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WORLD BAND RECEIVER

BAIRD TELEVISOR
REVISITED



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- ★ SATELLITE TELEVISION ★
- ★ SSB UTILITY LISTENING ★
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editorial

SWM SERVICES

Subscriptions

Subscriptions are available at £19 per annum to UK addresses £21 in Europe and £22 overseas. Subscription copies are despatched by Accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £32 (UK) and £37 (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 boards for SWM projects are available from the SWMPCB Service.

Back Numbers and Binders

Limited stocks of most issues of SWM for the past five years are available at £1.65 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available price £4.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Poole (0202) 665524. An answering machine will accept your order out of office hours.

Last month I promised you a brighter and improved SWM - well, here it is! You will obviously have noticed the change to the cover design - the new and bolder logo running up the left hand side of the magazine will help to overcome the main problems with modern newsagents' magazine displays where only a small part, usually the left hand edge, of the front cover is guaranteed to be visible. Inside, Steve has completely redesigned the page layouts to give the whole magazine an airier feel by taking advantage of the latest computer technology which we employ to produce the magazine.

On the editorial side, Elaine and myself have been listening to what you have told us about your likes and dislikes at the many rallies which we have attended and I have also taken note of what you have said in your letters and through the surveys which we have conducted either in the magazine or at rallies.

Any magazine is a living thing and must keep up with the times and the whims and needs of its readers if it is to survive. Those that ignore the clamours of their readers do so at their peril. However, the Editor has a very difficult job to do if he is to please the greatest number of readers and attract new ones to the fold. He has to try to decide which of the letters received are really genuine or which are part of an orchestrated move to try to influence him to change the balance of the magazine in favour of a vociferous minority.

Over the past four years, SWM has evolved, a bit like Topsy, and new regular features have been slotted in wherever it has been convenient. Now you will find the regular columns all grouped together towards

the back of the magazine. This doesn't mean that they are considered unworthy of a place at the front - just that I consider it to be easier for you to find what you are looking for if you know where to look for your favourite items. So you will find your letters, news and new products, together with my leader, when I feel that it is necessary to write one and the new 'Junior Listener' page at the front of the issue, followed by feature articles in the middle. 'Junior Listener' is aimed at providing some much needed encouragement for the youngsters - the six to sixteen year olds, for want of a better categorisation. Contrary to some rumours that I have heard, it is not a replacement for 'Starting Out' and I have other plans for series for the beginner. Don't forget to make sure that anyone you know with young children, or who are involved with them, such as Brownies, Guides, Cubs, Scouts or at school are aware of the 'Junior Listener' page.

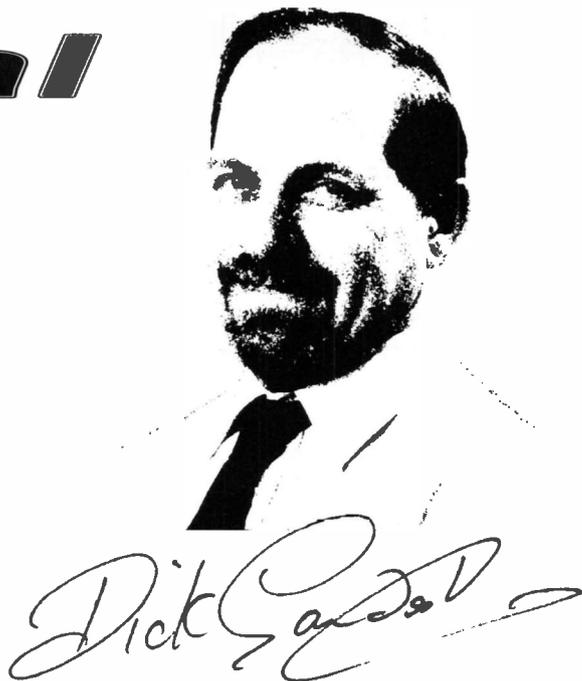
Advertisements, which are necessary if the price of the magazine is to be kept down to a reasonable level, will continue to be spread around the pages.

In the 'regular' section you will find your old favourites such as 'LM&S' by Brian Oddy, 'DXTV' by Ron Ham,

'Amateur Bands' by Paul Essery, 'Decode' by Mike Richards and 'Info in Orbit' by Lawrence Harris. These last two have been increased in size in response to the level of interest shown in them. Ron Ham's 'Band II Dx' column has been replaced by a new one called 'Propagation' which reflects Ron's major interest in radio. Two completely new columns are Roger Bunney's 'Satellite Television' and Peter Rouse's 'SSB Utility Listening'. 'Bandscan' will now appear at quarterly intervals, interleaving with Gerry Dexter's 'DX Letter from America' and a new column from Greg Baker in Australia. Godfrey Manning's 'Airband' and Alan Gardner's 'Scanning' columns now move into the regular section where they really belong.

All in all, I think that you should find the new look an even better read than previous issues.

This issue also marks the end of another era. KSC Printers started printing SWM way back in November 1950 and have printed every issue since then. This issue is their last and I would like to thank them for their dedication and helpfulness. When they started it was all hot metal, now it's all done on small desktop computers - such is the pace of technological change!



letters

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

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines. The views expressed in letters published in this magazine are not necessarily those of Short Wave Magazine.

Dear Sir

I read with interest your Leader Column in the December 1990 issue and look forward to the January issue. Whether it is essential to change the format in view of the fact that, as you point out, SWM is the second largest selling magazine, remains to be seen. However, time will tell.

Regarding the question of the 'Junior Listener', I am of the opinion that to aim a portion of the contents at six-year olds is a bit off beat. I am 62 years of age and have been an enthusiast for over 55 years, having been taught about radio by my father, who built his first radio in the mid -20s. My intake of early information was by example and not reading, it being doubtful if I would have understood what I read at that age. It was not until 1940 that I was given a copy of Newnes Short Wave Manual written by F.J. Camm and I read my first book on the subject. It may be of interest that I still have a copy of this book on my bookshelf.

I fully appreciate that children are more advanced these days due to the practical use of computers in schools, but it is doubtful if their reading ability is such that they would understand even a simple technique article. By the time they reach the age of 10 to 12, the ability to understand radio has advanced to such a stage that most children interested in radio can understand and appreciate radio articles dealing with broadcast schedules, antenna construction and computer additions and, therefore, do not require special articles. In making this statement I fully appreciate that there are exceptions to every rule.

While I agree that most enthusiasts, as in my case, start taking an interest at an early stage, SWM is for the adult reader. I have read SWM for many years and welcomed the change some years ago when it became dedicated to the listener and it is without doubt the best magazine on the market today.

In conclusion, I should add that I have recently retired from an architectural practice and have found my hobby to be one of the best ways of winding down.

**KENNETH W. REECE
PRENTON**

I hope that you find the new look to your liking, Mr. Reece. As you will see the magazine has not degenerated into something for the six-year olds. However, I firmly believe that to get the interest of children, then six is probably the right sort of age to start. If you want proof of that then you should see my wife's Brownie pack during the weekend of Thinking Day on the Air! Most of them have already passed the Radio Communicator badge and it is interesting that RTTY seems to be the preferred mode.

Ed.

Dear Sir

Congratulations to Ron Pearce for reminding us of the excellent results obtainable from a simple one-valve radio (September SWM). As Ron so rightly says, the quiet operation of these is a revelation to those accustomed to today's transistorised designs. The low level of noise should not be taken as a sign of lack of sensitivity, it is due to the absence of cross modulation, intermodulation, harmonics, spurious responses and local oscillator phase noise to which most semiconductor designs (with their totally inadequate input selectivity) are all too prone, and which seriously limits the maximum length antenna that is usable. With an O-V-O receiver, what you hear is what the antenna provides, with nothing added or taken away!

If these simple receivers do have a problem, it is lack of sensitivity especially at the highest short wave frequencies. As something of an old-timer myself, I will remember the efforts of myself and friends to reach the unattainable ideal reaction circuit which would give ever decreasing bandwidth, combined with stability and lack of backlash as it teetered on the brink of oscillation, and many weird and wonderful circuits resulted, often using pentodes since they gave you more grids to play with!

A basic requirement is for the highest possible Q for the tuned circuit to start with, and for those who like to experiment, the easiest way to get the correct coil connections is to wind the reaction coil in the same direction as the tuned winding, then the two inner ends are the earthy ends. The antenna coil can be wound in either direction, but it is usually best to earth the inner end. Jam jars make good high Q coil formers, wound with the thickest available wire. As only a few turns are required it is easy to adjust the variables for the best results.

Back to the days of true amateur radio!

J H C WELLS, EAST GRINSTEAD

Dear Sir

I am 78 years. I could not sleep so I got up and switched on my Russian Selena short wave set using an indoor antenna on my window sill. I tuned into the 16m band at 0524 - 0530 New Zealand to hear the Pasadena Orchestra playing 'I'll see you again'. Reception was poor, interference from a Russian station. Sorry I can not give you any more details. Reception report: SINPO 12211. Hope this might be of some interest.

F.J. ROUSE, LONDON

Dear Sir

Many thanks for the series by F.C. Judd on 'HF Radio Wave Propagation' as this explains a somewhat complex subject in an easy to understand way. Also of interest is 'Bandscan' with very good coverage on the Gulf Crisis and broadcasting to and from the area.

Next I would like to comment on the topic of pirates and clandestine stations. To me these are two different categories of broadcasting stations. Pirates are illegal and should not be reported, as Darren Taplin requests, other than if it's news, like last year's raid on Caroline.

Clandestine stations are not unauthorised stations as such, and are semi-legal. Because the authorities know they are broadcasting from an official transmitter site. For example, the Voice of Unity, widely heard on 15.685MHz around 1500UTC, the organisation behind the station is Muslim Mujahedeen of Afghanistan. The transmitter location is from the Abis transmitter site in Egypt, the same site as used by Radio Cairo. Therefore it cannot be classed as illegal, and can be reported.

**EDWIN SOUTHWELL
BASINGSTOKE**

Dear Sir

In reply to the letter in SWM from Mr Darren Taplin, I would like to express agreement with his view that reception details of Radio Caroline could be published. Surely, under the terms of the Marine Offences Broadcasting Act of 1967, the law would only be breached if, for example, SWM actively promoted Radio Caroline by publishing its programme schedule. You could quite legitimately report the existence of the station on a particular frequency as an item of news.

Having been on the air for over 26 years and apart from pioneering a much imitated format, Radio Caroline is largely responsible for revolutionising broadcast radio in this country which is now gradually giving more choice to the listener.

Despite all the alleged harassment by the DTI, the 'unauthorised broadcaster' has returned on 819kHz. I hope this will be a prelude to the station being fairly acknowledged and Radio Caroline will, at last, achieve the legal status it greatly deserves.

DAVID NICHOLLS, BRACKNELL

We have received several letters commenting on the subject of pirate stations and what SWM's attitude to them should be. We would be interested in hearing more on this subject before we finally make our decision on whether to report such stations or not.

grassroots

rallies

January 27: The CLARC & ULARS are holding their rally at Lancaster University. **Mike Sherlock G4ZYN. Tel: (0257) 452287.**

February 3: The South Essex Amateur Radio Society will be holding their 6th mobile rally at Paddocks, Long Road, Canvey Island. This will be an all-day event featuring trade stands, Bring & Buy, RSGB Bookstall, Boot Sale, home-made refreshments. Doors open at 10am. There will be extensive free car parking and easy access to Paddocks. **Dave Speechley G4 UVJ. Tel: (0268) 697978.**

***February 24:** The East Coast Amateur Radio and Computer Rally will be held at the Clacton Leisure Centre.

February 24: The Bideford Bay ARC are holding their 4th Taw and Torridge Rally at Bideford, Devon in the BAAC Halls starting at 10.30am. Talk-in will be on S22. **John Denford G0GFK. Tel: (0237) 476402.**

***March 9/10:** The London Amateur Radio Show will be held in the Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9 0AS.

***March 17:** The Norbreck Radio, Electronics & Computing Exhibition will be held at the Norbreck Castle Hotel Exhibition Centre, Queens Promenade, North Shore, Blackpool. Admission is £1, OAPs 50 and under 14s free. Free raffle ticket and exhibition plan. **Peter Denton G6CGF. Tel: 051-630 5790.**

March 17: The Wythall Radio Club will be holding their 6th annual radio rally at Wythall Park, Silver Street, Wythall, Worcs., which is on the A435 near Junction 3 on the M42 south-west of Birmingham. Doors open 11am. There will be three halls plus a marquee, trade stands, flea market, Bring & Buy, a bar and snacks will be available, talk-in on S22 and admission is 50p. **Chris Pettitt G0EYO. Tel: 021-430 7267.**

Acton, Brentford & Chiswick RC: 3rd Tuesdays, 7.30pm. Jan 15 - AGM. Paul Truitt G4WQO. Tel: 071-938 2561.

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. Jan 15 - AGM. Geoffrey Milne, 081-462 2689.

Bromsgrove ARS: 2nd & 4th Tuesdays, 8pm. Aston Fields Working Men's Club, Stoke Road, Astonfields, Bromsgrove. Jan 8 - Night on the Air, 22nd - Weather FAX by Barry Penver G6MRL. J. Yarnall G1JLQ. Tel: (0527) 503024.

Bromsgrove & District ARC: 2nd Fridays. Avoncroft Museum of Buildings & Arts Centre, Bromsgrove. Trevor Harper, Bromsgrove 33173.

Chelmsford ARS: 1st Tuesdays, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Jan 8 - The Annual Film/Video Show. Roy Martyr, Chelmsford 353221 ext 3815.

Cheshunt & DARC: Wednesdays, 8pm. Church Room, Church Lane, Wormley. Dec 26th - no meeting, Jan 2 - Natter Night, 9th - Flying Tonight by Ray G0MEO, 16th - Natter Night. Roger Frisby, Hoddesdon 464795.

Coventry ARS: Fridays, 8pm. Baden Powell House, 121 St Nicholas St, Radford, Coventry. Jan 4 - Computer Night, Bring Your Own if You Can, 11th - Night on the Air & Morse Tuition, 18th - Members Slide/Video Show, 25th - Annual Dinner. Neil, Coventry 523629.

Delyn RC: Alternate Tuesdays, 8pm. Daniel Owen Centre, Mold. Jan 15 - The Work of The British Legion by Rose Massey, 24th - Amateur Satellites. What Are They, What Do They Do and How To Work Them. Steve Studdart, Deeside 819618.

Derby & DARS: Wednesdays, 7.30pm. 119 Green Lane, Derby. Nov 28 - DXpedition to WL square by Paul G1WBZ, Dec 26 - No meeting, Jan 2 - Junk Sale, 9th - The Year in Retrospect, 23rd - CT2 - The Cordless Revolution by Mike Dorsett. Richard Buckley, Derby 852475.

Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross (Off Catherington Lane), Horndean. Jan 3 - High Tech Test Equipment by Hewlett Packard. S. W. Swain. Tel: (0705) 472846.

Kidderminster & DARS: Alternate Tuesdays, 8pm. The Queens Head, Wolverly, near Kidderminster.

Lothians RS: 2nd & 4th Wednesdays,

7.30pm. The Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. Jan 9 - Mini Talks by Geoff Walsh GM4FH & Peter Bates GM4BYF, 23rd - How to Survive Without Chips by Bill Jarvis. P.J. Dick GM4DTH, QTHR.

Mansfield ARS: 1st Thursdays, 8pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. Jan 3 - India - Overland from Delhi to Ladakh by Mick G8EHX. Mary GONZA. Tel: (0623) 755288.

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St John Ambulance HQ, 61 Emscote Road, Warwick. Jan 8 - HF Night at Warwick School hosted by Ted G0KAQ, 22nd - My Year as Young Amateur of 1990, how it went by Ted G0KAQ. Mike Newell, Kenilworth 513073.

Norfolk ARC: Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norfolk. Dec 26 - No Meeting, Jan 2 - The New Technology by Ray Gathergood G4LUA, 6th - 80 AFS, 9th - NICAM by Steve Sewell G4VCE, 16th - Baptism by Radio by Rev Brian Shersby G0ISL, 23rd - The UFO Phenomenon by Arthur Tomlinson. Mike Cooke, (0362) 850591.

Plymouth RC: Tuesdays, 7.30pm. The Fredrick Centre, Plymouth. Jan 8 - Construction Club Night, 15th - Natter Night, 19th - Christmas Dance, 22nd - A Station Set-up, 29th - Members Forum. G6ZHQ, (0364) 43433.

Preston ARS: Alternate Thursdays, 8.00pm. The Lonsdale Sports & Social Club, Fulwood Hall Lane, Fulwood, Preston. Eric Eastwood G1WCO, (0772) 686708.

Rhyl & District ARC: Jan 7 - Annual Junk Sale, 21st - Cartography, The Road to Russia by Jim GW4UWI: Edward Shipton. Tel: (0745) 336939.

Rugby ATS: Tuesdays, 7.30pm. The Cricket Pavilion, outside Rugby Maritime Radio Station. Jan 8 - Free Bring & Buy, 22nd - Test Gear Evening.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc, Bridge Farm House, East Dundry Rd, Whitchurch. Dec 26 - 144MHz Activity Evening, Jan 2 - Photographic Equipment Evening, 9th - Pottery Hands On by Peter G0DRX, 16th - Bristol Rally Planning Evening, 23rd - Soldering Iron Evening by John G4YQH. Len Baker, Whitchurch 832222.

Southdown ARS: 1st Mondays, 7.30pm. Chasely Home for Disabled Ex-Service-men, Southcliff, Bolsaver Road, East-

Club Secretaries:
Send all details of your club's up-and-coming events to;
'Grassroots',
Lorna Mower
Short Wave Magazine,
Enefco House,
The Quay, Poole,
Dorset BH15 1PP

bourne. Wednesdays & Fridays, 7.30pm. The Clubrooms, Hailsham Leisure Centre, Vicarage Road, Hailsham, East Sussex.

South East Kent (YMCA) ARC: Wednesdays, 8pm. The YMCA, Leyburne Road, Dover. Jan 2 - No Meeting, 9th - The Novice Training Course Discussion, 16th - Natter Night, 23rd - 50MHz A Valuable Resource by Ken Willis G8VR.

Stourbridge & DARS: 1st & 3rd Mondays. Robin Wood's Community Centre, Scotts Road, Stourbridge. Jan 7 - On Air & Natter Night, 21st - Sounds of Yesteryear by J.P. Stroud. Dennis Body G0HTJ, QTHR.

Sutton & Cheam RS: 3rd Thursdays, 7.30. Downs Lawn Tennis Club, Holland Ave, Cheam. 1st Mondays in the Downs Bar. Jan 7 - Natter Night at Downs Bar, 13th - 3.5MHz AFS Team Contest, 17th - Linears by John Stockley G8MNY. John Puttock G0BWW, QTHR.

Todmorden & District ARS: 1st & 3rd Mondays, 8pm. The Queen Hotel, Todmorden. Jan 7 - Antenna Design, 21st - Antenna Construction. Mrs E Tyler. Tel: (0422) 882038.

Trowbridge 7 District ARC: 8pm. TA Club, Trowbridge. Jan 2 - Social, 16th - AGM. G0GRI. (0380) 830383.

West Kent ARS: 3rd Fridays, 8pm. The School Annex, Albion Road, Tunbridge Wells, Kent. Dec 3 - Christmas Social at Seven Oaks Radio Club.

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road, SW19. Jan 11 - New Year Resolutions, 25th - R(F) Burns Night (Working GM). Chris Frost, 081-397 0427.

Wirral ARS: Wednesdays, 7.45pm. Ivy Farm, Arrowe Park Road, Birkenhead, Wirral.

Yeovil ARC: Thursdays, 7.30pm & Fridays, 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Dec 27 - Natter Night and Committee Meeting, Jan 10 - RTTY by G0LNI, 17th - Simple PSUs by G0HDJ, 24th - Discussion Night. David Bailey G0NMM, QTHR.

junior listener

Competition Time

This month, I have a couple of Crystal Sets, supplied by Link Electronics, to give away as prizes. As this is the first time and I'm feeling rather generous, I'll make the competition really easy! All you have to do is write to me with details of your interests and any radio equipment you use along with your name, age and address. All your letters will go into a box and the first one in each age range (up to 12 and 12-16 years old) picked out will win the prizes. You can't get much easier than that now, can you? If you don't win, but would like to add a crystal set kit to your birthday present list, they're available from your local Tandy shop.

Young Electronic Designer

How would you like to win some cash prizes for your bright ideas? Then you should try your hand at the Young Electronic Designer Awards. This annual competition gives young designers a chance to show their work and, in some cases, see it go into production. The awards are jointly sponsored by Texas Instruments and Mercury Communications.

The competition is open to students at secondary schools, polytechnics and universities in the UK. To ensure fair competition, there are three age categories: Junior (under 15), Intermediate (15-17) and Senior (18-25).

