I'm not sure where you get the G1FTU software from - if you know of a source let me know.

Bob McDonald (Wirral) has an impressive array in the shack. He uses a Telenetics CD650 for RTTY and ARQ modems and an ICS FX100 and a printer for fax reception via a Trio R2000 and Datong AD270. Although he does find reception of Offenbach on 134.2kHz is better when he uses a Sony AN-1 active antenna mounted vertically on the roof. In Iceland, Einar Suuranty Suzios uses the Realistic 730/4 package from Technical Software with his FRG-7 and long wire antenna. He's looking for a digital readout to add to the FRG-7, so if you can help drop me a line and I'll pass it on. The equipment is working well, although he says the log he sent made good reading.

David Aldred has an old Eddystone 940 which has given good service, but is now getting some trouble with the Low Nine. He's not quite sure yet which route to go on for the decoding side yet. He's got a 48K computer and a printer, but he's not sure if he's finished the job as he says the log he sent made good reading.

Mike Young is a C.W. fan. He retired four years ago and hasn't enjoyed it. He recently bought a Pro 2020 printer which enables him to draw large pictures to a C.W. printer. He has to read the main FAX scanner with another program to dump the pictures.

Mr. C. Young is a C.W. fan. He retired four years ago and hasn't enjoyed it. He recently bought a Pro 2020 printer which enables him to draw large pictures to a C.W. printer. He has to read the main FAX scanner with another program to dump the pictures.

In Denmark Eril Koe Z3Y1 uses a Tono 7000, a Drake TR7 and a Hygain TH3MU3 antenna. You should see his QSL card somewhere in this month's column.

It seems we've had a letter go astray. R. Selmes sent some FAX charts into the Short Wave Magazine Editorial Office and they haven't surfaced yet. If any readers have items they want to send in for use in the column, don't send them to the Editorial Office, they can't cope with mail as well as they'd like. If you could see the office you'd know what I mean.

Henry, when they find the letter I can show some of the charts sent in. In his shack, R. Selmes uses a DX302, a Spectrum 48K, an Apexpm printer, G4DSE software as well as Technical Software RX4. He was able to supply some very interesting amateur FAX stations he received during a recent contest.

Simon Evans uses a decoder, home-made a t.u. half size GSRV, and IC-735 and various computers for his DXing. He uses the computers for data and for monitoring direct from the Microbus FRG-735. He's built a level controller to get the Icom interface to RS232.

Bill Licence runs a MM2001 into a commercial u.f.t. TV via a two-way splitter at the rear of the TV. One side is the converter output, the other side is connected to the TV Yagi. Unfortunately, between the two there seems to be some reaction. The Yagi is picking up local manufacturing computer outputs thus making things up. Bill is another reader who praises ERA and Bill Green for the Micro-reader.

The last station to be detailed in this marathon belongs to Andred Keddie, who also uses an ERA Micro-reader, which he's had for about a month. The log he sent proves it's working well, he also has a JRC NR525 receiver fed via a switching unit by a Datong AD270 active antenna mounted in the soft and a 50 sideband antenna available and a Hamgear PMX preselector a.t.u.

Back in November I mentioned a public domain program for IBM PCs and clones called PC-Monitor. This program is primarily designed to interface and IBM PC to a Yaseu FRG-8800 receiver and control from the computer. I recently received a letter from the author Simon Collings announcing the latest enhancements which are included in issue 1.5.

This version is a complete revision of the original program and includes fixes for some of the problems along with some new features, a summary of the changes is shown here.

a) Addition of window open routines for the display of messages.

b) Improved cursor control.

c) Improved use of colour (no flicker with CGA).

d) Logbook bug fix.

e) Addition of FAX mode which directs output to printer as required by some multi-mode terminal units, i.e. PK-232.

f) Secondary channel mode.

f) Addition of BASIC test program from the FRG-8800 service manual.

Improved help files.

i) Optional display of S-meter and busy signal (needs additional hardware).

j) Memories expanded to 1000 channels.

k) Improved documentation.

If you would like to obtain a copy of this program it is available, also the Public Domain Software Library! or direct from Simon! If you order from Simon you will need to supply a formatted 5.25" double density 1.7MHz disk with a cheque or postal order for £2.50 to cover cost of copying and return postage.

Frequency List

The frequency list of stations heard in the last few months is still available and growing by the week. It's now so large that I must ask readers to send three or five cards, no envelopes. At this moment in time there
The Soviet MIR space station has been the main focus of attention again this past month, in both amateur radio and satellite general interest terms. The dear dark early warnings. December has provided many opportunities of excellent visual sightings, allowing the chance for the choice of orbital periods to give future forecasting accuracy, whilst radio observation demonstrated that the whole space station crew participated in all error radio communications experiments.

Not only did Musa Manarov come on 145MHz f.m. as U2MIR, but so did spacecraft commander Valery Titov as U1MIR, as well as the visiting cosmonaut medical doctor Yuri Polyakov with the call sign V1MIR. They were very active on many Wednesday and Thursday evening passes and during their weekend and relaxation periods. In particular focus was Musa Manarov, who was making his level best to communicate with the world's amateur radio community as he orbited earth every one and a half hours. It is very apparent that the same multi-look QRN communication problems hit the MIR amateurs as they did Owen Garriott when he was active from the USA Shuttle as WBLF, due entirely to the extraordinary high popularity of the event. Whilst over forty South African and upon eastern European stations were worked in the first two weeks of operation, only some five American, two west Europeans and one Russian amateur were logged, as the thousands of QSOs that could have evolved were rendered impossible by the death of several of the wealth of calls being simultaneously.

The result of mass of f.m. stations in line-of-sight range on the same frequency is to produce a total silence at the receiver. Hence zero readability of all stations except for those who can make use of the capture effect by maximising the gain that can be brought about by using higher power, greater antenna gain, and periods of closer proximity to the spacecraft when it is passing over the highly populated parts of the earth.

This problem (unless one has many local stations calling the spacecraft on the same frequency) does not stop listeners on earth from hearing MIR, as many of you who have reported as having heard the MIR cosmonauts active on the 145MHz band over SSB, often with some of the stations in the area calling up. Those who wish to get a QSL card may do so by sending a short wave listener report to one of the amateurs via G5MPN, Dave Sigman UW3AX, at PO Box 679, Moscow 107207, USSR. Being given a crew consisting of Alexander Volkov and Sergei Krikalov, accompanied by visiting French astronaut Jean-Loup Chretian (on his second trip) went up to MIR as planned via the SOYUZ TM-7 launched at 1550UTC on November 26. The two Soviet cosmonauts relaunched the docking crew who completed their planned year in space without any apparent ill effects, bearing in mind Romanenko's record 326 days on 11 November 1988. They returned to earth on December 21, with the French visitor (but leaving Dr. Polyakov to tend the new crew) after completing two additional orbits in the SOYUZ capsule value to a further bout of computer problems.

On both the upgoing and down-coming SOYUZ missions, many listeners to 121.750MHz narrow band f.m. were able to copy the strong signals despite their being in the middle of the band surrounded by strong wide band a.m. during their 49 hour 40 minute flight to MIR. The docking and the events leading to it were observed closely by Chris van den Berg from the Hague, who wrote: "During the pass in orbit 45.261UTC on November 28) radio traffic on 143.625MHz revealed the final phase of the docking, the 10014 discipline from SOYUZ-TM-7 was only 13 metres, and the approach speed was approximately 2.6 metres per second. The roll was reduced to 10.3 degrees after which they wait until television communications are established before completing the docking. The cosmonauts then, ever the fact for the time that would give some extra minute to the crew. It was not."
**Communication Satellites** by Larry Van Horn, available in the UK from Interbooks, 5M, Stanley, Perrh PH1 4QG, at a price of £13.25 plus £1.25 postage and packing. It has lots of information on amateur, manned, weather and spy satellites, with a frequency range going from 1.5MHz (Explorer-20) up to 5630GHz (USAAF satellites) and everything between.

**Weather Satellites**

Lawrence Harris of Peverell, near Plymouth, has again sent us some fascinating information and some superb pictures, including those promised last month.

He has found both MET 2/16 and MET 2/17 have been orbiting south-bound into sunlight over the UK, and, as in each case the aperture bars can be seen, a close up of this is shown in Fig. 1, which is such a picture of MET 2/17 taken in November 1988, with the aperture indication bars seen at the right. Lawrence says: "It can be considered as a binary display, with black representing 0 and white as 1, therefore as eclipse the aperture is fully open at setting 0000. Within seconds of entering full sunlight the bars change so you will see the binary read-out change 0 to 1 to 10 to 11 to 100, etc. In the reverse direction, you can see the aperture gradually open to its limit before switch-off. Fig. 1 shows binary values of 0000, 0001, 0010, 0011, 0100, etc.

NOAA-9 gave the picture of the Gulf of Botnia and Finland as shown in Fig. 2, Lawrence logged a "lock" fault on this weathersat at 1705 UTC on November 3, causing the picture a loss of synchronisation. By November 12 the fault was found to be very bad indeed, and no pictures whatsoever were usable. He found that on November 13 the fault seemed to have fully disappeared, either by self correction or by command, but sadly it returned again on November 17. During late November NOAA-9 and 11 were coinciding, so NOAA-9 was commanded off, leaving NOAA-11 operating normally.

OKEAN-1 was finally picked up after many recording sessions by Lawrence in the early hours of December 4. He reports that it has started a series of daily transmissions using the different formats. Onboard equipment includes a microwave receiver, a side ways looking RADAR and a light imager. Lawrence writes: "I have been getting very good results from this current series of tests, and will forward pictures when they are processed. Images so far recorded include both ocean and land, and what is possibly a store-and-forward picture of the northern polar ice cap.

Evidence of the clipping and melting of this region is shown by our Fig. 3, a photograph taken by Michael Meenan GDBA2BF of the University of Surrey UOSAT team, whilst on their recent trip to the North Pole to meet the Polar Ski-Trek team.

Lawrence has been looking for Fen-Yung-1, but despite many searches it has not been heard now for several weeks, and we have to assume that it still switched off. He sends us picture he took of other satellites, Fig. 4 being GOES-W a re-transmission from GOES-E showing the south-west quadrant in visible light. The photograph in Fig. 5 shows a visible light whole disc from METEOSAT taken in November.

He sends us a summary of current satellite activity with the current frequencies used:

NOAA-9: 137.620MHz. May be off for long spells.
NOAA-10: 137.500MHz. On continuously.
NOAA-11: 137.620MHz. On continuously.
MET-2/16: 137.400MHz. On in sunlight when the solar illumination level is greater than 90 per cent.
MET-2/17: 137.300MHz. As MET-2/16.

OKEAN-1: 137.400MHz. Sometimes on for eastern passes.
FEN YUNG-1: Currently off, possible permanently.

Finally from Lawrence comes some good advice, which applies to all short wave listeners, and weather satellite enthusiasts in particular. "Patience is the practice that must be learnt." He demonstrates these words of wisdom with the example of eventually finding MET-3/2 and OKEAN on in the early hours of each morning daily, having spent the night recording 137.850 and 137.400MHz alternatively.

**TV Satellites**

January 20 should see the commencement of broadcasting from the new Astra satellite, which has sixteen channels, six of which have been taken over already. Rupert Murdoch has four, W.H. Smith has two and Robert Maxwell is said to be taking over three channels. The operators of ASTRA have warned that they will "pull the plug" on any operator who does not conform to the official obligations of use.