In addition to being able to win a cash prize and trophy, the winners will have a presentation dinner in London. All the winning entries will also be displayed in the Science Museum in London. What sort of project do you need to design? Quite simply it should be an original electronic device, effective and useful in everyday life. Mercury Communications are also introducing the Mercury Planet Award for ideas that help the environment.

If you'd like to enter, the first step is to see your teacher. He or she should have details of how to enter. If you enter, I'd like to hear how you get on and I'll tell you about the developments in the competition as the months go by.



Jon Jones
PO Box 59
Fishponds
Bristol BS16 4LH

Hi and welcome to this brand new page. As it's so new, I'll start by telling you how it started and what I'm hoping to cover. The Editor has been aware for a while that something extra is needed for the six to sixteen year olds. The final prompt came from a letter written by Mark Farr of Crewe, printed in the November issue, which contained several good ideas for the basis of a regular column - so here it is!

Pen Pals

Another interesting subject is pen pals. The magazine has already received many letters asking for this, so I'll include it too. To find a pen-pal, all you have to do is write to me and I'll publish as many as I can in the column. So that you stand the best chance of getting the right pen pal, it's important to make sure you include plenty of detail. The important points are: name, address, age and interests. It would also be a good idea to say how long you've been interested in radio and list some of the things you've done.

Let's explain how the system will work. The first step is for you to write to me with the details I've just described. You also need to include a large stamped addressed envelope for the replies. I'll publish the main points in the column, except for your address and ask all those who would like to be pen pals to write to me. Then I'll gather all the replies together and send them on to you in your envelope - that's why it needs to be a large one. All you have to do is decide which ones are most suitable for you - and write to them.

Help Desk...

One of the problems facing those starting out in any hobby is where to get help and advice from. This is a service that I'll attempt to provide through this page. So, if you feel you could do with a hand, why not send me the details and I'll do my best to help out. There are no limits to the range of questions you can ask, just as long as they're in some way related to radio or electronics!

First of all, I'd like to give **you** a chance to have **your** say about what **you'd** like to see in the magazine and in particular this page. For this I need your letters but, rather than just sending your views, include details of your station. If you can manage a photo I'll do my best to print it. The address to write to is at the top of this column.

Antenna Matters

When I first started in radio I used to have all sorts of fun experimenting with antennas. The great thing about building antennas is that they are usually very cheap, so that even I could manage it on my pocket money. So, this month, let's try building our own long wire antenna for listening on the short wave bands. The long wire antenna makes an ideal general purpose antenna for the listener as it is both simple and versatile.

Before I start, I can hear you asking - how long is a long wire? Well, a true long wire antenna is a single wire with a length greater than the longest radio wavelength you want to listen to. Sounds a bit complicated, but there is a simple way to work out the length of wire you need. The length in metres is equal to 300 divided by the frequency in MHz. Put into a simple formula this is: $L = 300/f$ where L is in metres and f is in MHz.

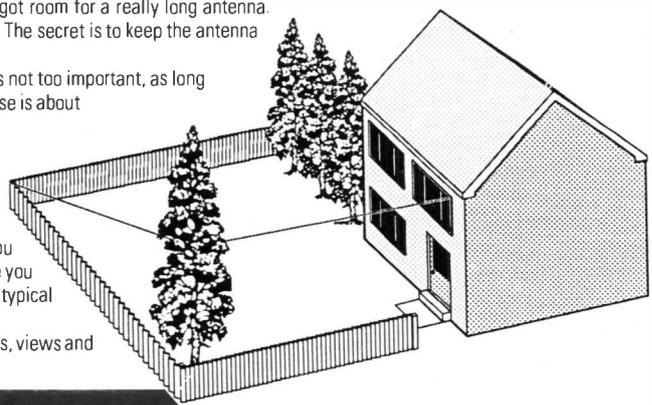
If you want to cover from medium wave right through the short wave bands, the antenna needs to be longer than 600m. However, if you only want to cover the short wave bands, you can shorten it to 190m.

The next problem, of course, is what do you do if, like me, you haven't got room for a really long antenna. Fortunately, the long wire antenna can be shortened a lot and still work well. The secret is to keep the antenna as long as possible.

The next question is what type of wire should you use? The type of wire is not too important, as long as it's strong enough to hold up its own weight. The smallest size you should use is about 0.3mm diameter. In fact, there's a special advantage in using thin wire - it becomes almost invisible! This is great when you've got problems with parents and neighbours who don't want to see wires strung across the garden!

When putting up your antenna, the ideal is to have it as high and straight as possible. In real life there are very few listeners who can do this, so all you do is put it up as high and as straight as you can. But, if a bend or two will give you some extra length, it's still well worth doing. To help you out, I've drawn a typical layout for you.

That's about it for this month. Don't forget to write to me with all your news, views and station details.



Eddystone User Group

The Eddystone User Group publish a newsletter six times a year for Eddystone enthusiasts. They can provide technical information and circuits for the equipment as they have access to Eddystone files. They also run free members ads in the newsletter. This is for an annual subscription of £7.50.

Eddystone Users Group, 112 Edgeside Lane, Waterfoot, Rossendale, Lancs BB4 9TR.

RNARS Award

The London (HMS Belfast) Group are sponsoring the London (HMS Belfast) Group Award to promote activity between group members and other amateur radio operators and short wave listeners. The start date is on and after 1 September 1973.

The award is gained by scoring points on the following basis:

a: For contacts with special stations, GB2RN, G4HMS, G7HMS - 10 points on each band worked.

b: For h.f. contacts with members of the group - 2 points each.

c: v.h.f. contacts with members of the group - 4 points each

Four contacts have to be with London group members this is inclusive of contacts with HMS Belfast, the remainder may be made up of contacts with RNARS members - 2 points each.

United Kingdom and European stations require a minimum of 30 points, stations outside the Continent of Europe require a minimum of 20 points.

For a further remittance of £1.00, stickers can be gained for every extra 30 points for European and UK stations and 20 points for stations outside the Continent of Europe. Again, four contacts have to be with London group members this is inclusive of contacts with HMS Belfast, the remainder may be made up of contacts with RNARS members - 2 points each.

The award will cost £1.50 or equivalent to all claimants. Surplus monies raised will go towards the upkeep of the amateur radio station aboard HMS Belfast. All claims in log form, date - time- mode-stations claimed, to be sent to **Owen Selby, 82 Gaynesford, Basildon, Essex SS16 5SG.**

The award will be issued free to blind and disabled claimants.

Radio & TV News

The Radio Scotland (Main) service will shortly be radiated on an additional f.m. frequency from the BBC's two radio transmitters at Port Ellen and Bowmore, on the Isle of Islay. This service is already broadcast on the medium wave band (810kHz), but reception on Islay is very weak and suffers from severe interference and fading. At the same time, the existing Radio Scotland service on 93.4MHz (Port Ellen) and 92.5MHz (Bowmore) will alter to include all the output of Radio nan Gaidheal and the English-language output of Radio Highland.

	Port Ellen	Bowmore
Radio 2	89.0	88.1MHz
Radio 3	91.2	90.3MHz
Radio Scotland + Radio Nan Gaidheal + Radio Highland	93.4	92.5MHz
Radio Scotland (Main)	104.9	103.6MHz

The BBC is building two new f.m. transmitting stations in Gwent - at the existing TV relay stations, Pennar and Abertillery.

	Abertillery	Pennar
Radio Cymru	104.3	103.7MHz
Radio 1	98.6	99.1MHz
Radio 2	89.0	89.5MHz
Radio 3	91.2	91.7MHz
Radio 4	93.4	93.9MHz

Test transmissions of Radio 1 FM from Whitehawk Hill, Brighton should begin in time for Christmas. Using a frequency of 99.7MHz, the new service from Whitehawk Hill will extend reception of Radio 1 in f.m. stereo to around 170 000 people in the Brighton and Worthing areas. The test transmissions will continue for two or three weeks before the Radio 1 FM service officially opens. During this period of tests, the transmissions may be subject to interruptions while essential engineering work is carried out.

BBC Radio Solent began broadcasting in stereo on Monday November 12, from new studio premises in Southampton. The stereo programmes are broadcast on f.m. only from the Rowridge transmitting station on the Isle of Wight. The m.w. transmitters at Fareham and Bournemouth will continue to radio BBC Radio Solent's programmes in mono. Operating on a frequency of 96.1MHz, Rowridge transmits BBC Radio Solent's stereo programmes to around 1 650 000 people in Hampshire, the Isle of Wight, east Dorset, western parts of West Sussex and parts of Wiltshire.

The BBC is building a new relay station for Radio Suffolk, to improve f.m. reception for around 52 000 people in the Lowestoft area. The new relay, sited in north Lowestoft, just off Hollingsworth Road, should be ready for service about now and will transmit on 95.5MHz.

NICAM digital stereo comes to Central Television and Channel 4 in parts of Warwickshire, Staffordshire and the West Midlands from the end of November 1990.

A new relay station called Finchley will shortly bring good TV and Teletext reception to about 1820 people in Finchley, London N3. It is being built jointly by the BBC and the IBA, on the roof of Norman Court, near Finchley railway station, and is expected to open in the next few weeks.

Channel 49	ITV (Thames/LWT)
Channel 52	BBC 1 (South East)
Channel 56	BBC2 (South East)
Channel 67	Channel 4

The BBC are building new transmitting stations in the following areas. They will shortly bring good f.m. radio reception to people in the areas.

Westwood	
Radio 1	97.9MHz
Radio 2	88.3MHz
Radio 3	90.5MHz
Radio 4	92.7MHz
Weymouth	
Radio 1	99.6MHz
Radio 2	90.0MHz
Radio 3	92.2MHz
Radio 4	94.4MHz
Grantham, Lincs.	
Radio 1	97.7MHz
Radio 2	88.1MHz
Radio 3	90.3MHz
Radio 4	92.5MHz
Eyemouth, Berwickshire	
Radio 1	99.3MHz
Radio 2	89.7MHz
Radio 3	91.9MHz
Radio 4	94.1MHz
Radio Scotland	104.6MHz

Mods for the AR1000

Harvey Lexton of Dressler has told us they are now supplying the AOR AR1000 modified to cover 500kHz to 1.3GHz, with no gaps. The cost for the modified radio is £269. They can also modify the Fairmate HP100E or the new HP200E or your own AR1000 to give the same coverage for £49 including VAT and P&P. If you're interested, contact: **Dressler Communications Ltd., 191 Francis Road, Leyton E10 6NQ. Tel: 081-558 0854.**



The Rapid Results College
 Tuition House, 27/37 St. George's Road, London SW19 4DS
 Telephone: (081) 947 2211 (Pre-enrolment enquiries 081-947 7272)
 Fax: (081) 946 7564 Telex: 295742 Study G

Mail Order Study

Would-be radio amateurs searching for a way to gain their Radio Amateur Licence, can always try a postal course. The RRC City and Guilds programme covers both Parts 1 and 2 of the course and prepares students for the examinations that are held in May and December of each year.

The RRC programme covers the following subjects: Licensing Conditions, Transmitter Interference, Operating Practices and Procedures, Electrical Theory, Solid State Devices, Radio Receiver, Transmitters, Propagation and Antennas and Measurements.

For further details, contact: **RRC, Tuition House, 27/37 St George's Road, London SW19 4DS. Tel: 081-947 2211.**

Modified ICF2001D

Johnsons Shortwave Radio tells us that all Sony ICF2001D receivers purchased from them after September this year were updated so as to overcome the front-end overload problems, according to the Sony modification sheet.

Johnsons have also offered to modify free of charge any ICF2001D purchased from them and still under guarantee. Out of guarantee sets, or sets purchased elsewhere, can be updated by Johnsons by arrangement - call for details.

Johnsons Shortwave Radio, 43 Friar Street, Worcester WR1 2NA. Tel: (0905) 25740.

Software for the Astronomers

Ron Ham wants to encourage the astronomers amongst our readers to write to him with their observations as he feels that this could be of relevance to his new 'Propagation' column.

Ron tells us that newcomers to astronomy, students or 'armchair' astronomers, like him, who want to study the night sky from the comfort of their home can obtain a good educational piece of software called Startrack+, for the Amstrad PCW8256, 8512 and 9512 computers. Amongst the many Startrack+ features is the ability to find and identify the 88 constellations and numerous stars, locate the moon and the planets. Furthermore, you can place yourself anywhere on the earth's surface and learn about the stars you may never see by setting the time to any hour, day, month, or year between 1000 and 2999AD. In Ron's view this is a very important feature of the Startrack+ software, which costs £19.95, from **Discovery Software, 291 Cricklewood Lane, Childs Hill, London NW22 2JL.**

European Harmonisation

In a highly successful second meeting in Athens, from 15-19 October, the European Radiocommunications Committee (ERC) reached agreement on several significant issues in European radio frequency management.

Czechoslovakia and Hungary, two of the five new members of the Conference of European Posts and Telecommunications (CEPT), sat on the ERC for the first time.

The Memorandum of Understanding on the creation of the European Radio Communications Office (ERO) was signed by Austria, the 17th administration to sign. The MOU came into effect on November 16 and guarantees funding from administrations for the ERO.

The ERO is being established to provide greater resources and to meet the demand for wider consultation on radio frequency management activities.

The ERC is being established to provide greater resources and to meet the demand for wider consultation of radio frequency management activities.

The ERC agreed the basic terms and conditions of employment for the six experts and two secretaries who will run the ERO initially. Details of the vacancy notice for the expert posts were agreed for circulation to all CEPT administrations and, through them, to industry. Applications are being invited with a deadline of 31 December 1990.

Short Wave Magazine, January 1991

news

The New HF-235 Receiver



Derbyshire based Lowe Electronics has announced the recent introduction of the latest in their range of h.f. receivers, the HF-235.

The HF-235 is the company's first product dedicated to the demands of professional point-to-point monitoring. The most notable features are its compact size with a '2U' (88mm) x 19in panel, a high level of r.f. performance, optional remote control through a RS-232 interface, ease of assembly for multi-receiver installations and bespoke software to drive specialised monitoring requirements.

This new receiver offers three choices for frequency tuning. Conventional spin-wheel tuning, front panel key pad and remote control. It is equipped for a.m., c.w., u.s.b. and l.s.b., with f.m. and synchronous a.m. also available using an optional detector unit. A full range of bandwidth filters is fitted as standard and specials can be provided for unique applications.

Lowe Electronics Ltd., Chesterfield Road, Matlock, Derbys DE4 5LE. Tel: (0629) 580800.

Two New Scanners

The Fairmate HP200 is a new and improved version of the popular HP100E. This set has extra wideband coverage, 500kHz-600MHz and 805-1300MHz. In conjunction with Fairmate, the importers Nevada have made several improvements to the receiver's sensitivity and stability. In addition, they are now supplying a UK spec charger and short wave telescopic antenna. The set will be available for £269.

The Nevada MS1000 scanning receiver is also new to the market. This is the first in a line of Nevada branded scanning receivers, designed specifically for the UK market. The set has the same specification as the new Fairmate HP200 hand-held scanner, but with the following additional features:



- Switchable audio squelch
 - Tape recorder output socket
 - Automatic signal operated tape recorder switching circuit
 - All metal case for improved EMC compatibility.
- The unit will cost £279.

For more details, contact:
Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (0705) 662145.

Short Wave Car Radio

Philips car stereo introduces the combination of a ten-band short wave world receiver, f.m., m.w. l.w. radio and auto reverse cassette with the launch of the DC777.

The DC777 is ideal for the car, boat or caravan, for the motorist travelling abroad wanting to keep up-to-date with the news from home or for drivers who like to listen to their favourite programmes from around the world.

The design features a drop-down panel with keys to store 20 favourite stations from the ten short wave bands. Direct access is also available on the short wave bands to allow fast and accurate tuning to specific broadcasts while a clock/timer allows the automatic broadcast of any programme at a preset time.

A further five presets are available on each of the f.m., m.w. and l.w. bands with autostore for the automatic storage of the five strongest stations on f.m. and m.w.

The DC777 has a 50W power output and is one of the first units to feature the Philips new SCA auto-reverse cassette deck. Security is a Philips strong point these days, with the DC777 featuring security coding. It also has a retractable option for a safe storage away from the car. The cost of the unit is £299.

Radio & Electronics Register

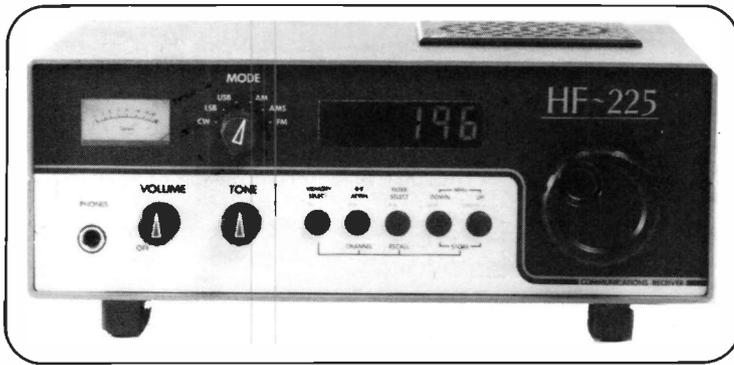
G4NKH is providing a method of buying, selling, exchanging and locating radio and electronic equipment. Daily updates are available, on request, at no charge. There's no waiting two or three months for adverts to appear.

Sellers pay a subscription rate of £8, to advertise as many times as they wish, all year long. Prospective purchasers have to send a 9 x 4in s.a.e. to G4NKH for the list. The purchaser can specify the equipment they are looking for or just the type of equipment they want to buy.

If you think you would be interested, then contact:

G4NKH Buyers & Sellers, 42 Arnott Road, Blackpool, Lancs FY4 4ED. Tel: (0253) 62925.

When you are ready to graduate to real listening Look to Lowe



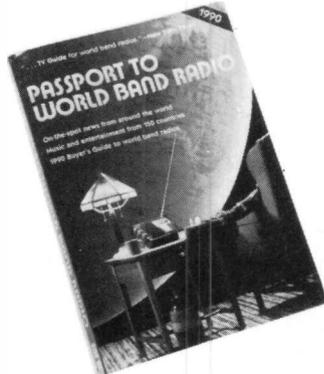
- | | | Price | Carr |
|---|---|----------------|---------------|
| HF-225 | HF general coverage receiver, 30kHz to 30MHz..... | £425.00 | £10.00 |
| (The HF-225 has been voted "Receiver of the Year" by World Radio and TV Handbook, against all other manufacturers' products") | | | |
| Options | | | |
| D-225 | Synchronous AM and FM detector..... | £39.50 | £1.00 |
| K-225 | Keypad for direct frequency entry | £39.50 | £1.00 |
| B-225 | Internal NiCd battery pack..... | £49.00 | £2.50 |
| W-225 | Active whip aerial..... | £19.50 | £2.50 |
| C-225 | Delux carrying case for HF-225.. | £23.86 | £3.00 |
| S-225 | Wharfedale speaker and lead..... | £49.50 | £3.00 |



- | | | | |
|----------------|--|----------------|---------------|
| R-5000 | Kenwood HF communications receiver. 100kHz to 30MHz..... | £875.00 | £10.00 |
| Options | | | |
| DCK-2 | 12volt dc power kit..... | £9.29 | £1.00 |
| VC-20 | VHF converter for 108 to 174MHz..... | £167.21 | £3.00 |
| VS-1 | Speech synthesiser for R-5000... | £32.26 | £1.00 |
| YK88A-1 | 6kHz AM crystal filter..... | £48.05 | £1.00 |
| YK88C | 500Hz CW filter..... | £46.08 | £1.00 |
| YK88CN | 270Hz CW filter..... | £54.64 | £1.00 |
| YK88SN | 1.8kHz SSB filter..... | £46.74 | £1.00 |
| SP-430 | External speaker unit..... | £40.81 | £2.50 |



- | | | | |
|----------------|--|----------------|---------------|
| NRD-525 | JRC communications receiver. 90kHz to 34MHz..... | £975.00 | £10.00 |
| Options | | | |
| CMK165 | VHF/UHF converter. 34-60, 114-174, 423-456MHz..... | £391.35 | £10.00 |
| CMH530 | RTTY demodulator..... | £102.19 | £1.50 |
| CMH532 | RS232 interface unit..... | £91.75 | £1.50 |
| CFL231 | 300Hz CW filter..... | £126.37 | £1.00 |
| CFL232 | 500Hz CW filter..... | £126.37 | £1.00 |
| CFL233 | 1kHz RTTY filter..... | £126.37 | £1.00 |
| CFL218A | 1.8kHz SSB filter..... | £117.89 | £1.00 |
| NVA88 | Matching external loudspeaker... | £62.86 | £2.50 |



THE LISTENERS' BOOK OF THE YEAR £12.95

Never has a title been so well chosen as the "Passport to World Band Radio". This is the one book which seems to contain everything you need to know about listening to the amazingly diverse world of radio broadcasting. Let's just run through what this book contains:—

Obviously it has a complete listing of all short wave broadcasters, not simply in order of frequency, but also listing by language and country of origin, AND also the timing of the broadcasts. Almost two hundred pages of such information would make the book worthwhile on its own, but you also have detailed reviews and comment from an acknowledged and respected authority on such matters covering no less than forty radio receivers ranging from the sublime to the gor-blimey. To add to all this, you also get over a hundred pages of general news, views, and information.