**UoSAT**

The University of Surrey announce that until further notice, the schedule for the Whole Orbit Data from UoSAT-2/Oscar-11 will be:
Sundays: Channels 1, 2, 3 and 61.
Mondays: Channels 1, 2, 3 and 61.
Tuesdays: Channel 19.
Wednesdays: Channel 29.
Thursdays: Channels 1, 2, 3 and 61.

The diary and bulletin board continue to be updated with fresh and interesting information on the latest space related happenings, and a full set of new Keplerian elements are available for computerised tracking.

Oscar-9, alias UoSAT-1, was seven years old in October 1988, but continues to give excellent service. It has faded from the original launching altitude of 556km to only 460km, but is expected to last out a further two years before it enters earth's atmosphere to burn up.

Reports on reception, experimentations, utilisation of the current satellites are always welcome, particularly when they are being used for scientific and educational projects.

**Help Line**

Mr G. J. Barcus, of Schaapmanlaan 39, 9722 NR Groningen, The Netherlands, writes to ask if any of our readers are willing to share their experience in tracking weather satellites using a computer, and, if so, can they advise him on what computer and programs to get. He finds that the BBC computers are hard to get in Holland, but the Commodore is still on sale.

He is seeking good pictures (particularly Africa) from satellites passing to his south from his window mounted omni-directional antenna, a better system not being possible from his second floor home surrounded by large apartment blocks.

Lawrence Harris, who sends us the regular supply of information and pictures, wonders if any fellow satellite fans are able to help him transcribe some of the more interesting tapes which he has made of MIR conversations and transmissions. His home address is 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QK.

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*Fig. 1, Fig. 2, Fig. 3, Fig. 4, Fig. 5*
Despite predominantly high pressure, the number 12.1 by the time of the lift proved very disappointing. "Band II DX has been very low at this QTH for the last few weeks," wrote John Woodcock from Basingstoke on December 9. "I have checked the bands on morning DX and found very little about, or perhaps I've been unlucky?" he added.

Our reader/DXer in Botswana, P. R. Gloster, using a Philips D1835 receiver, is also interested in the weather. While listening to Radio RSA on November 26 he noted that the temperature in Durban was 22-26 degs. In addition to a variety of programmes, some of BBC origin, he also heard the news and weather reports from Botswana, Lesotho and Swaziland and the current temperatures thereof. Around 1915 on the 26th, he logged good signals from the Afrikaans Language Service, and during the day he listened to stereophonic programmes, e.g., from Gaborone, Radio Botswana and found that the lower one, on 89.9MHz, Fig. 1, was the strongest.

Another weather watcher is George Garden (Edinburgh) who noted that the pressure was rising all week end on December 3/4 and it was very cold with low overnight temperatures. The usual often occurred in conditions associated with high pressure for DX work, thought George. Therefore, on the 3rd he took his gear to the top of Caln O' Mouth and while tuning through Band II he found a fading signal which was very strong on peaks and then waited for an idiot. At 1505, after hearing its local news and weather, George added Radio Cumbria, from the Sandanaber, near Carlisle, to his DXpedition log.

Antenna Mods
"Years ago I collected a few old 405-line 'H' and 'X' antennas and stored them away like a magpie," wrote Mike Bennett (Slough) who is thoroughly cleaning some of these parts to build a new Band II antenna. I did the same Mike and managed to salvage some rods and insulator blocks in good condition. These have been ideal for making up tee-dioples, one of which was installed on my chimney, Fig. 2, by an old friend and fellow DXer, Peter Penfold. Peter enjoys experimenting with antennas for the v.h.f. and u.h.f. radio and television bands. In addition to his TV gear, Peter's home at Felpham, Sussex, is equipped with JVC3040 and SX2000 receivers.

Reports
"The f.m. band continues to bring interesting signals," wrote Brian Renforth (Newcastle-upon-Tyne) who can receive Radio 1 from Black Hill and Home Moss daily ranging from very weak to reasonable quality under normal conditions.

31 Andrew Jackson (Birkenhead) logged Beacon and Viking Radio, Radios Lincolnshire, Nagaeloachta, Norfolk, Shropshire and Radio Telefs Eriann (RTE1) and on November 15 he heard Beacon, Penrose and Viking Radio plus RTE2. Mike Bennett (Slough) reports hearing music, sometimes only bursts, on 83.75MHz on November 18, 19, 20 and 25, and music with English voices on 87.75MHz on days 18, 19, 20, 22, 25, and 28 December. These are both television sound frequencies Mike, the former is the Russian Ch. R3 and the latter is the USA's A6. I wonder, are such signals reaching us via the greatly improved "F2" conditions I hope so.

TELEVISION

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

"November's tropo was far from exciting, though summing up for this year's we've got to be thankful for 'Olympic Style' DXing when previous records were broken and new transmissions logged from the same," wrote Simon Hamer (New Radnor). "Not much DX on the TV waves lately," remarked Mike Bennett (Slough) on December 6. "I've missed the opportunity to overhaul his equipment and add a D-100 Deluxe converter to his station. At Felpham in Sussex, Peter Penfold has modified a 24in Marconiphone receiver and installed the stacked Bow-tie antennas for the u.h.f. band and added JVC3040 receiver plus various home-brew arrays are ready for operation in Bands I and II.

Following recent gate damage, Brian Renforth (Newcastle-upon-Tyne) replaced his group C/D array with a Fuba X343 antenna directed toward Pontop Pike and is delighted with the results. "Ghosting is no longer a problem and the clear line structure is not unlike a 405-line picture on a smaller screen set - its clear! Being a wideband array we also have the addition of Bilsdale which was unwatchable - the picture are now almost noise-free," said Brian. Another addition to his station is a 12in Tokyo Delux 127A mono receiver which will be used alongside a pair of Thorn 1400s and a LaddGear up-converter during the forthcoming sporadic-E session.

In Arbroath, David Glenday is giving thought to the building a super antenna with a high gain low noise pre-amplifier for Band III, or importing a good continental job. Whichever you decide upon Dave, we will be pleased to hear about it. Don't forget readers, your fellow DXers are interested in homebrew, new gear and mods, so please let me have the details and I will use what I can.

Band I
During the next few months, while Band I activity is limited to short and often sudden outbreaks of sporadic-E, it would be use to have a check on the band first thing in the morning. For example Bob Brooks (Great Sutton) took an early look on November 17 and from 0835 to 1145 he watched programmes, among them Breakfast TV and Dynasty, from Italy (RAI), Portugal (TVH) and Spain (TVE). This opening was also enjoyed by David Glenday and Gary Smith (Derby) who wrote, "there were a few sporadic-E openings on November - the 17th was good for TVE on Chs. E2, 3 and 4".

David thinks the Spanish programme he saw was Dynasty because he remembers seeing it transmitted at that time back in the summer when TVE was frequently received in the UK.

Bob Brooks and Simon Hamer found some sporadic-E activity when, between them they logged test cards from Czechoslovakia (RS-KH), Denmark (DR Danmark) Sweden (STV Kanal 1) and the USSR on November 19, 21, 23, 24 and 27 respectively.

Scandinavian stations, on Ch. E4 were predominant in the log of Edwin and Tony Mancinis (Belper) on November 22, 23, 24, 27, December 4 and 10. Among the Idents they saw on these days were DR Danmark, (Denmark), YLE TVI (Finland), PTT NED 1 and their opening caption. (Holland), NRK - Clock Logo and testcards scribed Bremanger and Kongs-
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Tropospheric

A tropospheric opening took place around November 17 while I was putting the final touches on last month's column, so there was no time to include readers' reports of that event. However, this time I have stepped back a bit to use them.

During the opening on November 14, Simon received pictures from Luxembourg (RTL1) on Ch. E7 in Band III and Belgium, France, Holland and Ireland on many spots in Bands III and IV. Among the capsions he saw were BRT1 and RTBF1 (Belgium); A2, CANAL+, TDF, TF1 and FR3 (France); NED 1, 2 and 3 (Holland) and RTE1 and 2 (Ireland). The following day, Andrew Jackson, had a good u.h.f. haul when he received BBC1 North East, Northern Ireland and West; Border TV; Central TV and Central East Midlands; HTV West; RTE1 and 2; TVS and Ulster, from his home in Birkenhead. On the 28th, he again looked for u.h.f. DX and found BBC1 Northern Ireland, RTE1 and 1 and Ulster.

The Mancinis received Band III pictures from France (Canal +1) on November 14, 15, 22 and 23 and December 6, 9 and 10 and from Ireland (RTE1) on November 22. At 0950 on the 17th, David Glenday logged the Danish test card “TV2 Hedensted” on Ch. 30.

I noticed a real hefty ghost on u.h.f. pics during the evening of the 22nd and co-channel interference on the 29th and December 24. It began building up in the band on the 29th between 0200 and 0400 and by 0825 negative pictures from France were appearing in at the lower end of Band III.

News from India

Tropospheric openings enhancing the range of signals in Band III were observed by Lt. Col. Rana Roy in Meerut from September 28 to October 1 and days 4 to 7 and 10 to 16 inclusive. Most of these were early morning events which enabled Rana to see adverts, Fig. 1, from Lahore TV at 2215 on September 30 and breakfast TV and test cards from stations in India and Pakistan. Among those he identified in Band III were Agra, Amritsar, Bhatinda, Bhawalpur TV (Pak), Faisalabad (Pak), Jalandhar TV, Kasauli TV, Lahore TV (Pak), Mussoorie TV, Rawalpindi TV (Pak). Rana observed heavy co-channel interference on Ch. 10 from Bhawalpur on Mussoorie at 2140 on September 28 and again at 0840 on October 5, Figs. 2 and 3 and a very clear picture, at 2230 on September 28, from Bhatinda TV on Ch. 12, Fig. 4.

On 22 days during the month prior to November 3, Rana has received multiple, fluttering and smeary pictures, no doubt via “F2”, in Band I from Malaysian and Russian television networks. Identification of stations during this mode of propagation is extremely difficult however, his detailed log includes a variety of adverts - Fig. 5, seen with multiple images at 2145 October 18, badminton, racing, clocks...mainly Russian, dancing, feature films with sound dubbed in Malaysian language. logos - the “3”, Fig. 6, probably Malaysian at 2115 on the 20th and “Sports” at 1515 on the 27th and news...Fig. 7, BPEMR from the USSR at 2100 on November 3. “Two news presenters (one lady - one gent) with “B” caption on left top when the lady was present and on the right top when the gent was present. At times a star was seen on top left side when another news presenter was present,” said Rana.

Short Wave Magazine February 1989
LONG MEDIUM & SHORT

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

MW Transatlantic DX

Some broadcasts from Canada and the USA have been reaching our shores rather earlier than hitherto. At Shetland there has been a distinct lack of signals from the Caribbean area and S. America. The broadcasts from WINS in New York 1599 were received by Tim Thiel in Bristol at 2100 one evening, but that was quite exceptional as their signals are normally too weak to be heard after 2300. Tim also found the reception conditions interesting just before dawn. At 0530 DX was logged from the position of his antenna for the first time. This station has not been mentioned before in this series, so Tim's reception is subject to confirmation by QSL. Tim has contributed an attractive QSL card from KAAY in Little Rock, Arkansas which confirms his reception of their broadcasts on 1090 last September – see Fig. 1.