The "Passport" is an absolutely indispensable companion to the short wave listener and the price is so reasonable for so much information. Get one soon before they are out of print.

The price for this constant companion. Slightly less than that for a pedigree dog. It's £12.95 for callers, or we can send it to you for an extra £1.55 for postage and packing.

FREE

Send four first class stamps to cover the postage and we will send you, by return of post, you FREE copy of "THE LISTENERS 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

26 YEARS IN SHORTWAVE

When it comes to scanners

Look to Lowe

The new WIN-108

The finest handheld airband receiver in the world



The new WIN-108 is the latest version of this world beating air band radio, which has been acknowledged all over the world as the best hand held VHF radio available.

Now covering 108 to 143MHz, and with all UK and European channels covered in the now standard 25kHz spacing giving 1400 channels for your use, the WIN-108 will give you total listening satisfaction, at home or out on the airfield.

Everything you need is provided by the WIN-108; 20 memory channels, memory scanning, frequency searching between your chosen limits, a priority channel which you can programme to any frequency in the airband, direct frequency entry from a simple keypad, up/down tuning, and so on and so on.

Best of all, the WIN-108 comes from a respected manufacturer and is backed by the best service in the business from Lowe Electronics.

Airband radios are getting quite complex, and many people are confused by the increasing numbers of apparently similar radios on the market. To help you choose, here is a check list of absolutely essential features you must have in an airband radio. If the radio you are going to buy has any of these features missing, DON'T BUY IT, because you will be disappointed.

THE QUESTIONS

1) Does it have frequency coverage from at least 108MHz to 137MHz?

For all new channels? (The WIN-108 covers from 108 to 143MHz.)

2) Does it have channel spacing of 25kHz?

This is crucial, because all important frequencies are now using 25kHz channels. The old standard of 50kHz is totally useless. (The WIN-108 has 25kHz channels.)

3) Can you use ordinary pencils if you want to?

Having re-chargeable batteries is all very well, but it doesn't help you at an air show when they run flat. You can always get a set of Duracells from somewhere. (The WIN-108 uses easy to obtain batteries.)

4) Can you search for new signals between user-programmed limits?

If you have to search the entire Nav and Coms band all the time, it wastes valuable searching time when signals can be lost. (The WIN-108 has programmable search limits.)

So — four simple questions which you MUST ASK. For full details on the WIN-108 and all the other radios from our exciting range, simply ask for our airband information pack, which includes a free copy of our ever popular "Airband Guide".

Happy listening. (It will be with a WIN-108.)

WIN-108 £175 inc. vat.

Available from good dealers everywhere.

For the past 26 years Lowe Electronics have specialised in seeking out the best in radio and bringing it to our customers. Those customers will also tell you that we have another speciality — looking after them. Whatever is best in radio, we sell. Whatever we sell, we back with really expert advice and service. We are pleased to represent the best companies in the receiver world, and in addition to **WIN**, we also distribute the **AOR** range and receivers from **Signal Communications**. For full information and a copy of our Airband Guide, simply send us four first class stamps and mention that you saw our ad. in Short Wave Magazine". Happy listening.

Shops in **GLASGOW** Telephone 041-945 2626. **DARLINGTON** Telephone 0325 486121. **CAMBRIDGE** Telephone 0223 311230. **BARRY** Telephone 0446 721304. **LONDON (Heathrow)** Telephone 0753 45255. **LONDON (Middx)** Telephone 081-429 3256. **BOURNEMOUTH** Telephone 0202 577760. All branches are closed all day Monday.

Educational Software for Basic Electronics Part 1

The computer programs in this series by J.T. Beaumont G3NGD, can be used as Student Centred Learning material and also to supplement textbooks and notes for students studying for the CGLI Electronics Servicing Course 224 as well as the Radio Amateurs' Course 765.

One disadvantage of self-study is the limitation on the number of calculation questions given in a text book. Occasionally some answers are wrong and this only adds to the frustration. Many of the programs listed in this series have a calculation option. This makes it possible for the student to make questions up at random, and know that the correct answer can be obtained from the computer.

In the early years of study, students experience difficulty when using the oscilloscope. With this in mind, a major program is included later that presents at random, various waveforms on a c.r.o. screen and the student has to calculate voltage, periodic time and frequency.

All the programs are 'user friendly' and make full use of colour and graphics. This helps to maintain interest. The program 'Logic Gates', for example, will allow the student to open and close the gates directly from the keyboard, the answers given in a truth table.

Although the programs are written for the BBC

```

10 REM *****
20 REM *          PROGRAM ONE          *
30 REM *   Additive Mixing of Colour   *
40 REM *          J.T. Beaumont        *
50 REM *****
60 *FX11,0
70 *FX200,1
80 *KEY10 OLD:MRUN:M
90 MODE2
100 VDU23;820;0;0;0;
110 PROC_Start
120 PROC_Add_mix
130 W=3;Q=5
140 PROC_Comp
150 W=6;Q=3
160 PROC_Comp
170 W=5;Q=6
180 PROC_Comp
190 MODE1
200 PROC_Text
210 PROC_Border
220 *FX15,0
230 AS=GET$
240 IF AS="F" OR AS="f"
CLS:PROC_Finish:PROC_Border:END
250 IF AS=" " RUN ELSE GOTO 230
260 END
270 DEF PROC_Add_mix
280 PROC_Border
290 COLOUR 129
300 VDU23;820;0;0;0;
310 PRINT TAB(2,0);"ADDITIVE MIXING"
320 radius=200;angle=0
330 S=450;T=510
340 logical=1
350 PROC_rgb
360 radius=200;angle=0
370 S=750;T=510
380 logical=2
390 PROC_rgb
400 radius=200;angle=0
410 S=600;T=750
420 logical=4
430 PROC_rgb
440 COLOUR 132
450 COLOUR 138
460 PRINT TAB(3,29);"Press any key"
470 *FX15,0
480 AS=GET$
490 ENDPROC
500 DEF PROC_Comp
510 COLOUR 128
520 CLS
530 PROC_Border
540 radius=200;angle=0
550 S=450;T=510
560 logical=W
570 PROC_rgb
580 radius=200;angle=0
590 S=750;T=510
600 logical=Q
610 PROC_rgb
620 COLOUR 132
630 PRINT TAB(1,25);"Two Complementary"
640 PRINT TAB(1,27);"colours give WHITE"
650 COLOUR 138
660 *FX15,0
670 PRINT TAB(1,29);" Press any key "
680 AS=GET$
690 ENDPROC
700 DEF PROC_rgb
710 MOVE radius+S,T
720 GCOL 1_logical
730 REPEAT
740 MOVE S,T
750 PLOT 85;radius*COS(angle)+S,
radius*SIN(angle)+T
760 angle=angle+0.1
770 UNTIL angle>2*PI+0.1
780 ENDPROC
790 DEF PROC_Text
800 VDU19,0,4,0,0,0
810 PRINT TAB(11,2);"ADDITIVE MIXING"
820 PRINT " "
830 PRINT"The PRIMARY colours are RED GREEN
BLUE"
840 PRINT TAB(4,6);" "
850 PRINT TAB(6,8);"Red Green & Blue = White"
860 COLOUR 2
870 PRINT TAB(8,13);"Complementary Colours"
880 PRINT TAB(8,14);" "
890 PRINT TAB(8,16);"Red & Green = YELLOW"
900 PRINT TAB(8,18);"Red & Blue = MAGENTA"
910 PRINT TAB(8,20);"Green & Blue = CYAN"
920 PRINT TAB(2,24);"ANY TWO
COMPLEMENTARY COLOURS = WHITE"
930 PRINT TAB(2,25);" "
940 COLOUR3
950 VDU23;820;0;0;0;
960 *FX15,0
970 PRINT TAB(5,28);"Press the space-bar to
repeat"
980 PRINT TAB(6,30);"Press the ""F"" key to finish"
990 ENDPROC
1000 DEF PROC_Start
1010 COLOUR2
1020 PRINT TAB(3,6);"ADDITIVE MIXING"
1030 PRINT TAB(6,8);"OF COLOUR"
1040 COLOUR3
1050 PRINT TAB(4,15);"J.T.Beaumont"
1060 PRINT TAB(6,17);"(c) PW Publishing Ltd 1990"
1070 COLOUR14
1080 *FX15,0
1090 PRINT TAB(1,24);"Press the Space-bar"
1100 PROC_Border
1110 AS=GET$
1120 IF AS=" " GOTO 1110
1130 CLS:COLOUR7
1140 ENDPROC
1150 DEF PROC_Border
1160 MOVE0,0:DRAW1279,0:DRAW1279,1023:
DRAW0,1023:DRAW0,0
1170 ENDPROC
1180 DEF PROC_Finish
1190 CLS:PRINT TAB(17,5);"Bye"
1200 PRINT TAB(6,15);"Boot the disk for Disk Menu"
1210 PRINT TAB(10,18);"or TYPE CHAIN ""MENU""
1220 PRINT TAB(8,20);"and press the RETURN key."
1230 *FX200,2
1240 ENDPROC
    
```

Program 1.

microcomputer they are all written in BASIC. This means that it is possible to convert them to work on other computers.

I am grateful to the students at North Trafford College for their criticism and ideas that have made this series possible.

Additive Mixing of Colour - Program 1

This short program can be used as a visual aid to demonstrate the effect of mixing the three primary colours. This principle is used in colour television, where three electron beams (red, green and blue) are converged to energise colour phosphors on the inside of the cathode ray tube.

When the program is RUN, the three primary colours (red, green and blue) are each drawn on the screen (Fig. 1); the complementary colours appearing in the mixing process. This is followed by a mixing of complementary colours to show that:

- Yellow + Magenta = White
- Cyan + Yellow = White
- Magenta + Cyan = White

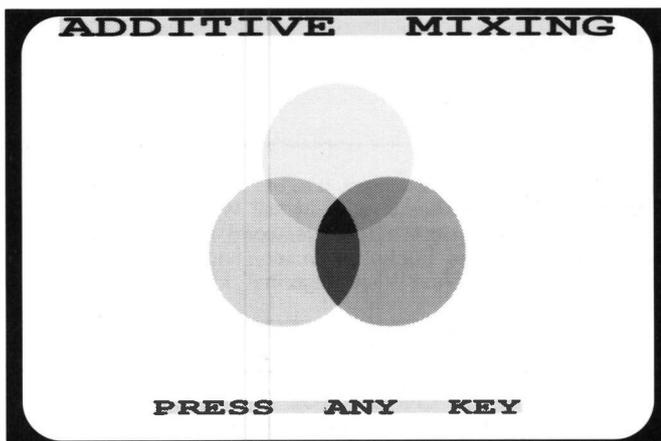


Fig. 1: Program 1 screen.

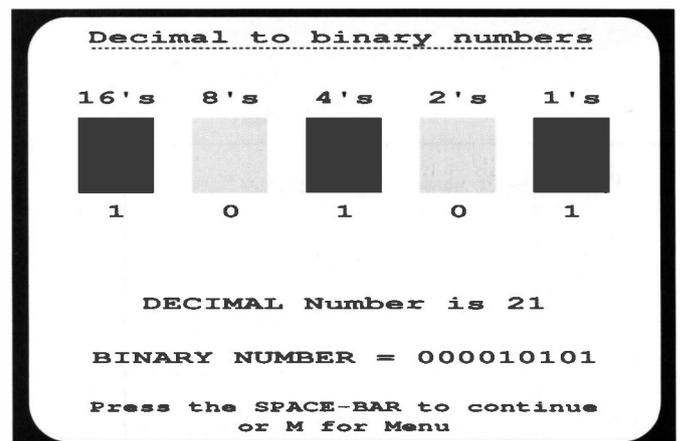


Fig. 2: Program 2 screen.

Finally, a summary of the demonstration is given on the screen. At this point, students can copy the information into their books.

Out of interest, the mixing process is achieved on the computer by the instruction GCOL1,1 at line 720. This informs the computer to perform a logic 'OR' with another colour.

Red = decimal 1 = binary
0001

Green = decimal 2 = binary
0010

Yellow = decimal 3 = binary
0011

as can be seen: Red +
Green = Yellow

The use of logic in this way may be of interest later on, when using the 'Logic-gate Tutor'.

Decimal to Binary Conversion - Program 2

This program can be used as a visual aid when teaching students to count in binary arithmetic. The CGLI Course 224 syllabus requires the student to understand the concept of the binary system of numbers, and to be able to convert from decimal to binary and from binary to decimal. Teachers usually demonstrate this concept by counting on their fingers, but this program goes a great deal further.

When the program is RUN, a Menu is presented on the screen. The Menu allows two options to be selected:

1: Decimal to Binary

When a denary (decimal) number is entered, (followed by pressing the RETURN key) five coloured rectangles appear on the screen to represent the binary digits. This is followed by the binary number itself. If however, a large number is entered, the binary number is printed on the screen, with a message stating that the rectangle display has an overflow.

2: Binary to Decimal

This option allows students to check their answers when converting from binary to decimal.

It is important to remember that only integers (whole numbers) can be used when converting decimal to binary, and also that binary numbers are either '0' or '1'.

```

10 REM *****
20 REM * PROGRAM TWO *
30 REM * Decimal to Binary *
40 REM * J.T.Beaumont *
50 REM *****
60 MODE1
70 *KEY10 OLD:MRUN:M
80 *FX200,1
90 VDU23:8202;0;0;0;
100 PROC_Start
110 AS=GET$
120 IF AS="1" CLS:GOTO 160
130 IF AS="2" CLS:PROC_B_to_d:RUN
140 IF AS="3" CLS:PROC_Finish:PROC_Border:END
150 IF AS="1" OR AS="3" RUN
160 PROC_Border
170 PRINT TAB(7,1);"Decimal to binary numbers"
180 PRINT TAB(7,2);"-----"
190 LET CS=""
200 COLOUR 2
210 PRINT TAB(9,20);"input a DECIMAL Number"
220 INPUT D
230 IF D>31 COLOUR 1:PRINT TAB(0,17);
"OVERFLOW There are more than FIVE digits"
240 COLOUR 2
250 PRINT TAB(2,5);"16's 8's 4's 2's 1's"
260 PRINT TAB(9,20);"DECIMAL Number is ";D;
SPC(6)
270 PRINT SPC(10)
280 LET A=D DIV 2
290 LET B=D MOD 2
300 IF B=0 THEN LET AS="0"
310 IF B=1 THEN LET AS="1"
320 LET CS=AS+CS
330 IF A=0 THEN FOR W=1 TO 4:LET AS="0":LET
CS=AS+CS:NEXT W:GOTO 370
340 LET D=A
350 GOTO 280
360 LET CS=AS+CS
370 PRINT TAB(5,24);"BINARY NUMBER = ";CS
380 IF LEFT$(RIGHT$(CS,2),1)="1" THEN GCOLOR,1
ELSE GCOLOR,3
390 PLOT4,1050,600
400 PLOT69,1200,600
410 PLOT69,1200,800
420 PLOT85,1050,600
430 PLOT85,1050,800
440 IF LEFT$(RIGHT$(CS,3),1)="1" THEN GCOLOR,1
ELSE GCOLOR,3
450 PLOT4,800,600
460 PLOT69,950,600
470 PLOT69,950,800
480 PLOT85,800,600
490 PLOT85,800,800
500 IF LEFT$(RIGHT$(CS,4),1)="1" THEN GCOLOR,1
ELSE GCOLOR,3
510 PLOT4,550,600
520 PLOT69,700,600
530 PLOT69,700,800
540 PLOT85,550,600
550 PLOT85,550,800
560 IF LEFT$(RIGHT$(CS,5),1)="1" THEN GCOLOR,1
ELSE GCOLOR,3
570 PLOT4,300,600
580 PLOT69,450,600
590 PLOT69,450,800
600 PLOT85,300,600
610 PLOT85,300,800
620 IF LEFT$(RIGHT$(CS,6),1)="1" THEN GCOLOR,1
ELSE GCOLOR,3
630 PLOT4,50,600
640 PLOT69,200,600
650 PLOT69,200,800
660 PLOT85,50,600
670 PLOT85,50,800
680 PRINT TAB(35,15);LEFT$(RIGHT$(CS,2),1)

```

```

690 PRINT TAB(27,15);LEFT$(RIGHT$(CS,3),1)
700 PRINT TAB(19,15);LEFT$(RIGHT$(CS,4),1)
710 PRINT TAB(11,15);LEFT$(RIGHT$(CS,5),1)
720 PRINT TAB(3,15);LEFT$(RIGHT$(CS,6),1)
730 COLOUR1
740 PRINT TAB(4,28);"Press the SPACE-BAR to
continue"
750 COLOUR2
760 PRINT TAB(13,29);"or M for Menu"
770 PROC_Border
780 Z$=GET$
790 IF Z$="M" OR Z$="m" RUN
800 IF Z$="" CLS:GOTO 160
810 GOTO 780
820 DEF PROC_Border
830 GCOLOR,3
840 MOVE0,0:DRAW1279,0:DRAW1279,1023:
DRAW0,1023:DRAW0,0
850 ENOPROC
860 DEF PROC_B_to_d
870 COLOUR1
880 PRINT TAB(11,2);"Binary to Decimal"
890 PRINT TAB(11,3);"-----"
900 PROC_Border:COLOUR2:Dec=0:Col=0
910 PRINT TAB(2,12);"Input a Binary Number (e.g.
01010)"
920 INPUT Binary$
930 PRINT TAB(2,12);SPC(39);TAB(0,13);SPC(39)
940 LET CS=Binary$
950 LET S=LEN(Binary$)
960 FOR C=1 TO S
970 Z=VAL(RIGHT$(Binary$,1))
980 dec=dec+Z*2^C:Col
990 Binary$=LEFT$(Binary$,LEN(Binary$)-1)
1000 Col=Col+1:NEXT
1010 PRINT TAB(7,15);"Binary number ";CS
1020 PRINT TAB(10,19);"= Decimal ";Dec
1030 PROC_Border
1040 PRINT TAB(4,28);"Press the SPACE-BAR to
continue"
1050 AS=GET$
1060 IF AS=">" GOTO 1050
1070 PROC_Border
1080 ENOPROC
1090 DEF PROC_Start
1100 COLOUR1
1110 PRINT TAB(6,2);"Binary & Decimal
Conversions"
1120 PRINT TAB(6,3);"-----"
1130 PROC_Border:COLOUR2
1140 PRINT TAB(4,6);"1. Decimal to Binary
conversion"
1150 PRINT TAB(4,8);"2. Binary to Decimal
conversion"
1160 PRINT TAB(4,10);"3. To leave the program"
1170 PRINT TAB(1,13);"-----"
1180 COLOUR1
1190 PRINT TAB(8,15);"input a number to select"
1200 PRINT TAB(1,17);"-----"
1210 COLOUR2
1220 PRINT TAB(2,20);"Please remember INPUT
WHOLE numbers"
1230 PRINT TAB(4,21);"for Decimal to Binary
conversion"
1240 PRINT TAB(2,25);"INPUT ONLY Zeros or 1s for
Binary"
1250 ENOPROC
1260 DEF PROC_Finish
1270 CLS:PRINT TAB(17,5);"Bye"
1280 PRINT TAB(6,15);"Boot the disk for Disk Menu"
1290 PRINT TAB(10,18);"or TYPE CHAIN ""MENU""
1300 PRINT TAB(8,20);"and press the RETURN key."
1310 *FX200,2
1320 ENOPROC

```

Program 2.

Extra Reading

Newnes Computer Engineer's Pocket Book 2nd Edition by Mike Tooley. A Heinemann Newnes Book. £9.95.

Newnes Amateur Radio Computing Handbook by Joe Pritchard G1UQW. A Heinemann Newnes publication. £14.95.

The Pre-BASIC Book BP146 by F.A. Wilson. A Bernard Babani (publishing) book. £2.95

The Pre-computer Book BP115 by F.A. Wilson. A Bernard Babani (publishing) book. £1.95.

An Introduction to BASIC Programming Techniques BP86 by S. Daly. A Bernard Babani (publishing) book. £1.95.

A Concise Introduction to the Language of BBC BASIC BP149 by T.J.E. Murphy. A Bernard Babani (publishing) book. £1.95.

Computer Hobbyists Handbook BP251 by R.A & J.W. Penfold. A Bernard Babani (publishing) book. £5.95.

The following notes are included for people wishing to use other computers.

60 *FX11,0 - turns the auto-repeat key off. If a student keeps his/her fingers on a key too long, the computer will not auto repeat.