The earliest signal to reach Jim Williett in Grimsby came from CBA in Moncort, New Brunswick 1070, which rated as 222 at 0015. By 0030, CJYJ in St John's, Newfoundland 930 was peaking 333 and WICAU in Philadelphia 1210 was logged as 222 at that time. At 0200 Jim heard WTPP in Dripping (150kW), Poole (10kW), at first time. A reception report detailing their signal as S222 has been sent to them and Jim is now awaiting their reply. Jim is intending to lengthen his skylines in Quebec 1060, rated as 222 at 0130 and to CBG in Gander 1400, rated as 233 at 0230.

Other MW DX

In Chertsey, Ciaran Fitzsimons heard Denizli, Turkey 558, rated as 33344 at 1733 and a broadcast in Arabic from Damas-Astra 567, rated as 42352 at 1735. Listening at 0230, Jim Williett picked up a broadcast in Arabic from UAE Dubai 1480, rated as SIO 223.

Jurgen Thiel has erected a 220m long Beverage antenna, directed towards the UK and terminated to earth at its northern end. Using it in conjunction with a battery portable, he can hear some of the BBC Radio 1 and 2 stations in at least 50% of the time any time during the day! For example, BBC Radio 1 on 1050 (shared by Burghhead (20kW), Duffin (15kW), Poole (10kW), Stagshaw (50kW), Stentpark (100kW) and low power relays) rates at 55555 at 1530. As an experiment, Jurgen is intending to lengthen the antenna by another 150-200m in the near future.

Following my comments about long distance mw reception during daylight, Roy Hill (West Kilbride) says he can usually hear Marnich, Luxembourg 1440 all day and two stations in W. Germany – Saarbrucken 1422 and Leipzig 1593 for much of the day. Infrequent, but deep snow fades have been observed on these signals. He has noticed that during the winter, the band is rapidly fading with signals from NW Europe for several hours after sunrise and presumes they reach him via sky wave paths. At present, Roy uses a 100m vertical wire antenna with anf2 pre-amplifier ahead of his Lowi HF125 receiver, but says his best results were obtained with an outdoor 3m by 4m omnidirectional resonant loop.

The choice of receiver is also important if good results are to be obtained on this band. Writing from London, Phil Townsend says that the mw performance of his domestic radio is superior to his Lowe SRX 30 communications receiver; however, the short tuning scale is a serious disadvantage as sometimes the scale pointer hardly moves when tuning from one station to the next.

For those DXers who enjoy searching for signals from the low power BBC relay stations installed around the UK, Ian Bond (Wirral) reminds us that the BBC Radio 1 relay in Wallasey runs just 500 watts on 1107.

MW Local Radio DX

The construction of a G2VZ type mw loop has been keeping Darton, Totsk bus in Turbridge Wells. He connected

MW Transatlantic DX

By way of an experiment, a new medium wave dvx chart has been included this month, which is hoped will provide some insight into what is available less in space. Your comments on the new chart would be appreciated.

Long Wave DX

Note: Lw & mw frequencies in kHz; s. in MHz; Time in UTC (= GMT).

Listening upon returning to Macclesfield, Neil Wheatley heard an announcement by Radio Jordan via their new s.w. service electrical noise there is very low. Honam 177 (750kW), Motala 189 (300kW) and Roma 216 (1140kW). Unfortunately, the signals from Roma were too weak to be confirmed by QSL. Tim has contributed an attractive QSL card from KAAY in Little Rock, Arkansas which confirms his reception of their broadcasts on 1090 last September – see Fig. 1.

The earliest signal to reach Jim Williett in Grimsby came from CBA in Moncort, New Brunswick 1070, which rated as 222 at 0015. By 0030, CJYJ in St John's, Newfoundland 930 was peaking 333 and WICAU in Philadelphia 1210 was logged as 222 at that time. At 0200 Jim heard WTPP in Dripping (150kW), Poole (10kW), at first time. A reception report detailing their signal as S222 has been sent to them and Jim is now awaiting their reply. Jim is intending to lengthen his skylines in Quebec 1060, rated as 222 at 0130 and to CBG in Gander 1400, rated as 233 at 0230.

Other MW DX

In Chertsey, Ciaran Fitzsimons heard Denizli, Turkey 558, rated as 33344 at 1733 and a broadcast in Arabic from Damas-Astra 567, rated as 42352 at 1735. Listening at 0230, Jim Williett picked up a broadcast in Arabic from UAE Dubai 1480, rated as SIO 223.

Jurgen Thiel has erected a 220m long Beverage antenna, directed towards the UK and terminated to earth at its northern end. Using it in conjunction with a battery portable, he can hear some of the BBC Radio 1 and 2 stations in at least 50% of the time any time during the day! For example, BBC Radio 1 on 1050 (shared by Burghhead (20kW), Duffin (15kW), Poole (10kW), Stagshaw (50kW), Stentpark (100kW) and low power relays) rates at 55555 at 1530. As an experiment, Jurgen is intending to lengthen the antenna by another 150-200m in the near future.