70 *FX200,1 - this disables the ESCAPE key

80 *KEY10 OLD:MRUN:M - this reprograms the BREAK key to RUN the program again. Students cannot then accidentally stop the program by pressing BREAK.

100 VDU23;8202;0;0;0; - this removes the flashing cursor, which can be annoying when using the computer as a visual-aid. This may appear more than once in a program, as it is cancelled each time the 'Screen Mode' is changed. (Note: for a BBC BASIC 1 Computer, this should be changed to VDU23,1,0;0;0;0;)

220 *FX15,0 - flush the buffer (must wait for key-press)

1000 DEF PROC_Start - this is called a 'Procedure'. On computers where this option is not available, the command GOSUB can be used.

Subroutines have a disadvantage that they cannot be called by name, nor can their program lines be isolated clearly from the main program. This is overcome on the BBC microcomputer by using PROCEDURES.

By selecting option 'F' at the prompt (line 230), the user may exit from the program. Normally, if the programs are stored on floppy disk, 'BOOTING' the disk will return to the Menu.

Baird Televisor Revisited

Our present all-electronic television system isn't based on the work of Baird. So, was he a crank or a misunderstood genius - or something in between? R.J. Harry investigated.

My interest in Baird was stirred when I bought a book at a local jumble sale. It was a first edition of *Newnes Wireless Constructor's Encyclopaedia* published in 1932. I remembered the book well. As a lad it had been my main source of information concerning 'wireless' matters, but that copy had been a later edition and had not contained the article on television. In my casual reading, I had come across several descriptions of Baird's Televisor - 30 lines produced by a spinning disc drilled with holes, but this book gave constructional details and reading through the article I thought the whole thing rather ramshackle and hardly worth the effort of construction.

More Confusion

But people did build the 'Televisor', as the television receivers were known, and the BBC transmitted the signals. The result of all my efforts at further research was more confusion. One early (1923) helper of Baird said, "...we did succeed in transmitting an image which was moving and recognisable". But another source reported, "...by the beginning of 1924 Baird was able to transmit, electrically, silhouettes of objects..."

At this time in the USA C.F. Jenkins was also transmitting silhouettes, so Baird's efforts at



John Logie Baird, 1888 - 1946. All photographs Hulton-Deutsch Collection.

this stage were not a technical advance.

Had all this happened in 1824, it would have been a significant event but it did not, it was between 1924 to 1936. Wireless telegraphy had been in use 75 years, the BBC were starting broadcasting and in the cinema 'talkies' were just coming into use. The ordinary citizen of the time was perfectly familiar with moving pictures which, even though they were shot on 16mm, on black and white stock, were still far

superior in definition to anything Baird was to produce. So why the interest in Baird? Would you pay 12 Guineas for a Baird Televisor kit, when you earned £2 or so a week? (1930) prices.

It was at this stage that I decided to attempt to construct a Televisor from the details given in the *Wireless Constructor's Encyclopaedia*. I did not intend to produce a working model, or construct a replica, but I hoped that by going through the process of construction I would gain some insight that would enable me to understand between the work of Baird. What follows is not a constructional article, although some practical details are given; it is an attempt to recreate the environment in which the first television receivers were made.

The principle of the Baird system is well-known, and I do not intend to describe it here, sufficient to say that scanning was achieved by a spinning disc and this was the major part of the construction of the receiver. Behind the disc was placed a neon lamp which was connected to the loudspeaker terminals of the wireless. The intensity of the light varied with

the transmitted modulation and if synchronised with the disc, a picture would be produced. It was necessary to construct a disc of hardboard or thin aluminium of about 20in diameter and to mark out thirty lines 12° apart radiating from the centre. Baird was limited to the extremely low definition of 30 lines per picture, twelve and a half frames per second, for technical reasons. The greater the picture, detail the greater is the bandwidth required and because Baird was transmitting on the medium wave he had to restrict the bandwidth of his pictures to that allocated to medium wave sound broadcast stations. Station separation was 9kHz and this must have limited the maximum modulation frequency to something less than 4.5kHz.

Returning to the construction; marking out 30 lines radiating from the centre of my aluminium disc was easy, but the next bit was tricky. The instructions said to mark the first hole 9.5in from the centre, and the next 1/30in closer to the centre and so on. Then drill each mark with a 1/30in (0.0333in) diameter hole. This would give a spiral track of 30 holes - a Nipkow disc.

Problems

Searching through my collection of twist drills, the nearest drill size I could find was 1/32in. The *Encyclopaedia*, under 'Drills and Drilling', listed nothing smaller than 0.040in (No.60). I reasoned that it was better to under drill then over drill. However, the accurate marking of the holes 1/30in apart presented a problem and Mr Newnes was mute on the subject. However, the consequences of messing up the drilling were spelt out; if the holes were too close then, as the disc was spun, the light from the adjacent holes would overlap and a light streak would result. If the holes were too far apart a dark streak would be produced.

I overcame my problem by using a 300mm length of 2BA studding which has 31.31 t.p.i.



Baird adjusts his television transmitter, March 1925.

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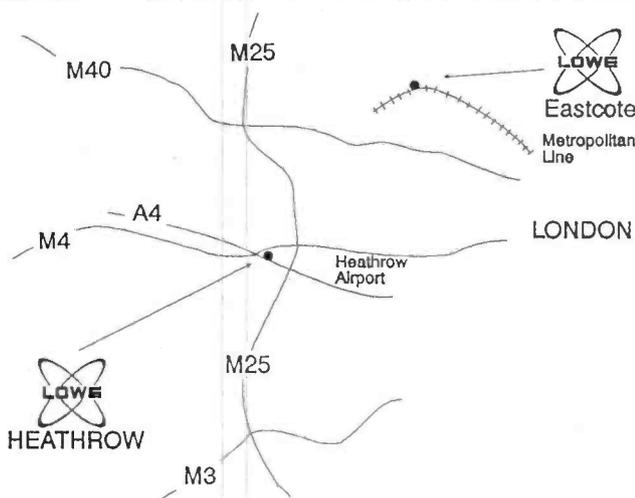
TH-77E



TH-27E



TH-26E



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The ICFPR80 is a hand held professional receiver with air band capability and an 8-way tuning system. Frequency coverage 150kHz-108MHz and 115.15kHz to 223MHz with FRQ 60 frequency converter.



The HP100E Mik II is a 1000 channel programmable handheld scanner. AM, FM and FM wide for commercial channels covering 8-600MHz and 830-1300MHz. Supplied complete with Nicad, Antennas, DC cable, shoulder strap, carry case & earpiece.



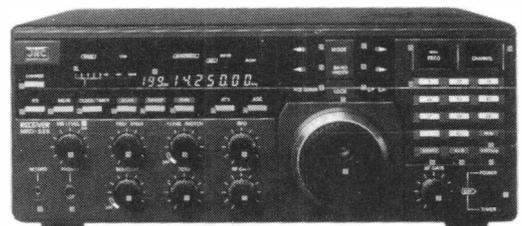
The Bearcat 200XLT is the cream of the Bearcat handheld scanner range. With 200 memory channels and simple operation these are proving very popular. Freq. coverage 66-88, 118-174, 406-512 and 806-956MHz.



The VHFHANDY and AIRHANDY are two compact thumbwheel controlled handheld receivers. Light in weight and easy to use makes them an ideal introduction to receive. The AIR handy covers 118-136MHz and is AM. The VHF Handy is FM and covers 141-190MHz.



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Key Events

Still pictures by telegraphy	1860s
Discovery of photo-conductivity of Selenium	1873
Scanning disc suggested by Nipkow	1884
Shadow graphs J.L. Baird & C.F. Jenkins	1923
30-line Baird system television by radio	1929
240-line Baird system in competition with 405-line Marconi-EMI system	1936
Marconi-EMI win the day	1939
BBC TV closes down at start of World War II	1939

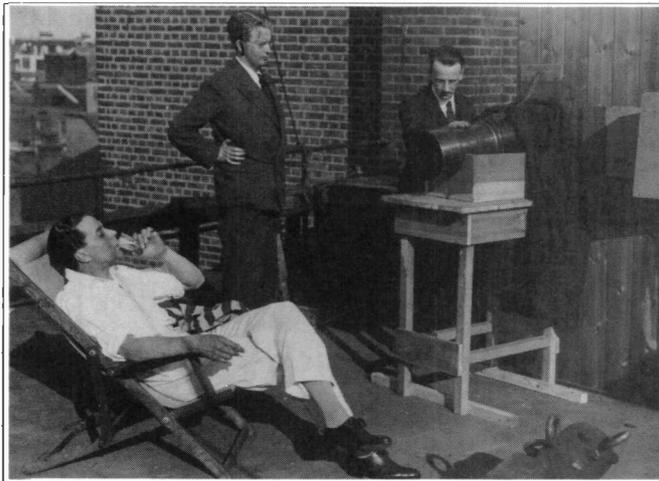
Using two solder tags that had been cut to a point and soldered to two nuts, I constructed a simple marking machine by fitting them at the ends of the studding and locking one nut to act as the centre pivot. Starting at the outermost hole I scribed a line, rotated one solder tag on its nut one whole turn and marked the next hole, and so on.

Tedious

The drilling was straightforward, but until I started the minute size of the hole had not struck me. If I had used hardboard instead of aluminium, the holes would have been less precise, from my experience of drilling hardboard, pieces of fluff tend to stick to the hole. I suppose that in the thirties, hardboard was more readily available than aluminium sheet, so I probably had a good start on contemporary constructors.

Drilling thirty holes with a hand drill is extremely tedious and I paused to wonder how Baird managed to get a picture at all. An early Baird camera used a similar disc to scan the scene and direct the light onto a light sensitive cell. If he had used 1/30in holes at the transmitter an extremely feeble amount of light would have fallen on the cell. Photographs of his early equipment show a scanning disc fitted with large lenses (apparently a job-lot from discarded lanterns). The lenses allowed more light to pass through that could be focused onto the light cell.

At this stage, I was beginning to understand the problems Baird faced with the available technology of his day. One of his collaborators (V.R. Mills G5QM) is recorded as saying that Baird could not get the disc to operate satisfactorily and called him into help. Mr Mills rearranged the optics to scan the image and not the selenium cell and made it work. Mr Mills parting remarks must have cancelled any elation felt by Baird at seeing his creation work, "...no future for mechanical system...work on cathode ray tube..".



Jack Buchanan (l) with Baird (c) on the roof of The Television Company's offices circa July 1928.

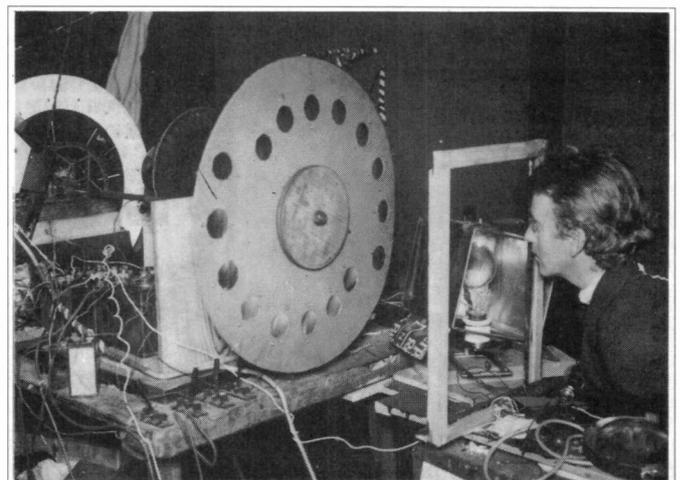
This was in 1923, but Baird took no notice for in early 1926 he demonstrated his mechanical system to members of the Royal Institution. As late as 1930, criticism was being expressed. A member of the Science Museum staff, who had met Baird many times, recorded years later that, "...his pictures were pitiful and so severely limited...that I refused to accept other than a token of the things he would have liked to thrust upon me." A pity that, the more artifacts preserved the easier it would be for a later generation to make a balanced judgment.

Having completed drilling the holes, I mounted the disc on a wood chassis complete with electric motor. I found that a frame from a 35mm slide holder was just the right size for the 'window' through which I could view the televisior, and I added a 3in reading glass to give some magnification. The device was beginning to resemble the ramshackle constructions I had seen in old photographs.

Whatever the criticism, Baird must have had some support because he managed to get an

institution such as the BBC to put its resources at his disposal - even if the early transmissions were only half an hour and without sound.

The sort of neon lamp that a constructor of the thirties would have used was unobtainable. I had reached about as far as I could go and still stay true to the technology of the early thirties. But I could check my hole drilling by using an ordinary tungsten lamp instead, Mr.



Baird's transmitting station, March 1925.

Further Reading

For an easy read. *The Secret Life of John Logie Baird* by T. McArthur & P. Wadell, published by Hutchinson 1986.

For someone seriously interested. *British Television the Formative Years* by R.W. Burns, published by P. Pergrinus 1986.

The quotations come from correspondence in *Electronics & Power* 19975-76 (a monthly journal published by the IEE) following an article by Messers Garratt and Mumford in the same journal earlier in 1975.

Newnes was right, if you do not get the holes in exactly the right position you get light and dark streaks, but I like to think that I could have got a picture of sorts.

Why did people go to all the bother of making or buying Televisors for such obviously poor pictures? Novelty certainly, but I think also that the fact that the pictures came by radio added to the romance of the occasion. However dim, flickering and unsteady the image, it must have been a thrill to receive a picture using your wireless.

The television system (System A) that eventually came into service and ended in the mid-1980s with the introduction of 625-line colour (System I) was developed by EMI Ltd., a company which did not come into existence until 1931. In 1938 the Scophony Company offered for sale a 405-line projection receiver - using mechanical scanning. Whatever his contribution, Baird must be given credit for being first. ■

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(66-88 MHz, 118-174 MHz, 406-512 MHz.)

UBC 100XLT (100 CH MEM.) £199

(66-88, 118-174, 406-512 MHz.)

UBC 200XLT (200 CH MEM.) £229

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Modes:- AM - FM - Wide FM A much improved version of the HP100E

The new HP 200 has superior performance and stability.

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Modes:- AM - FM - Wide FM

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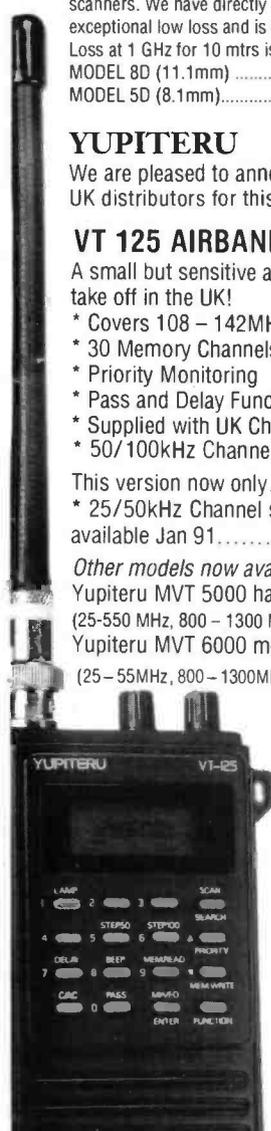
- Fairmate HP100E, Yupiteru, AOR 1000, ICOM 1C-R1, Uniden BC 50XL, Uniden BC 55XL, Uniden BC 70XLT, Realistic PRO 38, Uniden 200 XLT, Uniden 100 XLT.

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NEW VERSION



NEW NEVADA MS 1000 BASE/MOBILE SCANNER



Another Medium Wave DX Loop Antenna

There have been many designs for loop antennas in the past, so why another one? This design, by John Tweeker, is simple to make and looks attractive as well.

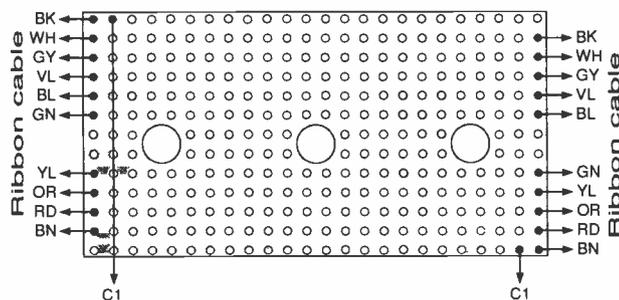
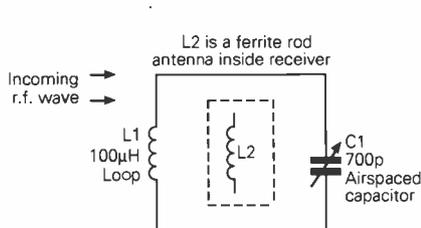
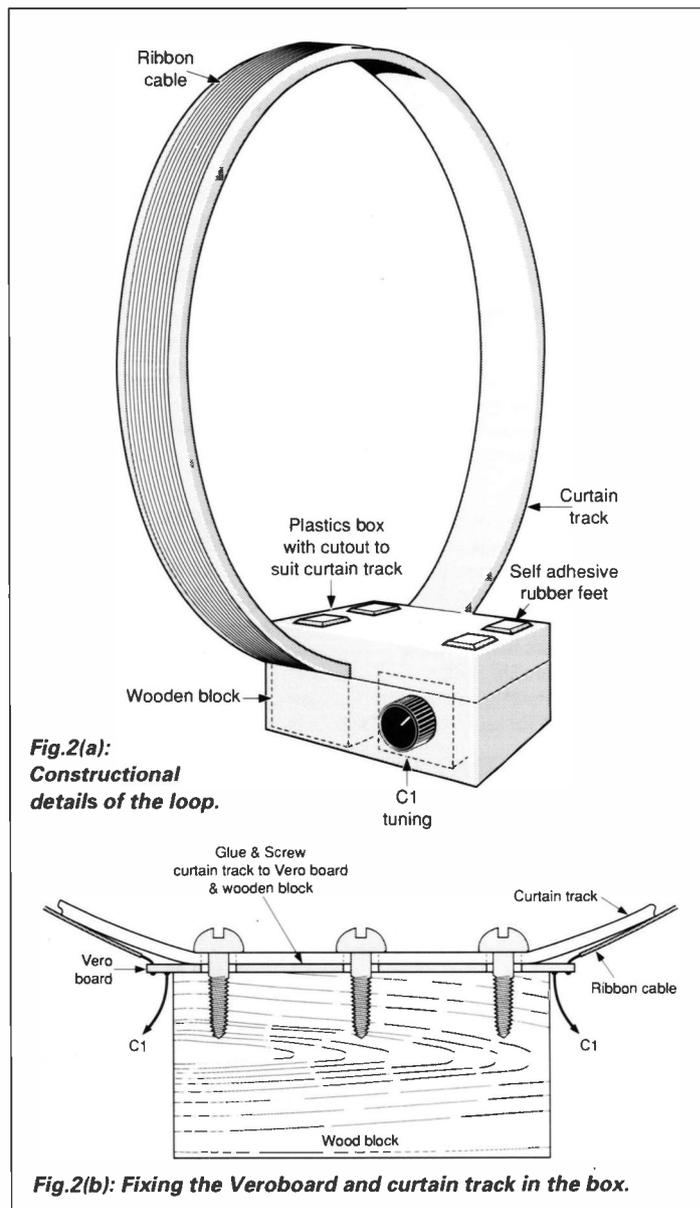
Well, although the previous designs may have worked well electrically, they have nearly all been very hard to live with. In this design I have tried to produce a loop antenna that will be simple to use, won't look like a 'Heath Robinson' creation, and should be within the scope of most home constructors. The prototype lives permanently in my living room with a minimum amount of objections from 'er indoors'. Indeed, it is something of a conversation piece!

A loop antenna has two important characteristics which make it especially useful in the overcrowded broadcast bands. It is both **selective** and **directive**. The selectivity will help to overcome overloading in the front end of the receiver by rejecting unwanted signals. The directivity of the loop comes about from the way in which it functions; an r.f. wave which arrives at the loop can either reinforce or tend to cancel itself depending on the direction of arrival. A wavefront which arrives in the plane of the loop will induce currents which add together, while one which

arrives at the open face of the loop will induce currents which sum to zero. An easy way to visualise this is to picture a basketball entering the goal hoop. The ball (r.f. wave) which hits the side of the hoop will cause it to shake (i.e. excite the loop), whilst the ball which passes straight through the middle of the hoop has no effect upon it. The more oblique the angle of the ball the more the hoop will shake!

Circuit Description

The circuit diagram of the loop (Fig. 1) is absolutely conventional - a circuit that will resonate at any point in the m.w. band and beyond, by means of a 700pF variable capacitor and a 0.1mH inductance. Energy is coupled into this tuned circuit primarily by inductive coupling between the loop inductance and the magnetic component of passing electromagnetic waves. In other words it picks up signals from all around itself. The loop current at the resonant frequency is magnified by the circuit 'Q factor'. The resultant magnetic



Project

YOU WILL NEED

Capacitors

Variable (Maplin FF40T)

700pF 1 C1

Miscellaneous

1.5 metres 10-way ribbon cable (for L1); 1.5 metres white curtain rail (L1 former) (Texas Homecare Stock No. 738057); Veroboard, 24 holes by 13 strips; Knob for C1; Plastics box 150mm by 80mm by 76mm (Electromail 507-674); Screw Caps (Electromail 549-139); Woodscrews (Electromail 526-259); Hook up wire (2m); Self-adhesive pads (Maplin HB22Y).