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**SITUATED AT SOUTHERN END OF M25 — EASY ACCESS TO M25 AND SOUTH LONDON**

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<thead>
<tr>
<th>HF RECEIVERS</th>
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<tr>
<td>Icom IC R71</td>
<td>956.00</td>
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<td>Yaesu FR 800 V.H.F. Converter</td>
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**V.H.F. SCANNING RECEIVERS**

| Icom IC R700 | 956.00 | — |
| Yaesu FRG 6000M | 956.00 | — |
| WIN | 100 Airband Receiver | 175.00 | 1.50 |
| A.D.R. | AP 2000 | 487.30 | — |
| Signal | R035 "Airband" | 487.30 | — |
| Signal | R035 "Airband" | 487.30 | — |
| Kenwood R21 Wide Band Receiver | 487.30 | — |

**V.H.F. SCANNER ACCESSORIES**

| A.D.R. | HFC1 HF Converter | 48.00 | 1.50 |
| Renville | Dipole Antenna 30-500 MHz | 32.25 | 3.00 |
| Icom AH7000 Antenna 25-1300 MHz | 82.50 | 3.00 |

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<td>50 metres 16 swg hard drawn copper wire</td>
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at that distance must rank as a remarkable achievement.

Short Wave DX

An increasing number of sunspots are being observed on the active surface of the sun, and interest in the v.s.o. activity, high levels of solar noise have been evident on the higher frequency bands for some time recently. During some days reception has been more seriously affected by sudden ionospheric disturbances. Apart from these effects the reception conditions are in general very good.

Five broadcasters are now making daily use of the 25MHz (11m) band: RNI Oslo, Norway 25.730 (Eng Sundays only 1000-1030, Nor to Africa 1000-1045 and 1200-1250); BBC via Daventry UK, 25.750 (Eng to Africa, Asia 1100-1515); Radio RSA, Johannesburg, South Africa 25.790 (Eng to Europe, Canada USA 1400-1556); RFI Paris, France 25.825 (Fr to Africa 0900-1545) and Radio Denmark, Copenhagen 25.850 (Dan to Africa 1400-1455). Although the jamming by the USSR of the broadcasts from Radio Liberty via Gloria, Portugal 25.665 (Russ to N. Asia, E. Europe 0900-1600) ceased at the end of November, their transmissions were subsequently discontinued. The test transmissions made by UAE Dubai on 25.900 (Ar 0615-1400) have not been heard recently. Test transmissions & broadcasts by Radio Nederland were heard on 25.970 (Du 1030-1125) during early December, but they have also ceased.

The BBC World Service broadcasts via Daventry UK 25.750 are being well received. The BBC Africa Dick Moon notes their signal in George, South Africa as 44444 at 1100 and the latest report from P. R. Guipurasad in Molope, Botswana quoted 45434 at 1410. Dick Moon logged the transmission from RFI Paris, France 25.820 as 34343 at 1055.

Writing from "down under", John Ratcliffe says he tuned to 25.750 just in time to hear that it was "13 hours 45.975MHz of timeless interest" that he was listening to "the World Service of the BBC". Their broadcasts are also being heard every day in Montreal, Canada by Alan Roberts. Using a 31m dipole with a single conversion home-built receiver he can hear some of the other transmissions too, but the broadcast from RNI in Oslo 25.730 have only been heard once. The only signal that moves his "S" meter needle is from Radio RSA in Johannesburg on 25.790.

That signal has probably been a few feet over Africa and Dick Moon, using a Matsui MR 4099 portable with just its built-in whip antenna, John Naslund in Brightont, England via 55444 at 1425. They have been attracting the attention of Ted Walden-Vicent in Great Yarmouth. He uses a Grundig 310L5 portable with a built-in whip antenna and reports reception as good during most afternoons. John Coullier found their talk about an amateur radio satellite called "Dove", which beams down peace messages on occasion, as of special interest. John uses a Yaesu FRG-7 receiver in Winchester.

Broadcasts from RFI, RNI and the BBC were mentioned in a large number of reports. The signals ratings varied quite considerably, no doubt because these transmissions reached via backscatter and other modes. One common factor was mentioned, rapid flourishes and echo effects on the BBC signal.

The propagation conditions prevailing in the 21MHz band have generally been excellent. Most of the broadcasts which are boomed to Europe are reaching their target well. They include Radio Japan via Movabi, Gabon 21.695 (Eng 0700-0830) 35563 at 0703 by David Edwards in Walland; UAE Radio Dubai 21.605 (Ar, Eng 0615-1400) 54340 at 1030 by Mark Selby in Aldershot; Radio RSA Johannesburg, South Africa 21.1400-1600 logged at 1400 by Edward Broadsmith in Worcester; Radio Japan viaMovabi, Gabon 21.705 (Eng, Jap 1500-1700, 0820-1030) 44444 at 1005 by John Nash: WYFR via Okeehobee, Florida 21.615 (Eng, Ger 0800-1000) logged at 1000 by Ron Pearce using a 2 transistor (2N3819/BC109C) straight receiver in Burgess.

Transmissions to other areas have also been reaching the UK. The BBC via Limassol, Cyprus 21.470 (Eng to E. Europe, Soviet areas 0900-1000) 21.615 at 0703 by Kenneth Reece using a JRC NRD 525 receiver with a delta loop antenna in Preston, BBC Bristol, GDR 21.540 (Ger, Hi to S. Asia 0730-0830) SIO 323 at 0820 by

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

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Dxers
- Ian Bond, Wirral
- John Evans, Sharrow
- Ciaran Pizzicares, Charsley
- Gordon Brown, Lincoln
- P. R. Guipurasad, Botswana
- Roy S. Levitt, Kansas
- Leslie Hillis, Grantham.
- Sheila Hughes, Morden
- Georges Cocozza, I.O.W.
- Mark Selby, Aldershott
- Tim Brown, Berkshire
- Darran Taplin, Trowbridge Wells
- M. Jenny, Jeave, Spain
- Phil Towerwood, London
- Jim Willett, Gransby

David Middelmenis in Eyemouth: SRI via Schwarzenburg, Switzerland 21.695 (Fr, Eng, Ger to S. Asia 0745-1030) at 0835 by David Wretan using a Trio R200 receiver with a 30m wire antenna in Cambridge; Radio Portugal 1400-1700 to Africa 1000-1200 SIO 433 at 1000 by Cyril Kellam in Sheffield.