Optional Items (see text)

Resistors

Carbon film, 5%, 0.25W

470kΩ 1 R1

Semiconductors

Diodes

OA47 1 D1

Miscellaneous

Rubber Feet (Electromail 543-333); 3.5mm chassis sockets (Electromail 478-497); Hi-Z earpiece (Maplin LB25C).

Component Suppliers

Electromail, PO Box 33, Corby, Northants NN17 9EL. Tel: (0536) 204555.

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field is then coupled into the receiver's rod antenna and the loop windings.

Construction

The former for the inductor was made from a 1.3m length of white plastics curtain rail. The type chosen is sold in Texas Homecare stores and has a shallow channel in one side. By coincidence this channel is exactly the right width to accommodate a strip of 10-way ribbon cable. The rail is simply bent into a loop of 380mm diameter, with the channel outermost. This gives an overlap of 50mm. By drilling three 6mm holes through the overlapping ends the loop can be secured to a 45 x 45 x 70mm piece of hardwood by 25mm x No.8 woodscrews. The appearance of this part can be improved by first staining the block of wood and then using plastics screw caps for the screw heads. See **Fig. 2**.

The inductor itself was made from 10-way ribbon cable. I used the multi-coloured variety as this gives a very attractive appearance. The cable is stuck into the channel of the curtain rail using self-adhesive pads. The free ends of the cable are soldered to a small piece of Veroboard. It is important that the connections are staggered so that you end up with a continuous loop (and **not** ten parallel loops!). Having accomplished this you should wire the inductor in parallel with the capacitor. The Veroboard was attached to the top of the wooden block using the tree woodscrews.

Next a plastics box to accommodate the capacitor and the wooden block was selected. (If you choose to use a metal case beware of creating a 'shorted turn'). The type I chose

has a transparent lid section. This allows the innards of the circuit construction to be seen, so obviously neat wiring is required. The lid was filed to

allow the loop to pass through the sides of the box. The wooden block and the capacitor were screwed into the base of the box from below, again

plastics screw caps were employed. Some self-adhesive rubber feet were stuck onto the TOP of the box to provide a perch for the receiver.

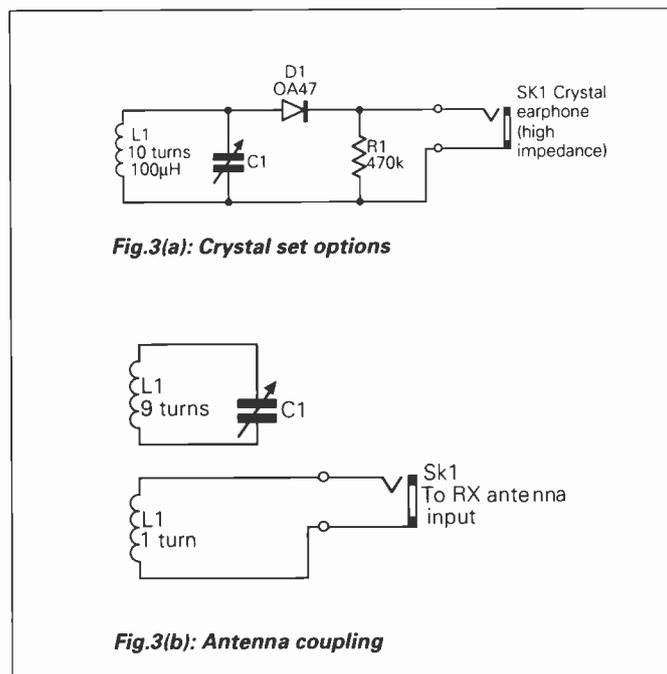
Using The Loop

No connection is needed between the receiver and the loop if a receiver with an internal ferrite rod antenna is employed. The receiver is simply placed inside the loop, sitting on the plastics box, with the internal ferrite rod windings lying in the same direction as the loop windings.

In the case of a receiver which has no internal ferrite rod a direct connection is required between the loop and the receiver. This was achieved in the prototype by using only nine turns of the loop for the antenna and using the remaining turn as a transformer coupling loop for the receiver. The connection was made via a 2.5mm jack socket mounted in one end of the case.

The loop is perfectly conventional in operation; you simply tune both the radio and the loop for maximum signal strength then rotate both the loop and radio together until the interfering signals are minimised. In practice it may be found best to slightly detune the loop to one side of the wanted transmission in order to reject a strong adjacent signal.

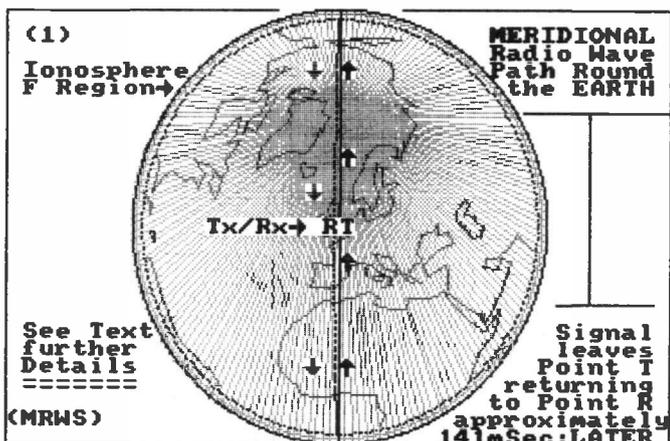
This loop can also be used as a 'crystal set'. This is done by adding the circuit of **Fig. 3**. This could form an interesting project for a newcomer to radio electronics. There can be few other things quite as 'magical' as a radio that doesn't use batteries! Obviously you'll need to be within a few miles of the transmitter to obtain a reasonable signal.



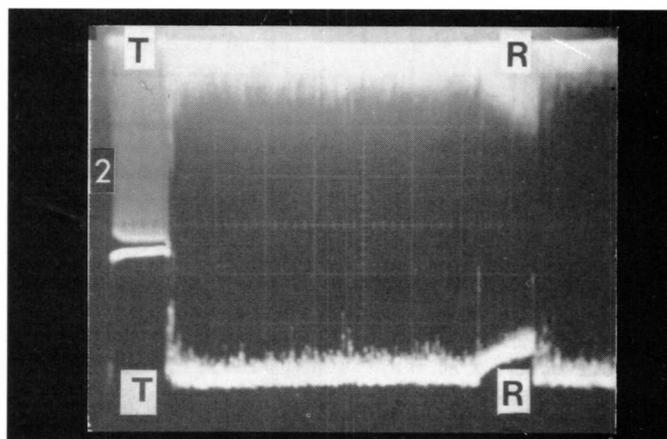
HF RADIO WAVE PROPAGATION

F. C. Judd G2BCX Part 5

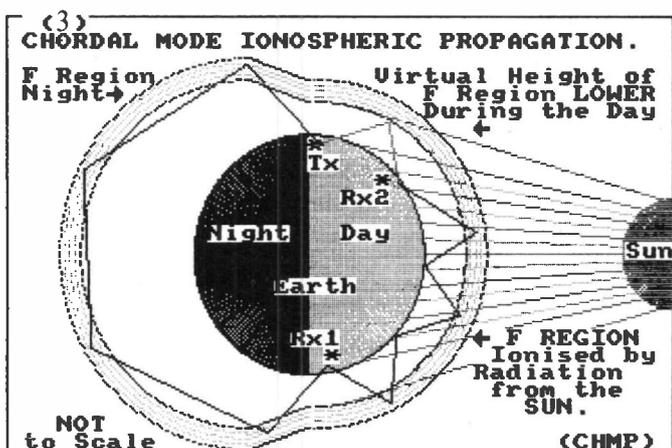
In conclusion, four items are dealt with (1) h.f. radio signals can, and do, travel round the full circumference of the earth. An initial signal and its 'echo' can often be heard when the right conditions prevail, especially on the 28MHz (10m) band. (2) A method for measuring the time taken. (3) A mode of ionospheric propagation known as the 'Chordal Mode'. (4) Data from which the maximum usable frequency (m.u.f.) within the h.f. spectrum can be ascertained.



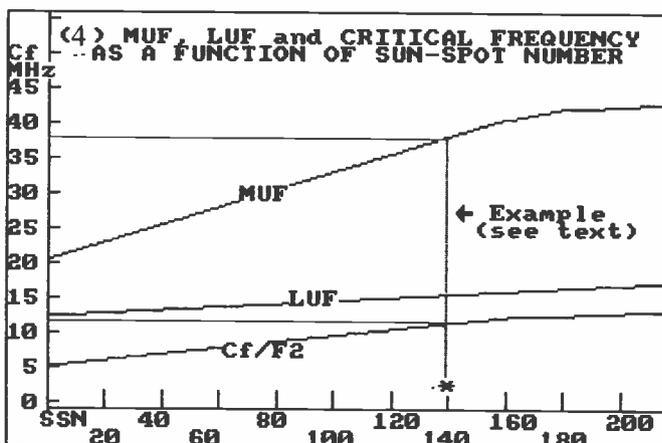
(1) When suitable 'ionospheric propagation' conditions prevail, h.f. radio signals transmitted from a place, say 'RT', somewhere in the UK (see illustration) could, for example, travel north (direction of arrows and solid line) over the polar region, round the other side of earth (light arrows and dotted line) across the south polar region and back to 'RT'. The 'calculated' time given takes other factors into account, but is only approximate. Meridional 'surface' circumference is 40 000km. Now see (2).



(2) Measurement of time taken for a continuous signal, e.g. speech or c.w. to travel completely around the earth would be virtually impossible, even though its 'echo' might well be clearly audible. However, with suitable 'ionospheric conditions' and by transmitting short duration 'dot signals' (20ms) approximately one every 200ms, the time taken for these signals to travel an ionospheric/earth path may be 'measured' with reasonable accuracy. The signals are received at the place of transmission, the time taken for the journey round the earth being measured with a calibrated oscilloscope as illustrated. (T) Transmitted Short Dot (R) Received signal. Total ionospheric/earth Meridional path journey 42870.4km. Time taken 143ms.



(3) Although quite feasible, the so-called 'Chordal Mode' of h.f. radio propagation via the ionosphere has yet to be proved. The theory is that as the virtual height of the F region increases at night, a signal transmitted from, say, (*Tx) may travel anti-clockwise, be refracted along the region and returned to earth at a distant receiving point, for example, (*Rx1). The signal might then continue along a normal F region/earth propagation path to other points; (*Rx2), for instance. The transmitting signal could, of course, travel via the F Region from (*Tx) to (*Rx2) via a short path.



(4) This data will provide a reasonable approximation of the maximum usable frequency (m.u.f.) from the 'critical frequency' as defined by the 'sunspot count number' (SSN). Example: (*) SSN = 140. Critical Frequency, F Region = 11MHz. MUF = $11 \times 3.5 = 38$ MHz. With this condition, the 28MHz band (10m) should be well open. Note: l.u.f. - lowest usable frequency. For critical frequency data see Part 4, (3) and (4).

Thanks are due to The Rutherford Appleton Laboratory, Oxfordshire, The US Department of Oceanic and Atmospheric Administration, Boulder, Colorado, The US Department of Defense, The General Electric Company of America and Dr. Andre Kocleleburgh (Sunspot Bulletins) Brussels, Belgium, each having supplied scientific data upon which many of the 'graphics' in this series are based.

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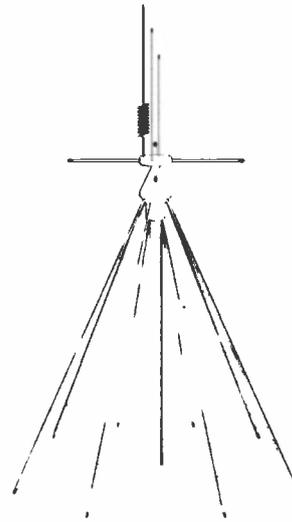
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SKY SCAN DX-DISCONE 25 to 1300MHz



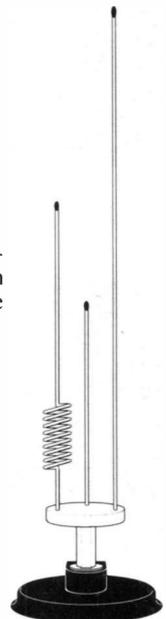
Most discons only have horizontal elements and this is the reason that they are not ideal for use with a scanner. Most of the transmissions that you are likely to receive on your scanner are transmitted from vertically polarised antennas. The Sky Scan V1300 discone has both vertical and horizontal elements for maximum reception. The V1300 is constructed from best quality stainless steel and aluminium and comes complete with mounting pole. Designed and built for use with scanners.

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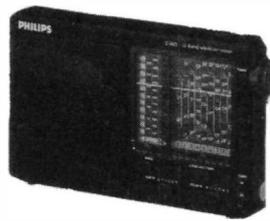
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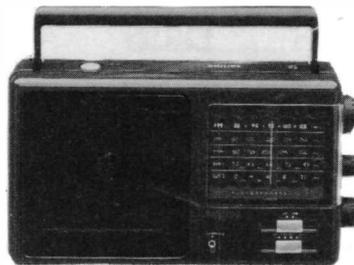
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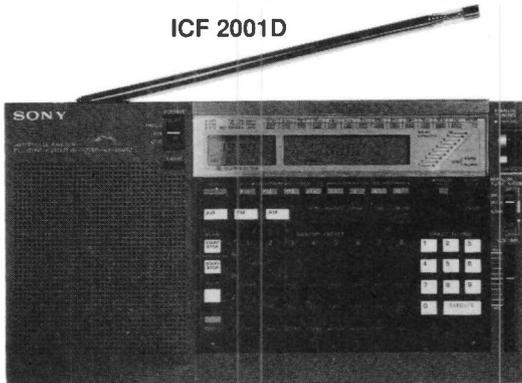


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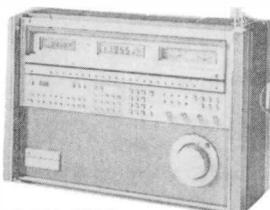
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Frequency Range: LW 150.0-420.0kHz (2000-714.3m) MW 520.0-1610.9kHz (576.9-186.2m) SW 1.6110-2.9009MHz (186.2 - 103.4m)
Precision: Direct Readout to 100kHz for SSB/CW/AM. Direct Readout to 10kHz for FM

£1800.00

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P.O.A.



Sony CRF-V21 World Band Receiver

Mike Richards G4WNC

The top end of the communications receiver range is the source of dreams for many of us. Mike Richards G4WNC gives you an insight into the CRF-V21 executive receiver from Sony.

I must admit, I have always been fascinated by the adverts for the Sony CRF-V21. The fact that the receiver comes complete with RTTY and FAX decoding as well as a built-in printer makes it even more interesting.

The frequency range of the basic unit extends from 9kHz through to 29.99999MHz and 76MHz to 108MHz. The low frequency range is particularly unusual as most receivers stop at around 100kHz. The reception modes are also very extensive covering a.m., f.m., narrow f.m., s.s.b., FAX and RTTY. So, without more ado, let's take a detailed look at the CRF-V21.

Documentation

With a receiver as complex and versatile as the CRF-V21, good documentation is essential. As you would expect from Sony, the information supplied was very comprehensive. The main operational manual comprised some 174 A4-pages that were spiral bound for ease of use. This manual was really first rate, with excellent use of diagrams to illustrate all the operations. Every aspect of the operation was covered and the level of detail was just right, there was even a handy help section after each chapter.

Many people, like myself, are too impatient to read the manual before using a new receiver. To help with this there was a good section on general reception that covered the basics functions very concisely. There was also a quick reference manual that served as a handy reminder once the basics had been mastered.

One reception area that perhaps needs a little more technical understanding is FAX. Sony are obviously well aware of this, as they have supplied a 27-page A4 booklet devoted entirely to this subject. This included a clear description of how the FAX system worked and the meaning of terms such as IOC. There was also some

very good explanations of common problems with FAX reception. The final section contained a handy frequency list of current FAX stations.

The final book provided was Sony's *Wave Guide*. This is a very good guide to general broadcast listening. One extra bonus was that this guide could be stored in a small compartment in the front cover of the CRF-V21, which meant that it was always available as a reference.

Setting-up

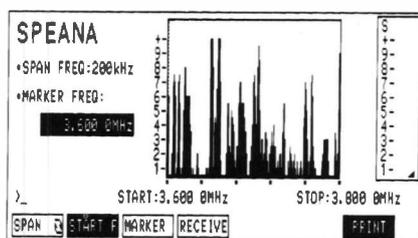
Despite the comprehensive coverage of the CRF-V21, it was surprisingly simple to get started. The power requirements were well catered for with the option of using either battery or mains. The battery option required the use of a special 6V NP22H NiCad pack, one of which was supplied. Battery life is always an important consideration and the manual suggested a battery life of between three and five hours. The actual period depends very much on the mode being used. Installation of the battery pack was very easy as it simply slid into a compartment on the side of the receiver.

As with most processor-controlled receivers, an auxiliary supply was required to maintain the contents of the memories and clock. The CRF-V21 needed two AA size batteries for this function.

For operation from the mains, a separate power unit was supplied. This was quite a hefty unit measuring 160 x 92 x 232mm. The connection to the receiver was made via a dummy battery that slid into the standard battery compartment. The mains voltage range was 110 to 240V at 50 or 60Hz, so should suit all the common supply types.

Moving onto the antenna, the CRF-V21 is designed to work with external antennas only as there are no built-in systems.

Fig. 1: The 3.5MHz amateur band at night.



However, the supplied AN-V21 active antenna was extremely versatile. The unit comprised a base that measured 220 x 32mm and into the centre of this was screwed a 520mm telescopic whip. In addition to containing the antenna pre-amplifier, the base unit also housed a ferrite rod antenna for l.w. and m.w. reception.

If you needed to use the CRF-V21 as a portable, the whole active antenna could be stowed away very neatly in a compartment on the rear of the receiver. This was a really useful feature as so many receivers make no provision for the storage of the accessories. To add to the versatility of this antenna it had been weather-proofed so, if required, it could be mounted externally. This is, of course, the arrangement that will provide the best results. The connection to the receiver was made via a standard 50Ω BNC socket that was located on the side of the receiver under a neat protective flap. Adjacent to the BNC socket was a 3.5mm jack that was used for the power feed to the active antenna. Incidentally, although the active antenna required two leads at the receiver end, these were combined into one coaxial lead for the main run to the receiver. More conventional external antennas could be connected directly to the BNC socket, so the CRF-V21 was very versatile.

If you have an interest in the direct reception of weather satellites Sony's optional AN-P1200 receive dish and converter can be added.

With the antenna and power sorted out, the receiver is ready for operation. However, there are a number of additional useful inputs and outputs available.

On the audio side there is a standard external speaker jack and a separate headphone socket for private listening. There is also a useful range of low level audio signals that can be used for connection to a tape recorder or even some secondary decoding equipment.

One notable feature is the provision of variable play-back sensitivity. This means that the CRF-V21 can handle a wide range of input levels.

For use with a tape recorder there is a remote socket. This provides access to a pair of contacts that can be used to remotely start a tape recorder. The great advantage of this is that the contacts could be activated by the receiver's timer so enabling specific transmissions to be recorded whilst you are away.

Last, but not least, is the provision of an RS-232 serial communications port. The socket used for this port is a miniature DIN type. Thankfully, Sony have provided a lead for this socket that is terminated with a standard 25-way D-plug for connection to the computer.

Display

The front panel of the CRF-V21 is dominated by a large l.c.d. panel that is used to convey most of the operational information. This includes information such as the frequency, mode, signal strength and the function associated with the seven push-buttons immediately below the display. For a receiver such as the CRF-V21, with so many modes, this is a very effective and flexible system. To prove the point, it could even be configured to operate as a spectrum analyser, but more of that later.