Those heard during the early afternoon include Vatican Radio, Rome 21.485 (Fr, Port, Eng to Africa 1100-1220) 55555 at 1215 by Bill Griffith using Sony ICF 2002 portable with an AN-1 active antenna in London; Radio Moscow, USSR 21.800 (Eng, Fr. Art to N. Africa 0900-1200) SIO 44444 at 1245 by Philip Rambaut, Radio Austria Int, Vienna 21.490 (Ger, Sp, Fr to W. Africa 1300-1700) 55555 at 1305 by Neil Dow in Lockdown, Radio DW via Wertachtal, W. Germany 21.600 (Eng, Swa to Africa 1500-1700) SIO 555 at 1500 by Kenneth Buck in Edinburgh, using the home built receiver seen in Fig. 2.
Later, the BBC via Ascension Island 21.470 (Eng to Africa 1616-1745) was logged at 1635 by Ron Pearson; BRT Wave, Belgium 21.810 (Eng to Africa 1630-1655) 54444 at 1640 by P.D. Redgran; Radio DW via Cyclops, Malte 21.680 (Ur, Eng to S. Asia 1430-1650) SIO 333 at 1645 by Philip Rambaut; WCSN Scotts Circular, Malte 1.640 (Eng, Fr, Ger to Africa 1740-1755) SIO 534 at 1650 by Alan Smith in Northampton; RAI Rome (Eng, Fr, Ger to Africa 1640-1745) 32222 at 1700 by Christian Pritchard using a Kenwood R200 receiver with a t.u. and random arrival. Available in Cambridge, Radio Nederland via Bonaire, Nat. Antilles 21.685 (Eng, Fr, Du to Africa 1745-2143) 44343 at 1835 by Darran Taplin.

The conditions on the 17MHz (16m) band were good, but due to time to solar flares seriously disturb reception by causing total blackouts.

Listening at 0600, Christian Pritchard picked up Radio New Zealand 17.705 (Eng to Pacific Areas 2345-0700) 32343 at 0700 and rated it as SIO 333 during darkness. Kenneth Reece has continued to monitor their transmissions daily and his latest log details variations in their signal strength which "just audible" during some mornings to 34443 at 0627.

Many broadcasters beam a variety of languages towards Europe at some time during the day. They include Radio Pakistan; 17.660 (Ur, Eng 0715-1120), rated as SIO 333 by 0815 by David Middlemiss; UAE Radio Dubia 17.865 (Ar, Eng 0615-1500) SIO 333 by Kenneth Buck; Voice of Israel, Jerusalem 17.575 (Eng, Fr 1100-1200) 34444 at 1100 by David Warner; Radio Bangladesh, Dacca 17.700 (Eng 1200-1730) 34543 at 1230 by Leslie Hollis using a Yaesu FT-737 receiver with a Windom antenna in Grantham; Radio RSA Johannesburg, S. Africa 17.795 (Eng 1800-1900) 54444 at 1900 by Robert Pattison; BBC World Service, 17.830 (Eng to Africa 0545-0715) 55345 at 0700 by Mark Selby; AIR via New Delhi, India 17.705 (Eng, Hi to E. Asia 0530-1230) 34443 at 1230 by Richard Radford-Allenday using a Sangean ATS-803A receiver with a 50 ft. long wire antenna in Cambridge.

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### SEE & HEARD

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<td>R. Trujellon, Cuba</td>
<td>Venezuela</td>
<td>0205</td>
<td>E. P.</td>
</tr>
</tbody>
</table>

**DXers:**
- A: Leo Barr, Sunland
- B: Robert Cowell, Blackpool
- C: Alan Curry, Stockton-on-Tees
- D: Neil Davey, Lockerbie
- E: David Edwards, Walland
- F: Bill Griffith, London
- G: P.R. Guernsey, Botswana
- H: Sheila Hughes, Morden
- I: David Mawby, Kent
- J: John Nash, Brighten
- K: Fred Pellant, Slimmington
- L: John Paterson, London
- M: Roy Patrick, Derby
- N: Christian Pitchard, Cambridge
- O: Richard Purdy, Southport
- P: Kenneth Reese, Pranton
- Q: Mark Shepherd, Southampton
- R: Tim Shirley, Bristol
- S: Neil Swales, Newcastle-upon-Tyne
- T: Mike Thorne, Carlisle
- U: Bill Griffith

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the UK. From Birmingham, Ferris Harris says he was thrilled to hear their broadcast at 0800 for the first time.

Alan Smith was also delighted to hear the NZ Bellbird and their opening announcement at 0800 for the first time. He then managed to pick it up on three successive mornings! Some idea of their signal can be ascertained from the 2423-2505 noted by David Woodward at 0910.

Broadcasts to Europe from Radio Australia via SIRIO, SE, Australia 9.655 (Eng 0700-1000) are reaching their target well. Although George Heawood has noticed some co-channel interference at times, most mornings their signal is SIO 444. Their shippanter station also beams programmes to other areas. As Alan Smith has also been reaching the UK, Leo Barr logged 9.770 (Eng at SE Asia 1000-1300) as 22232 at 1045. In Florida, Michael Anthony noted 9.580 (Eng to C. Pacific, USA 0800-2130) as 44544 at 1015-1952. Richard Radford Reynolds rated 9.620 (Eng to E. Asia, W. Pacific Area 2000-2130) as 32332.

During the day, many broadcasts are beamed towards Europe. They include the Voice of Mediterranean Valletta, Malta 0735, 7.905 (Eng, Sp, Fr at 0700-1030) heard at 0830 by Roy Pateck using a Lofe HF125 receiver in Derby; Vatican Radio, Rome 9.854 (It, Fr at 0700-1030, 1200-1530) heard by Alan Smith at 0700 by Danorpuck; FEBC Manila, Philippines 9.800 (Chin to C. Asia 0800-1300) 32333 at 1422 by Leo Barr; Voice of Vietnam, Hanoi 9.840 (Eng, Russ, Viet, Fr at 0700-1630) 34334 at 2041 by Richard Radford Reynolds; RSKS Riyadh, Saudi Arabia 9.720 Fr, Eng, Ar at 1400-2300 32222 at 2050 by Alan Curry; AIR via Delhi, India 9.910 (Eng 2000-2300) 34335 at 0205 by Neil Dove; Radio Baghdad, Iraq 9.770 (Fr, Ger, Eng 1900-2225) SIO 544 at 2141 by Alan Smith; VOPC Taipel, Taiwan 9.595 (Eng 2200-0000) SIO 323 at 2215 by David Middlemass; Voice of Israel, Jerusalem 5.010 (Rus, Fr, Eng 1500-2300) 32223 at 2315 by Neil Westley.

Also logged were the BBC via Ascension Island 9.600 (Eng to Africa 0400-0815) 45554 at 0647 by John Parry, Radio HCBJ Quito, Ecuador 9.745 (Eng to Australia 0700-1030) 52234 at 0735 by Mark Selby; RTV David, Myanmar; FECA Radio Maha,仰光, Myanmar 9.590 (Eng to C. America 1000-1200) 44444 at 0810 by Edward Broadsmith; FEBC Manila, Philippines 9.800 (Chin to C. Asia 0800-1300) 32333 at 1422 by Leo Barr; SLBC Colombo, Sri Lanka 9.720 (Eng, Hin to S. Asia 1230-1730) 32233 at 1500 by Alan Smith; Voice of America, SIO 323 at 2215 by David Middlemass; Voice of Israel, Jerusalem 5.010 (Rus, Fr, Eng 1500-2300) 32223 at 2315 by Neil Westley.

The introduction of this new series in the November 98SWAM has met with a good response and a number of interesting logs for inclusion in the chart have been received from regular listeners and newcomers to this aspect of our hobby. Several listeners have mentioned that searching for new beacons is perhaps the most interesting and absorbing that they had envisaged and that their speed in reading the calllogs, which are sent in Morse code, is already improving.

The details given in the chart this time make it help to overcome the difficulties in identifying some of the beacons. It seems that a copy of Reed's "Modern Almanac" may now be useful. In some of our public libraries, and enquiring libraries by mobile (Newcastle-upon-Tyne) indicate that the Almanac is published annually towards the end of August and can be purchased direct from the publishers. The 1988 edition costs £13.95, but the publishers will sell back copies if available at £2.00 each plus £2.00 postage. The bears to avoid are quoted in the 1987 edition should be adequate for most DXers. If you wish to obtain more, contact: Thomas Reed, 178-185 High Street, Sunderton, Tyne and Wear. (Tel 019-567 5211).

The next deadline for this section will be March 13.

LW MARITIME RADIO BEACONS,

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

<table>
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<td>Oak Hill, WV, VA</td>
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Lagos 7.255 (Eng, Fr to Ha to Africa 0500-2200) logged at 0600 by Tim Shirley; BBC via Tsang Teui, Hong Kong 7.180 (Jap, Eng, Chin to Asia 1100-1615) 34443 at 1245 by Leslie Hollis; KBC Seoul, S. Korea 7.550 (Fr, Kor, Ar to E. Africa 1545-1845) SIO 333 at 1740 by Richard Radford; Radio RSA Johannesburg, S. Africa 7.295 (Port, Eng to E. Africa 1700-2100) 55555 at 1900 by P. R. Guruprasad; Voice of Israel, Jerusalem 7.460 (Eng, Port, Sp to USA 0000-0255) 45444 at 0018 by David Watten.

Some long distance signals were also logged in the 6MHz (4m) band: WHRI South Bend, Indiana 5.100 (Eng to Europe 0650-0800) 54434 at 0620 by Kenneth Reece; Burma 8S, Rangoon 5.985 (Bur, Eng to Burma 0930-1500) SIO 333 at 1530 by Alan Smith; VOA, via Tsinghai, Philippines 5.955 (Chin, Ca to C. Asia 1100- 1600) 31532 at 1530 by Richard Radford Reynolds; Radio Pyongyang, N. Korea 7.576 (Russ, Fr, Kor, Sp, Ge to Europe 1500-2100) 44444 at 1625 by Bill Griffith; Radio Australia via Carnarvon, W. Australia 6.035 (Eng to Europe, S. Asia 1530-2030) 33343 at 1800 by Christian Pritchard; Radio Global Rla, Brazil 6.030 (Port to SE, Brazil 0800-0200) logged at 0130 by Tim Shirley; Radio Japan via Sackville, Canada 5.960 (Eng, USA 0200-0400) 34543 at 0232 by Neil Dove.

Short Wave Magazine February 1989
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<td>Weymouth</td>
<td>Lancs</td>
<td>J*</td>
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<td>B, C, J</td>
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<td>S. W. Cornwall</td>
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<td>I J</td>
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DXers:  
A: Kenneth Buck, Edinburgh.  
B: Gerald Daynes, Bristol.  
Clive Grey, Wirral.  
Leisle Hollis, Grantham.  
Alan Jarvis, Cardiff.  
Cyril Kellam, Sheffield.  
John Nash, Brighton.  
John Parry, Northwich.  
Norman Pilgrim, Leicester.  
Philip Rembair, Macclesfield.  
Andrew Westmoreland, Wakefield.  
Neil Wheatley, Newcastle upon-Tyne.  

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