Frequency Selection

Tuning around on the CRF-V21 is extremely easy with a number systems available to the user. Perhaps the most obvious is to use the large, 63mm, rotary knob on the front panel. This knob has a rubberised coating and the weight and feel were excellent. As with all receivers using digital synthesisers, the tuning is not truly continuous. The frequency actually changes in small steps. The size of these

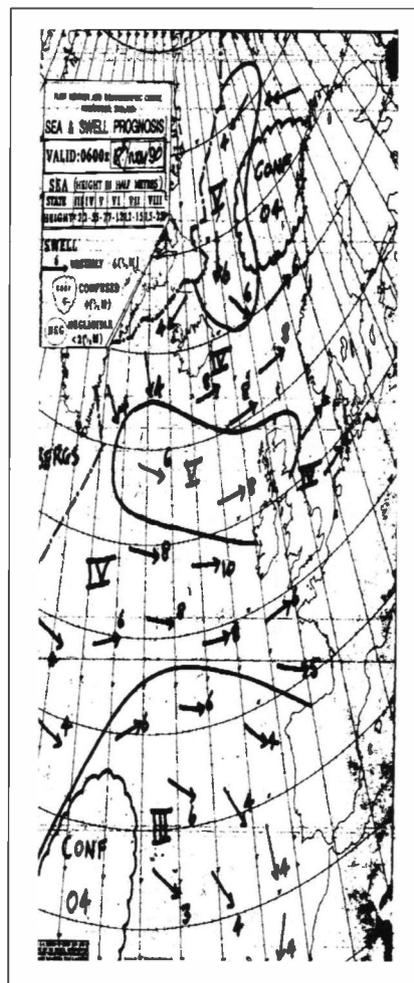


Fig. 2: FAX pictures from Northwood.

steps can be varied between a coarse 1kHz and a very fine 10Hz. This is a useful range and strikes a good compromise between rapid and accurate tuning. To prevent the tuning knob being accidentally knocked off frequency, there is provision to disable it completely.

If you need to tune to a specific frequency, by far the quickest method is to use the direct entry option. In this mode, the frequency is typed in via the front panel keypad. This makes tuning over a wide frequency range very fast. Once a frequency has been set using direct entry, the rotary control can then be used to make any adjustments that may be necessary.

In addition to these manual tuning methods, the CRF-V21 is fitted with an impressive range of memory and scanning options.

Memories

The organisation of the memories in the CRF-V21 is very well thought out. They are divided in to 50 pages, each of which can store seven

frequencies. As you would expect from a receiver of this specification, all the details of the receive mode are also stored with the frequency. This greatly simplifies the use of the memories and makes for very speedy mode changes.

Another extremely good point about the memories is that you can assign a name to each stored frequency and also to each memory page. The maximum number of characters that can be accommodated is seven, but this should be adequate for most purposes. Once into memory recall mode, the station names are displayed along the bottom of the l.c.d. unit. Recalling a memory is just a case of pressing the appropriate key. Once the memory has been selected, both the memory name and the page name are displayed clearly along the top of the l.c.d. unit.

Another area worthy of note is the way the tuning knob is used whilst in Memory Mode. If the Page Feed button is held depressed whilst the tuning knob is turned, the page number either increases or decreases depending on the direction of

rotation. This is a very quick and convenient way of moving around the memories. The same technique is used to enter the memory and page names, only in that case the Titler had to be enabled. There is also the facility to add a page mark to a favourite memory page so that that page can be recalled at a single button press.

One problem that I find with receivers having large memory capacity is actually keeping track of where everything is. This is where the built-in printer of the CRF-V21 comes into its own. You can easily obtain a full print out of the memories complete with the page name, memory name, frequency and mode. For complete security, you can even store the whole memory range on a standard audio cassette recorder!

Scanning

Once you have a receiver with microprocessor control and a number of memories, the next step is to include some scanning functions. Not surprisingly, Sony have taken full advantage of the processor control built into the CRF-V21. The first of these is called Automatic Scan Tuning and is simply a complete scan of the receiver's frequency range. The scan looks for signals that exceed a signal strength that has been set by the operator. When a suitable signal is found there are the usual options to either stop, pause for the duration of the transmission or pause for a pre-set period. The only other parameter that can be set by the operator is the scanning steps that can be 3, 5, 9, 10 or 50kHz.

The second, and perhaps more useful, scanning mode is

known as Limited Scan Tuning. This is basically similar to the full scan except that the operator can select the upper and lower limits of the frequency range to be scanned. There is, however, one very powerful extra associated with this mode called Automatic Memory Input. With this facility enabled the frequency of all stations that exceed the squelch level are automatically stored in memory. There are 70 memories available for this and they are located in pages 51 to 60, just above the normal memory pages.

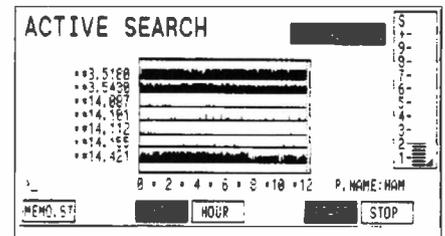
The final scanning mode is a conventional memory scan. However, there is an interesting twist in that it only scans pages with a name defined by the operator. This means that say four or five pages could be filled with marine band frequencies and all the pages called 'Marine'. Starting a memory scan on any 'Marine' page will ensure that all the marine band memories were covered.

Whilst on the subject of scanning, I ought to mention that there is also a standard Priority Mode.

Spectrum Analyser

This is where the versatility of the CRF-V21's display system really starts to show as the display can be configured to operate as a spectrum analyser, giving a graphic representation of the activity in a specified band. The frequency span of the display can be set to either 200kHz, 1 or 5MHz. Once set-up, there are a number of useful options to increase the flexibility of the mode. In its default condition, the lower end of the displayed spectrum is determined by either direct

Fig. 3: Active search of the amateur bands.



frequency entry, or by using the tuning knob. Once the correct band had been selected, you can enable and adjust a marker line. This is moved using the same controls as when setting the low end of the spectrum. By using this mode you can easily find out the frequency of any of the stations shown on the display. You can also set the CRF-V21 so that the receiver tracks the marker line. This allows the operator to listen to any signals within the spectrum analyser tuning range. This is a great system for spotting activity in a band.

This feature is further extended in the Activity Search mode. With this mode you can monitor all seven memories in any one memory page. The display takes the form of a graph with seven horizontal traces, one for each memory. The X-axis of the display is calibrated in time and could be set to either 12 minutes or 12 hours. Activity on any one channel is indicated by a thickening of the line in direct proportion to the signal strength. This mode is extremely powerful for plotting the active periods for particular stations. If each memory is set to a different band it can even be used to plot the propagation conditions.

With both of these modes, a printout of the display can be obtained by pressing the Hardcopy button on the front panel.

Reception Modes

Probably one of the most attractive features of the CRF-V21 is that it can handle a wide range of modes without any additional equipment.

The broadcast enthusiast is well catered for with wide band and narrow band a.m. filtering. The latter being particularly useful on the short wave bands. A further sophistication in a.m. reception is provided with a synchronous detector. This operates by receiving either the upper or lower sideband of the a.m. transmission and ignoring the other sideband. The great

advantage is when suffering interference from an adjacent station, all you have to do is select the opposite sideband in synchronous mode and the interference disappears. So you can see, this is a great boon to the broadcast DXer. For the reception of amateur and commercial voice transmissions, the CRF-V21 is fitted with the standard u.s.b. and l.s.b. modes.

One of the attractive features of the CRF-V21 has to be the built-in FAX decoder. It is this feature that makes the Sony stand out among the many receivers on the market. The actual implementation of the FAX mode is very straightforward, so the operator does not need to be particularly experienced. The mode is selected simply by pressing the FAX button on the front panel. You are then presented with a new display screen that contains all the necessary information. All the standard drum speeds are included, as were IOCs of 576 and 288. To compensate for the rather small print size, you can choose to print one of three chart sections. This is very useful, but it does require the operator to know what part of the chart is needed. With the transmission of FAX charts being a rather slow process, it is good to see that the CRF-V21 can be set to automatic reception. In this mode, the receiver detects a start tone and synchronisation pulses and automatically selects the appropriate settings and starts the printer. Another good point is the auto phase. Using this feature meant that charts can be phased part way through a transmission. This is particularly handy when tuning around searching for interesting charts.

Accurate tuning is always important for good FAX reception and the CRF-V21 handles this with very effective use of the display. Part of the display was configured as a narrow band spectrum analyser, so that the FAX signal can be clearly seen and tuned.

It is, of course, possible to receive weather pictures direct



from the geostationary satellites. The CRF-V21 can receive these, but only when an additional antenna and converter is added. Unfortunately, this was not supplied with the review model.

The final reception mode is radioteletype or RTTY. This is handled in a similar way to the FAX option, with a very good tuning display. There is also the facility to adjust the baud rate, shift and polarity to suit the signal. The operator has the option to either output the decoded text to the display, printer or the serial port. The only odd point about this mode is that the most common speed, 50 baud, is not provided. The actual rates included were 60, 66, 75 and 100 baud. This mode can also be set to receive ASCII transmissions, but there are so few of these on air that it is of little use.

Computer Control

Computer control is another area where Sony have taken maximum advantage of the CRF-V21's microprocessor. The RS-232 port provides access to all the main operational features of the receiver. Not only can you send instructions, i.e. to set the received frequency, but you can also extract information. This process extends right down to being able to extract page and memory names. With suitable driver software, the CRF-V21 can be operated remotely very successfully.

Performance

The on-air evaluation of the Sony was carried out using both the supplied active antenna and my own external long wire antenna. It quickly became clear that the CRF-V21 is a very capable receiver. The sensitivity is excellent at 0.17µV for 6dB S/N in the 2MHz to 30MHz range. This specified performance is backed-up by the results in the lab. The CRF-V21 either met or exceeded its specification on all counts.

One problem area that soon became clear, is the illumination of the main display unit. If the receiver was used in good lighting conditions, the performance was fine. However, in poor conditions the display can be quite difficult to read. The problem appeared to stem from the fact that the display has no back-light. This results in a total

dependence on external lighting. The CRF-V21 is fitted with some front panel lighting in the form of an adjustable strip-light. Unfortunately, this does not help the problem with the display, as it creates a lot of reflections. The only option for the operator is to adjust the display contrast for best results.

Moving on to the reception modes, I found these to be generally very effective. The ability to choose the receive bandwidth for a.m. reception is very useful. This enables the operator to get the best possible from this mode. Provision of synchronous a.m. reception has been a feature of several Sony receivers and has been proven to be very effective. This system really came into its own when receiving broadcast stations on the crowded h.f. bands. It is quite amazing to hear strong adjacent channel interference completely disappear when this mode is selected.

The next area for attention was FAX reception - an area of special interest to me. I started with reception of some weather charts from Bracknell Meteo. The tuning indicator proved to be very effective, making it easy to select the optimum tuning point. The quality of the received charts is really very good, as can be seen from the examples in this review. All the functions worked faultlessly, with the auto phasing being particularly handy. With chart reception complete, I next tried receiving press photos. My favourite station for this is Associated Press in Buenos Aires. Reception of these was again very good with the 16 grey levels ensuring a good image quality. Because FAX images can take up to 15 or 20 minutes to transmit it is important that the receiver has good frequency stability. The CRF-V21 scored extremely well on this and proved to be extremely stable.

When looking at the RTTY performance I did hit a snag. The problem was the baud rates provided, or rather not provided. For amateur transmissions 45 baud is standard and for the majority of commercial stations 50 baud is the norm. However the CRF-V21, as supplied, was only able to receive 60, 66, 75 and 100 baud. This was a serious limitation to the RTTY performance. All is not lost, as the provision of microprocessor control should enable this to be

Specification

Receiver

Frequency range:	9kHz-29.9999MHz; 87.5-108MHz
Modes:	a.m. wide, a.m. narrow, sync u.s.b., sync l.s.b., u.s.b., l.s.b., c.w., n.b.f.m.
IF frequencies:	55.845MHz, 455kHz, 10.7MHz
Sensitivity:	9 - 49.99kHz: 30dBµV (30µV) (a.m. wide S/N=6dB) 50kHz- 1.99999MHz: 20dBµV (10µV) (a.m. wide S/N=6dB) 2 - 29.99999MHz: 0dBµV (1µV) (a.m. wide); -15dBµV (0.17µV) (s.s.b. S/N=6dB) 76 - 108.09998MHz: 10dBµV (3µV) (f.m. S/N=30dB)
Selectivity:	a.m. wide: -6dB ±3kHz, -50dB ±7kHz a.m. narrow: -6dB ±1.35kHz, -50dB ±3kHz s.s.b.: -6dB ±1.35kHz, -50dB ±3kHz FAX/RTTY: -6dB ±1.75kHz, -50dB ±3.6kHz n.b.f.m.: -6dB ±7kHz, -50dB ±12.5kHz
Image rejection:	more than 70dB
FAX drum speed:	60, 90, 120 & 240 r.p.m.
IOC:	H(576), L(288)
RTTY speed:	60, 66, 75, 100baud
ASCII:	110, 200, 300 & 600b.p.s.
FAX drum speed:	120 & 240 r.p.m.
IOC:	H(576) L(288)
RS232 data transfer rate:	300, 600, 1200 & 4800b.p.s.
Data length:	Data: 8bit Stop bit: 1 or 2 bit
Parity check:	Even, odd, none
Dimensions:	412 x 285 x 169mm
Weight:	9.5kg including the rechargeable battery and printer paper

corrected with a software update. I have passed the problem to Sony, so, with luck, this may be changed on later models. On the positive side the CRF-V21 performed extremely

well when receiving baud rates within its capabilities. The option to display the decoded text either on the screen or printer was useful as it helped to save paper.

Summary

The Sony CRF-V21 is certainly a very comprehensive and capable receiver. The technical performance of the main receiver was really excellent. In fact there were only two real problems the display illumination and RTTY baud rates. I can see no reason why both of these shouldn't be quite straightforward to correct. The question has got to be - is the high price tag of the CRF-V21 really justified? This is a difficult question as it depends on the buyer's individual requirements. Sony are famous for producing high-quality, executive equipment and the CRF-V21 must fall into this category. It is certainly unique and the technical performance is excellent. So really the choice is yours but at the end of the day you have the quality reputation of Sony to back your decision.

The Sony CRF-V21 costs £2999.95 while the optional AN-P1200 satellite antenna and converter costs just under another £2000.00. The CRF-V21 can be obtained from most Sony outlets, however, the review model was supplied by **ASK Electronics, 248-250 Tottenham Court Road, London W1P 9AD.** My thanks are due to ASK for the generous loan of the review model.

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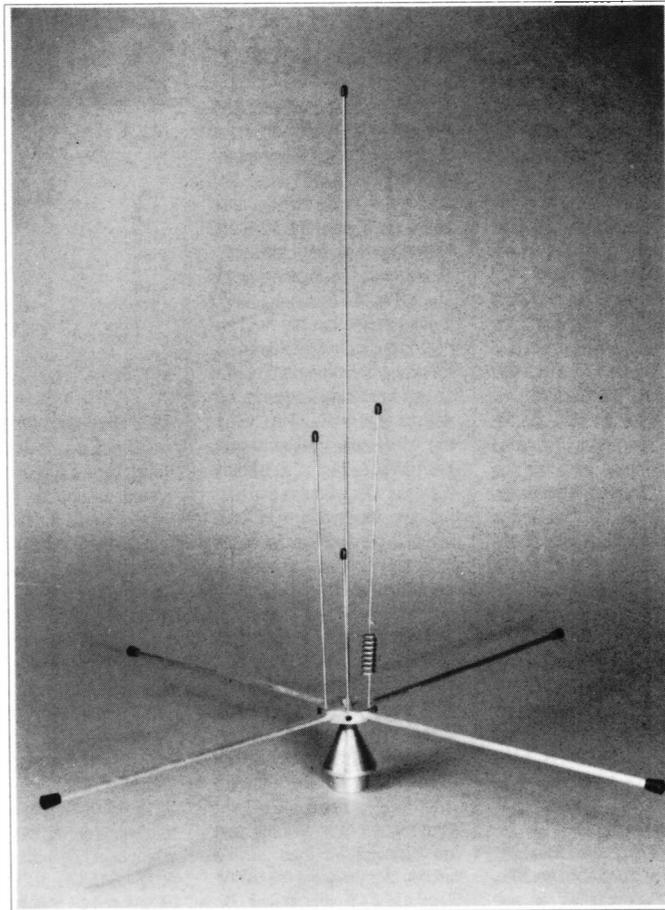
Sky Scan DX V1300 Discone

The discone is one of the most popular antennas with scanner users. Alf Brimming BRS 36662 has put the unusual Sky Scan DX Discone through its paces.

The V1300 is unlike any other discone I have seen. Above the cone are four vertical whips, giving the V1300 both vertical and horizontal active elements, pre-cut to set frequency bands.

The V1300 is made of good quality, stainless steel and aluminium and on unpacking the parts I was very pleased with the high overall standard of the engineering. The only change I would suggest is to the design of the cone. I would like to see the base of the cone threaded to take the top of a screwed support tube and make an already good bit of engineering outstanding. Although it would probably raise the overall cost a little, but would be well worth it for the overall improvement to the waterproofing of the coaxial mounting point.

The coaxial cable and the PL259 are fitted inside the cone after passing through the support tube, giving good weatherproofing. This needs to be done before any of the radiators and active elements are screwed into place. Once this is done, the discone is ready to mount out in the open, as high as possible and away from all power lines. One golden rule when putting up any discone is use UR67, or similar, coaxial cable, to cut down feeder losses at the higher frequencies.



Results

Test results taken against two other discone antennas, one without a vertically polarised section and one with such an element, showed that from 50 to 107MHz there was no difference between the three antennas. On the 108 to

136MHz a gain of 4dB over the two reference discones was measured. Between 137 and 175MHz this rose to 7dB falling to 2dB between 176 and 525MHz and steadying at 4dB between 526 and 1300MHz.

Using the Sky Scan V1300, I carried out listening tests at my QTH in Bristol. On both the v.h.f.

and u.h.f. Air Bands I was able to monitor air to ground and air to air, both ways, at distances of over 300 miles under far from ideal conditions during the first half of October 1990.

During the test it was pleasing to record, after darkness on several days, a number of military in-flight transmissions on frequencies never before monitored by myself between 176-525MHz.

The receivers used to carry out the tests were Kenwood R5000VHF, Signal R535 air band receiver, Kenwood RZ-1, Icom IC-R100 and a Realistic PRO2022 scanner. Not much difference between the receivers was noted during the tests.

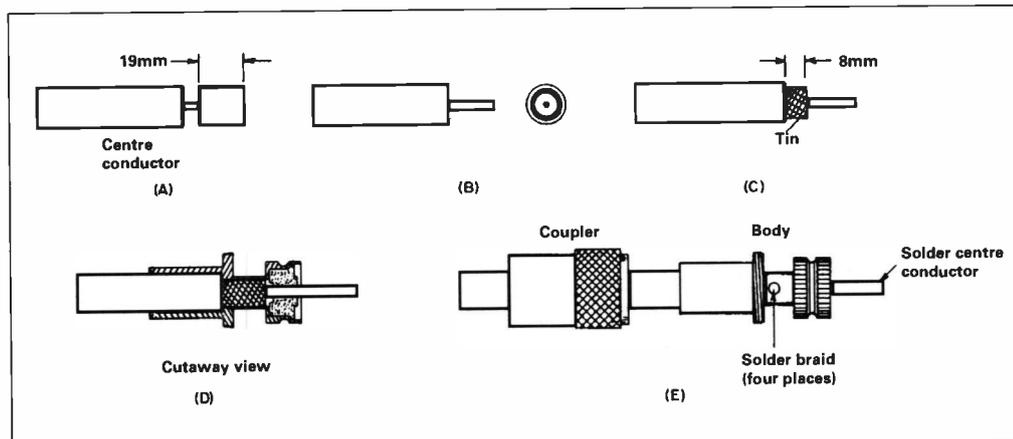
Conclusions

It all adds up to the fact that your receiving station is really only as good as your antenna makes it. From my tests, I think that you should get very good results with the V1300 and any good scanner on the market today. The Sky Scan V1300 can be used for transmitting on the 144, 430 and 1296MHz amateur bands, unlike many other wide-band discones, if one of the long elements is replaced by an element about 280mm long. This length would depend on the locality of the QTH and should only be done by a person with some knowledge of working with antennas.

My thanks to **SRP Trading, Unit 20, Nash Works, Forge Lane, Belbroughton, nr Stourbridge, Worcs. Tel: (0562) 730672.** for the loan of the Sky Scan DX Discone which costs £49.95 plus £3.00 post and packing.

How to fit a PL259 UHF connector to coaxial cable.

Original drawing taken from The 1990 ARRL Handbook, courtesy of ARRL.



propagation

by Ron Ham

Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

The sun is only a minor star in the Milky Way, but to us here on earth it is of major importance. Our planet is engulfed in a complex, gaseous atmosphere that protects us from the sun's more deadly rays. Following the advent of radio, it was soon learnt that certain regions of this gas, such as the troposphere and the ionosphere, have a definite influence over the transmission and reception of radio waves. It is the natural disturbances to the normal state of these regions that cause terrestrial signals to suddenly increase their accepted range and provide the communications that the DXers look for. With the help of your letters, I plan to tell you about the state of the sun and compare any sunspot activity with auroral and/or ionospheric disturbances, meteor trail reflection, Sporadic E and the association between tropospheric openings, atmospheric pressure and the weather.

I would also like to include your work with computers or in the field of radio-astronomy. So, whichever bit of the observational world interests you, welcome to this column and don't forget, if you see, hear or work anything unusual, do tell me about it - what we publish today is posterity's scientific record.

Solar

At his observatory in Selsey, **Patrick Moore**, using his special projection apparatus, observes the sun as often as possible and indicates on a prepared paper chart the position and shapes of any visible sunspots. A typical example is the drawing he made at 0830 on September 21, **Fig. 1**. During September, **Ron Livesey** (Edinburgh), using a 2.5in refractor telescope and a 4in projection screen, located 5 active areas on the sun's disc on days 9 and 26; 6 on the 8th and 29th; 8 on the 3rd and 10 on the 15th. **Neil Clarke GOCAS** (Ferrybridge) says that the mean sunspot number for the month was 124.7 compared to 199.9 for August and his computer print-out, **Fig. 3**, showing the daily level of solar flux for the month, clearly portrays the climb between the 7th and 19th to 208 units and the decline to 149 units from the 20th to the 29th.

At his observatory in Bristol **Ted Waring** counted 62 sunspots on October 14 which may have had a lot to do with the weak auroral warning that **Ern Warwick** (Plymouth) logged

from the German beacon DK0WCY at 0851 on the 16th and the "noisy" 28MHz band and the echo on the signal from the USA beacon WA4DJS that he heard on the 18th. **Patrick Moore** found a good number of spots at 0840 on the 20th, **Fig. 2**. **Cmdr Henry Hatfield** (Sevenoaks), using his spectrohelioscope, located 4 sunspot groups, 15 filaments and 11 small quiet prominences at 1028 on the 4th; 3gps, 8fs and 10qps at 1040 on the 12th; 3gps, 7fs (one thin and active) and 11 small qps at 1122 on the 13th; 4gps, 9fs and 8qps at 1202 on the 16th and 2gps (one with a very long chain of 7 spots), 13fs and 11qps at 1400 on the 26th. His observations were hampered by cloud on the 1st. In addition Henry recorded continuous noise from the sun with his 136MHz radio telescope periodically on the 8th and a number of individual solar bursts on the 17th, 18th and 20th.

Auroral

Ron Livesey is the auroral co-ordinator for the British Astronomical Association. As well as his own observations, he received reports of 'glows' from observers in various parts of Scotland during the overnight periods on September 13, 16, 18, 19, 20, 21, 22, 24, 25 and 28; 'quiet arc or band' on the 20th and 21st; 'ray bundles' on the

20th and 'active storm' on the 16th. Also on the 16th, **Doug Smillie** (Wishaw) received weak auroral reflected signals from GB3LER (Lerwick) on 144MHz.

Magnetic

The 'Ap' magnetic index for September, "was mostly unsettled to active with just 6 days when the field was quiet," wrote Neil Clarke and added that the most active days were the 12th and 15th when the index reached 24. These figures are shown on Neils graph, **Fig. 4**. "Observers report a quiet month but the field appeared gusty," wrote Ron Livesey following the information he received from magnetometer operators Garry Hawkins (Bristol), Tony Hopwood (Worcester), Karl Lewis (Saltash), David Pettitt (Carlisle), Doug Smillie and from his own observations in Edinburgh. In general they found the most active period was between the 11th and 14th.

International Beacons

Thanks to **Mark Appleby** (Scarborough), **Chris van den Berg** (The Hague), Henry Hatfield, **John Levesley** (Bransgore), **Ted Owen** (Maldon), **Fred Pallant** (Storrington), Ted Waring and Ern Warwick for their 28MHz beacon logs covering the period September 26 to October 25.

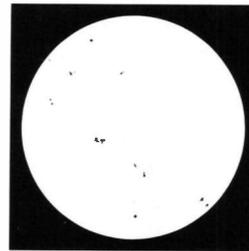


Fig. 1.

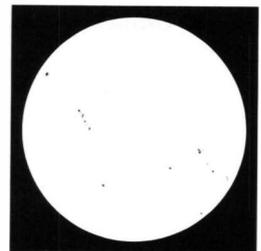


Fig. 2.

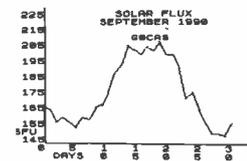


Fig. 3.

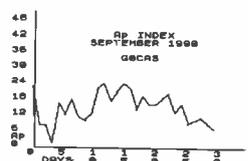


Fig. 4.

Their combined efforts enabled me to prepare the chart in **Fig. 5** which shows a generally active period except for October 10 when I'm told the band was almost 'dead'. The majority of these signals are transmitted from strategic sites around the world and can be found on specific frequencies between 28.2 and 28.3MHz. Readers wishing to take part in this routine observation should write for a log.

Ern Warwick reports hearing a new beacon sending "N2BJG/B FN21 PSE QSL" on 28.282MHz. On the other amateur bands during this period, he often copied signals from IK6BAK on 24.915MHz, PY2AMI on 24.931 and 18.100MHz, LU4AA, ZS6DN/B, 4X6TU/B and 4U1UN/B on 14.100MHz and DK0WCY on 10.144MHz.

Tropospheric

The slightly rounded atmospheric pressure readings for the period September 26 to October 25 were recorded at noon and midnight by the Short & Mason barograph installed at my home in Sussex. As expected, tropospheric openings coincided with the falling high pressure between October 10 and 13 and 20 and 23. Around 2155 on the 22nd, **Leo Barr** (Sunderland), using an AOR800 scanner, heard amateurs through the Newcastle repeater on 433MHz saying that the 144 and 432MHz bands were "wide open to Western Europe".

Band II

Tropospheric openings usually provide good DX hunting conditions in the domestic v.h.f. broadcast band (87.5-106MHz) and these two October events were no exception. Leo Barr, using Matsui MR4099 and

Philips FCD463 receivers, logged BBC Radios 2 and 4, with generally good stereo from Holme Moss and ILR Radio Borders from Eyemouth early on the 13th and "lots of stations from Western Europe, too many to note or identify all of them," late on the 22nd. Next morning at 0713 he logged BBC Radio 1, possibly from Scotland and during the following half-hour he heard Dutch stations, at good strength, around 93.5, 97.6, 98.7 and 99.9MHz. While in Laurencekirk on the 27th, **George Garden** (Edinburgh) reports "a short spell of very still weather before the onset of deep low pressure and fairly heavy wind an rain". However, at 2245, using an in-door dipole and amplifier, he tuned through Band II and was delighted to find BBC Radio Newcastle and ILR Radio Clyde 1 and Radio Borders from Eyemouth and Selkirk and RadioTay from Perth.

Info

At 1003 on October 28, Leo Barr listened to "excellent stereo" test transmissions from a new nearby community station, Wear FM, due to begin broadcasting at 0900 on November 5. **Francis Hearne** (Bristol) told me on November 5 that, "Chilton Radio has now separated. Its medium wave section is known as Chiltern Radio Supergold."

During October I recorded 4.28in of rain and logged thunder static on days 15, 18, 27 and 30. The highest humidity reading was 84% at 1600 on the 5th and the most rain of 1.55in fell overnight on the 27th/28th. The average noon pressure was 29.88in (1010mb) with a peak of 30.35in (1027mb) on the 8th and a trough of 29.2in (988mb) on the 28th and 29th.

	SEPTEMBER										OCTOBER																		
	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BBC001	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DF0AAB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
DL0RGI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
EA3JJA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
H0GGEW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IY4MI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KATNEV	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KB4LPI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KC4DPC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KE5DH	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KF4MB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KL4X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KW7Y	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LASTEN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
LU1UG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NX2QB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NZ1JG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OK0EG	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OK2TEN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PT7AAC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PK2AM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PK7AA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SK2EN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VE2HOT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VE2HT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VE2STN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VE5YF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VK2RSY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VK6WI	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
VK6RWA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WA4DJ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WB4LJE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WC2E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WJ2D	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
W7JF1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WB7L4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WBUR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WBUXD	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
YO2X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z08F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z1M1F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z1L4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z56V1F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z56V1F	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Z71ANB	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4N27K	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5B4C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6Z4RR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Fig. 5.

ssb utility listening

Peter Rouse GU1DKD
Barcroft, Rohais de Bas, St Andrews, Guernsey, C.I.

Welcome to a new, regular column dedicated to h.f. listening on those communications bands used for s.s.b. voice traffic. It will look at such diverse areas of communications as aviation, marine, military, satellite and shuttle launches and more. I shall also be looking at equipment, antennas, books and accessories as well as giving hints on tuning around for these types of transmissions. This month I will look at what is happening in the Gulf and you will find a comprehensive list of frequencies that are being used by the military.

Naturally a column like this is as good as you the reader make it and I look forward to receiving your comments and details of any interesting loggings.

First though some words of caution. Despite the fact that little, if any, sensitive communication is ever passed in the 'clear' (without some form of coding, scrambling or frequency hopping) the British authorities still take a fairly dim view of you tuning into anything except licensed amateur or broadcast transmissions. However, there does now seem to be a bit more unofficial 'give' in Britain, particularly where some aviation and marine transmissions are concerned (except 'link' telephone calls) and I suspect that the authorities are not particularly worried about you eavesdropping on transmissions from such bodies as NASA who not only publish their frequencies but even seem to encourage listeners. Having said all that, though, you should not take any of the above as an invitation to break the law.

Who am I

Regular readers of this magazine will probably associate my name more with scanners and weather satellites than h.f. communications but, in fact, I am a fan of all forms of communication including digital modes - though I will leave those to Mike Richards. My home station consists of an NRD-525 receiver fed by a full-size G5RV antenna connected to the coaxial feeder via a 1:1 balun. I do not have premises suited to a multi-band, rotatable dipole and find the G5RV is a good compromise for covering a wide range of bands that are not harmonically related. Other station equipment includes a Packrat PK-232 run under the control of a Macintosh SE com-

puter and an Icom IC-R7000 receiver.

The Gulf Crisis

Hopefully, by the time you read this, a peaceful settlement will have been reached in the Gulf. However, at the time of writing the situation was still tense, with troops, munitions and supplies still being ferried in by sea and air. This meant that the many frequencies used by the military were still very active (weekdays during normal working hours, of course).

The Gulf area is part of what is known as MID 1. This is an h.f. control zone which runs from Ankara in Turkey, down to Cairo and then Jeddah. It then runs to the southern end of the Gulf and onwards to Bahrain, Kuwait, Basrah and Tehran before cutting west back to Turkey. Other stations within this network include Baghdad, Basrah, Damascus, Amman, Ben Gurion and

Beirut. The main frequencies in use for MID 1 are 2.992, 5.667, 8.918 and 13.312MHz. Although MID 1 is defined for civilian air traffic control, military aircraft passing through the area stay in touch with the controllers.

Military operations have been monitored on a number of frequencies and the list should help you but I cannot guarantee accuracy as it has been drawn from a number of sources. Several frequencies provide some fascinating listening at times such as the AWACS (airborne early warning radar system) operators on 8.967MHz. Broadly speaking, the frequencies between 5MHz and 15MHz will provide the best results - not only with traffic from the Gulf area, but also military units and aircraft crews talking back to the United States.

Next month I hope to look at many of the h.f. frequencies used by NASA during Shuttle launches. Meanwhile, if you have any interesting frequencies then drop me a line.

Freq (MHz)	Area/Type	Station	Country
2.5125	Marine	Agaba Radio (QSK as advised)	Jordan
2.6125	Marine	Agaba Radio (QSK as advised)	Jordan
3.0480		USAF	
3.0500		US Navy Air Force	
3.0600		Extensive use by F world-wide	UK***
3.0670		Croughton Military (2300-0500 UTC)	
3.0700		USAF	***
3.0810		USAF Global Command & Control (GCCS)	S. Arabia ***
3.0950		Saudi-based AWACS	
3.1090		US Navy Air Force/RAF tactical	
3.1130		USAF	
3.1160		RAF	UK
3.1200		RAF Air Defence System	UK
3.2950		USAF Strategic Air Command	
3.3690		USAF Strategic Air Command	
3.4040		Basrah and Beirut	
3.4530	MID 1 Civ	Amman Control	Jordan
3.4670	MID 1 Civ	Aden and Cairo Radio	Iraq
3.8000	MID 1 Civ	Baghdad Radio	
3.9310		US Army	
3.9390		RAF Air Defence System	UK
4.3636	Marine	Basrah Control QSK 4.0692MHz	Iraq
4.4163	Marine	Agaba Radio QSK 4.1219MHz	Jordan
4.4318	Marine	Agaba Radio QSK 4.1374MHz	Jordan
4.4770		USAF Strategic Air Command	
4.4950		USAF Strategic Air Command Ch. Echo	
4.7110		US Navy	
4.7210		Air Force 1 & F VIP flights	***
4.7250		USAF Strategic Air Command Ch. Victor	***
4.7270		USAF Strategic Air Command 'Electric'	
4.7300		RAF Akrotiri/Flight watch channel	Cyprus
4.7420		R.A.F. Strike Command 'Architect'	***
4.7440		USAF 'Hightower'	
4.7460		USAF Global Command & Control	
4.7630		British Army	
4.8110		NATO standard frequency	
5.2300		USAF	
5.2430		USAF	
5.2970		RAF Tactical	UK
5.3020		USAF	
5.3700		USAF	
5.5810		Baghdad Radio	Iraq
5.6030	MID 1 Civ	Baghdad/Basrah/Beirut Radios	
5.6670	MID 1 Civ	Aden/Amman/Bahrain/Damascus/Jeddah	
5.6670	MID 1 Civ	Kuwait and Tehran Radios	
5.6830		Kuwaiti Air Force	Kuwait
5.6850		RAF Tactical	UK
5.7030		USAF Command Control	***
5.7070		USAF	
5.7100		USAF 'Mystic Star'	
5.7290		RAF Strike Command 'Architect'	UK
5.8000		USAF Tactical airborne command post	***
6.5064	Marine	Basrah Control QSK 6.2000MHz	Iraq
6.5100	Civ	Jeddah Control	Saudi Arabia
6.6345	Civ	Beirut Radio	Lebanon
6.6830		USAF 'Mystic Star'	
6.6930		USAF	
6.6970		USAF/US Navy	
6.7120		USAF Strategic Air Command	
6.7150		USAF bases	
6.7200	Atlantic	US Navy (CinClant)	UK
6.7380		RAF Strike Command 'Architect'	***
6.7400		USAF - 'Finger'	***
6.7500		USAF (including 'phone patches)	***

6.7570		USAF (SSB & RTTY)	***
6.7600		USAF 'Mystic Star'	***
6.7610		USAF Strategic Air Command Ch. Quebec	***
6.8120		USAF	
6.8170		USAF	
7.7300		USAF	Europe
7.7350		USAF	
7.4750		USAF Strategic Air Command and tactical	***
7.8310		USAF Strategic Air Command and tactical	***
8.0350		Royal Navy 'ModNavy' London	UK
8.7220	Marine	Royal Navy via Portsmouth QSK 8.1981MHz	UK
8.7282	Marine	Jordan Radio (Agaba) QSK 8.2043MHz	Jordan
8.7623	Marine	Basrah Control QSK 8.2384MHz	Iraq
8.8470	MID 1 Civ	Baghdad/Beirut Radio	
8.9180	MID 1 Civ	Aden Radio/Amman Control/Bahrain Centre	
8.9180	MID 1 Civ	Damascus/Jeddah/Kuwait/Teheran	
8.9670		USAF/Saudi Air Force AWACS	***
8.9700		USAF (Logis)/Kuwait Air Force	***
8.9770		RAF Tactical	UK
8.9900		Gulf Air Traffic Control	
9.0110	Med & M. East	USAF Command Control Net	***
9.0140		USAF Command Control Net	***
9.0180		USAF VIP flights inc Air Force 1	***
9.0270		USAF Strategic Air Command Ch. Romeo	
9.0320		RAF ground control/flight watch	
9.0570		USAF Strategic Air Command & TAC Ch. Papa	***
9.0650		Royal Navy	UK
9.0240		RAF Tactical	UK
9.0270		USAF Strategic Air Command	
9.0320		RAF Strike Command 'Architect'	UK
9.0360		US Navy Air Force	
9.9200		USAF Strategic Air Command	
9.9230		USAF Strategic Air Command	
9.9260		USAF Strategic Air Command	
9.9290		USAF Strategic Air Command	
9.9910		USAF 'Mystic Star'	
10.0180	MID 1 Civ	Kuwait/Teheran	
10.8500		US Army	
11.0180		US Navy	Turkey
11.0550		USAF	***
11.0580		USAF 'Mystic Star' SAM	***
11.1180		USAF VIP flights & Air Force 1	
11.1200		USAF VIP flights & Air Force 1	
11.1760	Eur/N Atlantic	USAF Global Command	***
11.1790	Med/M. East	USAF Global Command	
11.1820	W Atlantic	USAF Global Command	
11.1850		RAF Tactical	UK
11.1900		US Navy	
11.1935		Royal Navy	UK
11.2040		RAF Strike Command (Upavon)	UK***
11.2050		USAF	***
11.2130		USAF	
11.2150		USAF AWACS	
11.2200		USAF Strategic Air Command Bravo ch.	***
11.2260		USAF Global Command 'Mystic Star' Ch.F535	***
11.2340		RAF Strike Command (Upavon)	UK***
11.2360		USAF Global Command	
11.2390		USAF Global Command	
11.2430		Royal Navy	UK
11.2430		USAF Strategic Air Command primary day ch.	***
11.2480		USAF Strategic Air Command	
11.2490		USAF VIP	
11.2550		US Navy (CinClant)	***
11.2570		USAF & RAF	
11.2680		US Navy (CinClant)	Atlantic
11.2710		USAF Global Command	
11.3000	AFI-3 Civ	Jeddah Radio	Saudi Arabia
11.4080		USAF Strategic Air Command Ch. Yankee Quebec	
11.4600		USAF SAM & VIP flights	
11.4940		USAF Strategic Air Command Ch. Lima	***
12.0700		USAF Strategic Air Command/Tactical	
12.1520		RAF Akrotiri/UK voice channel	Cyprus
12.2150	Indian Ocean	US Navy 'Hicom'	***
13.2110		USAF Strategic Air Command Ch. Bravo Whisky	***
13.2150		USAF Global Command & Control Ch. Quebec Bravo	***
13.2410		USAF Strategic Air Command Ch. Sierra	***
13.2440		USAF	***
13.2470		USAF	***
13.2570		RAF Strike Command 'Architect'	UK
13.2880	MID 1 Civ	Kuwait and Teheran	
13.3120	MID 1 Civ	Amman/Bahrain/Damascus	
13.3120	MID 1 Civ	Jeddah/Kuwait/Teheran	
13.3200	MID 1 Civ	Basrah Radio	Iraq
13.3360		USAF VIP & SAM flights	
13.4400		USAF VIP & SAM flights	
13.4450		USAF VIP & SAM flights	
13.4550		USAF VIP & SAM flights	
13.4730		RAF Gibraltar	Gibraltar
13.7130		USAF VIP & SAM flights	
13.8230		USAF VIP & SAM flights 'Mystic Star'	***
13.9070		USAF Strategic Air Command	
14.9130		USAF Strategic Air Command	
14.9130		USAF VIP & SAM flights	
14.9550		USAF Strategic Air Command Ch. Charlie	***
15.0150		USAF	***
15.0210		US Navy	
15.0310		RAF Strike Command (Architect)	UK
15.0360		USAF Croughton	UK***
15.0410		USAF Strategic Air Command Ch. Mike	
15.0570		US Navy	Atlantic
15.8500		USAF Adana	Turkey
16.0350		USAF Croughton	UK
16.0410		USAF Croughton	UK
16.4540		USAF Croughton	UK
17.9720		USAF Strategic Air Command & tactical	
17.9750		USAF Strategic Air Command	
17.9800		RAF Metro	UK
18.0020		USAF Global Command & Control	
18.0180		RAF Akrotiri	Cyprus
18.0180		RAF (Strike Command)	UK
18.5940		USAF Strategic Air Command Ch. Zulu	***
20.1670		USAF Strategic Air Command & tactical	
20.6310		USAF Strategic Air Command Ch. Whisky	
20.8900		USAF Strategic Air Command Ch. Delta	
21.4100		Kuwaiti Air Force	Kuwait
21.4150		Kuwaiti Air Force	Kuwait
23.2200		RAF (Strike Command)	UK
23.2270		USAF Global Command & Control	
23.2870	Atlantic	US Navy 'Hicom 3' (CinClant)	
23.3150	Indian Ocean	US Navy 'Hicom 1' (CinPac)	
23.3370		USAF Strategic Air Command Ch. Uniform	
23.3850		USAF 'Mystic Star'	
27.8700		USAF Strategic Air Command Ch. Delta Quebec	

*** indicates stations most consistently or recently heard
SAM/VIP = Special Air Mission & VIP flights (government officials, etc)
Air Force 1 is a Presidential flight, Air Force 2 is the Vice-President

bandscan

Peter Laughton

Now that Eastern Europe is opening up, we're finding out more and more about how international broadcasting operates in that part of the globe. For instance, if you look at the amount of hours broadcast by the Soviet Union, the individual republics, Cuba plus East Europeans countries such as Hungary, Czechoslovakia, Bulgaria and so on, you come up with an enormous list. Yet the number of times when they interfere with each other is quite small. To many, it comes as no surprise that the International Organisation for Radio and Television (OIRT) - the East European equivalent to the European Broadcasting Union - has been organising regular meetings where its members work out where on the dial each is going to broadcast. Mind you, in Geneva there's a body called the International Frequency Registration Board, a UN body that collects schedules from stations across the globe. However, it seems the IFRB does not collect data on transmissions that fall just outside the current 'official' broadcast bands. But what does the OIRT plan to do in the future? Ideally, of course, if there was contact between East and West, at least some of the current frequency chaos could be reduced. However, it now seems the Czech authorities are questioning the whole future of the OIRT, as many East European broadcasters want to become members of the European Broadcasting Union instead.

Kashmir Secret

Elsewhere on the radio front, Indian journalists have been reporting what they describe as a secret radio station in Kashmir, which has taken on a revolutionary tone, calling the people to rise up against the Indian army. It turns out the radio isn't secret. Pakistan-backed Azad Kashmir Radio from Muzaffarabad has been on the air for years using 792kHz and 3.660MHz. But a programme broadcast in Urdu on Fridays at 0230 and again at 1130UTC called Hamara Kashmir, which means 'Our Kashmir', has started shouting for independence. Both the Pakistani government and Kashmir separatists have denounced the programme as being the wrong approach.

Ivory Bluff

A few months back, there was a curious French television report that claimed that the West African Ivory Coast was to be the site of a new relay station for Vatican Radio. The news item said the move was part of a deal made by Ivorian president Felix Houphouët-Boigny with the Holy See. The president agreed to build the relay station as well as a Catholic university and hospital in Ivory Coast in exchange for the Pope's consecration of the enormous basilica he has had built in his home village of Yamassoukro. However, when called, the Director General of Vatican Radio, Pasquale Bourgomero, seemed to be as surprised at the report as

we were. He says that Vatican Radio has looked into exchanges with other stations, but has no plans to build facilities in Africa. They are more interested in finding relay facilities in Asia. In fact, there are already strong ties between the Vatican and the Catholic religious short wave station Radio Veritas Asia in the Philippines.

Goddess of Democracy

Remember last year's Goddess of Democracy project? You may recall that this was the ship that set sail from France with the intention of broadcasting pro-democracy messages from international waters just off the coast of mainland China. But the *Goddess of Democracy* never got on the air, because governments in the region refused to assist the Chinese dissidents on board, and the promised medium wave transmitter was never installed. A Taiwanese citizen has now purchased the ship for half a million dollars. He plans to convert the *Goddess of Democracy* into a museum so that no-one will ever forget the Tiananmen massacre in June 1989.

Bonaire Experiments

It seems that Radio Netherlands is suddenly carrying out a series of tests to improve reception of its Bonaire relay station, and make measurements of s.s.b. signals. Tests have been announced with 30 minute transmissions in the standard double sideband (a.m.) mode, and the remainder of the broadcast with a 6dB reduced carrier and only one sideband. The results so far indicate very little difference on standard radios. It is only in the last ten years that broadcast transmitters capable of working in a reduced



QSL card from Radio Moscow.

carrier s.s.b. mode. Given the choice, many stations have purchased a.m. transmitters that are cheaper.

Like the BBC, Radio Netherlands has added an Optimod system to its signal processing chain. Basically this splits the audio spectrum into six different bands and processes them in such a way that the transmitter is forced to modulate more efficiently. It gives the impression of a fuller sound and punches through the static much better.

Whilst this will help the station's audibility, the Dutch government has turned down plans for a third relay station. Radio Netherlands was hoping to build a transmitter site in Thailand together with the BBC. Assuming the British government approves the BBC's half of the project, the BBC should have no problems finding other partners. Radio France International, Radio Australia and Deutsche Welle have all expressed interest in using Thailand as a site for an Asian relay.

USSR Update

A Telex has just arrived from the Soviet Union to announce that the first international gathering of DXers and s.w.l.s in the USSR took place in Leningrad between December 6 and 9. It was arranged by a group called Inter-radio, an independent club for s.w.l.s and radio amateurs. The meeting was supported by the Finnish DX Association who took the train to Leningrad to attend the event. Let's hope that this is the first

of many meetings. Perhaps this is the opportunity for the European DX Council to organise a proper 'East-West' conference, probably in Prague or Warsaw. From a western point of view, this would be a cheap way to explore the east, and learn about the stations that have broadcast from behind the 'Iron Curtain'.

Meanwhile Vasily Strelnikov has certainly made a name for himself in international broadcasting circles by his rock request show on both the North American and World Services of Radio Moscow. Now he's persuaded Radio Moscow to install a listener request line. If you fancy giving it a go, then the number to try is 010 7 095 2336591.

Paradise Harmonic

The Association of North American Radio Clubs may have folded, but many of ANARC's activities continue. The ANARC network on the amateur radio bands is still active each Sunday at 1500UTC on 7.240MHz i.s.b. The group recently carried an unusual tip about Radio Paradise, a religious station on St Kitts in the Caribbean. This station normally operates on 825kHz, but because of what must be a transmitter fault, a signal on the third harmonic of 2.475MHz is also being radiated. One to check out for transatlantic propagation at the moment.

The End

I've enjoyed bringing you these notes from the dial, but it's now time for me to pursue other interests. Bandscan is going to be re-organised to bring you more regional reports from around the globe. I hope you'll support the new authors in the same way you've supported me. I'm not disappearing off into the sunset, you'll still hear from me from time to time when I have some interesting items to pass onto you.



Two QSL cards from Radio Canada International, which sadly closed down on 4 December 1990.

satellite tv news

Roger Bunney, 33 Cherville Street,
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This column hopes to provide all kinds of information on the satellite TV world, with the odd juicy bit of gossip about the terrestrial TV industry.

Most TVDXers will be familiar with the scrambled TV service of Canal+, France that uses the Discret form of encryption. Terrestrial TV transmissions are rarely scrambled, but on 18 May 1990, a new scrambled TV service, Sky Network Television, commenced a three-channel service in New Zealand. Viewers can purchase decoders at their local stores for NZ\$399 (or hire at \$13.50 monthly) to use with the u.h.f. transmitted offerings though, at this time, only the Auckland, North Island area is covered. They should have expanded over North Island by the end of this year and cover the more populated parts of South Islands during 1991. The channels cover a 24-hour news service (mainly CNN plus a dusting of BBC news); a sports channel and a noon-to-midnight movie channel.

Problems face Canal+ in France with their terrestrial transmission service, since 'pirate' decoders are now commonly available. The long term aim is to change the encryption standard to a higher level, addressable system coupled with the use of D2-MAC. The problems of programme security are profound with the wealth of single and multi-mode pirate decoders now available in the satellite press in Europe - and the UK for that matter. One advertisement noted in a German magazine indicated that most scrambled signals could be cleared with the purchase of their various plastics boxes, even the Sky Videocrypt has been hacked successfully. At the 1990 Satellite Shows in Earls Court, D2-MAC decoders were available to the trade with demonstrations

of their picture quality - which was surprisingly good. Perhaps Filmnet is the most 'hacked' and pirated satellite channel with decoders offered on the trade market down to £49 + VAT, though with recent buy-outs of programme companies its likely that both Filmnet and RTL-V (both on Astra 1A) will change their encryption to a more secure standard within the year - so any readers thinking of purchasing black boxes take note, the boxes may not be upgradable.

Canal+ Espagne has delayed its Spanish opening due to office and studio building delays and has stated a September opening, some six months after original plans for the service. It is however thought that Canal+ are seeking a more secure encryption standard since pirate boxes are readily available over the border in France!

Rupert Murdoch of The News Corporation and Sky TV fame is joining forces with the NBC and Cable Systems Corporation to project a Sky Cable service for the North American continent. Based on the Hughes HS601Ku (11GHz) satellite they reckon to have up to 27 channels beaming down from their 101°W orbital slot. Programming will be available to either cable systems or the general public, the latter using dishes of 450mm diameter. If all goes well, the DBS service will be operational during mid 1993. Over one billion US\$ will be put up for this venture, which if successful could provide upwards of 100 channels by the year 2000.

Intelsat has announced its plans for the next few years which involves three new phases of satellite. The Intelsat VI series will be used for video/telephone and general data information with transponders for Ku (11GHz) numbering 10 and 38 C Band (4GHz) units, these capable of TV transmission. Additionally,

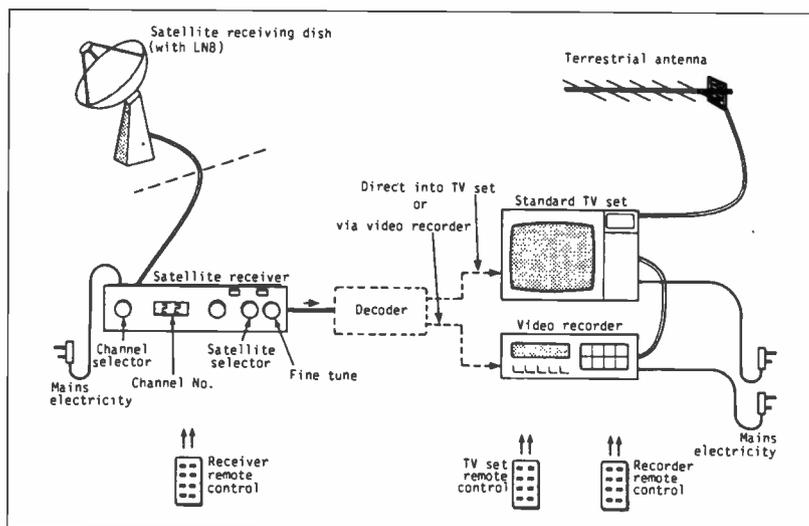


Fig. 1: A typical satellite television receiving system. Reproduced with permission from *An Introduction to Satellite Television BP195* by F.A. Wilson, published by Bernard Babani (publishing) Ltd.

three Global TV channels will be included. At least five of these birds will be orbited. Intelsat VII will carry 26 Band C and ten Ku band transponders with independent, steerable C and Ku dishes. Upwards of five will be in service.

Intelsat K will be a powerhouse of signals with capability of 32 TV channel operation (in half transponder mode) and can provide a 50dBW signal power. Eastern beams will cover most of Western Europe and extending into Eastern Europe, from North Africa to North Scandinavia. Western beams will have the capability to reach into the North American seaboard and Central America.

Romania was accepted into Eutelsat membership on May 4 thus enabling the country to both transmit and receive signals via the present and future European Eutelsat satellites. Another new country in space will be Yugoslavia with their projected service of six hours of local material - which if popular will expand into more of a pan-European programme format. The DTI have allowed cable TV operators to

utilise microwave links for programme distribution between cable head end hub units. These link circuits will be broadband and operate within the 17.3-17.7GHz band and be available by the end of March 1991.

It is interesting to note that various European TV satellites services are viewed in Morocco with, perhaps, less than the usual censorship expected in that area. Sky, TF1, La Cinq are transmitted

over terrestrial u.h.f. transmitters in both Rabat and Casablanca. One of the most popular programmes is Super Sky ex-RTL. Though a degree of censorship is at times displayed on certain of the more explicit scenes, if the Rabat transmitter decides to restrain viewers, re-orientation of the antenna to Casablanca will often reveal the missing Rabat material!

Abbreviations

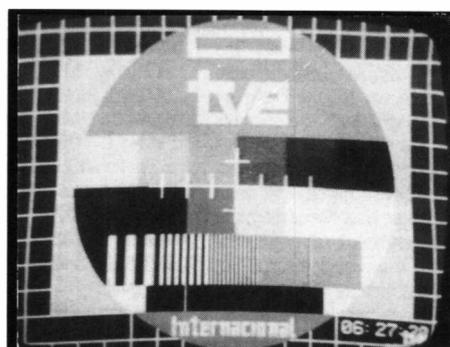
d.b.s.	direct broadcast satellite
dBW	decibels reference one watt
DTI	Department of Trade & Industry
GHz	gigahertz
mm	millimetres
NZ\$	New Zealand dollars
SNG	Satellite News Gathering television
TV	television
TVDXer	"long distance" television signal watcher
u.h.f.	ultra high frequency
US\$	United States dollars
VAT	Value Added Tax
°	degrees



This is from a News Gathering Unit in Syria uplinking via Eutelsat at 7° east (525-line).



From Gorizont 15 at 14° west showing the Moscow-London circuit with caption.



TVE International programme carried on Eutelsat 1 F5 at 10° east, Ku band 11.149GHz.

amateur bands round-up

Paul Essery GW3KFE
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For many years, it's been illegal for Soviet stations to accept foreign currency. Much of that sent with QSL requests has ended up on the Black Market. It's now, however, quite OK. So 'green stamps' (dollar bills), or similar, are now acceptable and the recipient can go to his bank in USSR and deposit foreign money with no questions asked. However, there seems little doubt that letters containing enclosures are often opened and the contents fail to reach the intended recipient.

So, in practice, it is best to either QSL Russians through the Bureau, or to use a stamped addressed envelope. Bear in mind though, that it's no use whatever putting a UK stamp on a return envelope - you must find a stamp shop who will sell you the correct mint Russian stamps to cover air or surface mail return.

News

Don't forget to have a listen to Wireless Line, compiled by *Practical Wireless* on 0898 654632 which will give you all the latest news, updated every Friday. This gives you a chance of a bite at the interesting DX which mostly pops up at short notice

Top Band

Years ago, there was a newsletter produced by the late, great W1BB. When Stew was taken ill, Ivan VE3DO took on the chore. When Ivan had to give up, there was a blank, but now I hear that G3XTT and G3RBP are offering a new *Top Band Sheet*, at least a couple of issues per DX season. All possible support is needed if this one is to succeed. Details from G3XTT, 105 Shiplake Bottom, Peppard Common, Henley-on-Thames RG9 5HJ.

Beacons

Beacons are a helpful way of assessing band conditions. One of the most useful of these is the well-known NCDXF chain on 14.100MHz. Each one operates for one minute and then gives way to another one, over a ten-minute cycle, giving world-wide coverage. Now the beacons are to be up-dated by arranging that when a particular beacon finishes its minute on 14.100MHz, it immediately moves to 21.150MHz for one minute and then again to 28.200MHz for one minute.

In due course, all the bea-

cons in the chain will be arranged to do this, so that one can assess the characteristics of the three h.f. bands in ten minutes flat. In effect, this will also give a check on the three WARC bands too. On 28MHz, of course, there are already umpteen beacons up and down the bands to be logged. Every beacon signs its call sign in slow Morse, so even if you know no Morse but have a 'look-up table', you should be able to identify each one after a few repetitions. Note that most have a call sign followed by the oblique slash / followed again by either the letter B or possibly BCN.

Letters

Daniel Peake (Burnage) is proposing to take the Novice Test, both practical and c.w., next year. He listens on all bands 1.8-30MHz, but his favourites are 21 & 28MHz. The antenna is a 100m wire up in the loft, fed by way of a Lake TU1 a.t.u., into a Saisho SW5000. On 28MHz this set up accounted for LR5A, 5T7AZ, PJ2MI, JMOGMI, VE7IG, VP2E, 9H1EL, S01A, FC5R, 9Y4H, PJ9W, IT9HBT, HC2G, PT7FX, UT5RY & TA2AU. The 21MHz band was used for ZW5B, AH0E, KC8PE, YC50DG, KF4ZH, T77C, R6L, LU4L, BY2BW, PQ5C, K2FWH/M, HB9CCL, CU3LF, YZ90S, 9H1XX, C6ACN, 9H1GU, C6ACD, V06LV & N5CAF. The 18MHz band was tried too and managed ZL3DX, 4K0ADS, K1VZT/MM & ON4UE/P/CT1. Down again to 14MHz, where VK2IK, 5B3DES, HX1LXF, YT90T & 4K4/P/EK0AK were noted.

Dennis Sheppard (Earl Shilton) has been somewhat busy this month. First there was an antenna-moving session, to try and reduce the QRM and wideband noise emanating from the TV set next door, then there was a receiver change in the shack. The first list comprises copy taken on the old AR88: On Top Band, HB9JAP & EA7CL1; on 3.5MHz JA5AQC, JA6J00, HL1UA, 0A4ED, ZL4AP, VK6LK, VY20HM, 5T5CK, JA2KIW, JA4DND, HK4DHR & plenty of USA. On 7MHz there were PY1HY, C 06SD, VE2SIM, TI2VYR, VK2WC, VK3RE & VK5BC while on 28MHz JR4ABB, VE3JF, HR1RMG, N3EMA/KH2 (Guam), YC0WWL, CX4GL, 5N30MRD, & lots of other JA & W signals.

When the FR50B was set up, on 3.5MHz, it came up with 4U11TU, 0Y9JD, UA9MBV, VE1NAA, VE3POS, ZL1CCR, ZL2ANR, ZL4AP, ZL4BO, TK5BF,

YB6GR, YB6CA, CR9FF, VS6CT, RA0AD, ZDBZ, T77C, VP2EHF, W6MDH, 9Y4H & assorted Ws. For a first, ZL3GS was heard on 28MHz along with ZP0Y, while on Top Band, PA3DIP, SP9FV, OE3HPU, OK3KII, ON4UN, I5KKW & LY1BYK were logged. All signals were s.b., of course.

Now to **G. Bramwell** (Swinton), he has come back to the hobby after picking up an old second-hand Trio 9R59DS receiver. This is used along with a 20m random wire up aloft and a home-brew a.t.u. to get the most from the antenna. Starting with 28MHz, I note f.m. signals from N2HYD, KD3FH, LZ1KVH, plus s.s.b. from PY1KAA, KC4CUS, WB9AHN, K4JPD, N2EPJ, W2TSZ, PY2CK, VE3MR VE7CQ, 7X1KR, W1AF, CU7AC, WD8PCT, KD5ZM, 5B4ES, & a daffy of Europeans. The 21MHz band was tried and produced N4ZC, W2HPI, WA2WFJ, TI3EMU, HR1RMG, VE1BN, W1HBB, N1CER, VE3PRU, N4UGS, ZB2AZ and again Europeans. On 14MHz, there were Europeans and East Coast Ws aplenty, while on 7MHz, he found 5Z4BI, JA6CUH, 3A9A, HL1UA, JA4JBZ, 4N4AE & the usual crop of Europeans. On 3.5MHz, VE1ANJ, WB3GCG, V06FG, W2HCW, K2NL, W4MYA, 9H1EL, W2VP, N8HYR, VO1EM, HL1IUA, VS6CT, CU2AI, plus Europeans were all noted.

Finally Mr Bramwell asks about possible modifications to this receiver. If anyone knows of any, please contact him direct at 43 Beechfield Road, Swinton, Greater Manchester M27 1RA.

Harold Wood (Gorton, Manchester) is no newcomer to s.w.l.ing, but was a little startled to receive a request for 'green stamps' for a QSL from a Russian station recently. However, as mentioned earlier, this is now legal and, of course, a popular station making lots of contacts does find direct QSLing a financial burden. On 14MHz Harold notes VE8RCS, YZ90S, E15GE/MM, JX7DFA, on 28MHz

VE1JOE, 9H3BSG, PJ1B, 8P9X, VP2EC, VE3XO & an XM31Y - has anyone got any more details on this one? Turning to 24MHz I see T77J, AB4MJ, VE3BIR & CT1DUR.

Eric Masters (Welling) has a 25m end-fed and a direct-conversion receiver. This managed DH3IAT, DL2IAD, ON4AVA, GD3FXN for an all-time new country and a string of G stations; all c.w.

Vince Cutajar (M'Scala, Malta) looks mainly at the WARC Bands. On 18MHz UD7KWB, 4U11TU, J73A, TI5GLF & HP1XSO; on 24MHz it was UD7KWB, D44BS, 9J2WS, FT4XG, VP5VWB, CN2TU & 7Q7JA.

More Letters

Charles Wells (Mansfield) also joins into the fray over QSLing Soviet stations and his comments form the meat of my earlier comments. On 18MHz, s.s.b. located ED2NCE celebrating 900 years of the town of Estella, QSL via EA2CCG, D44BC, JP5DX, 4K3BB (Novaya Zemlya), J37AJ, VK2IP, SP1MHV, DU3NC/P, RB5FF, plus c.w. from VP5P, VE7SR, SV1CU, CY9CF, CN8VV, ZB2/WA6CDR, WB2KKI, W2FCC, K3DOL, UT5WX, U0AL, UV3EH. On 21MHz Charles bagged a QRP CX3EU, CXX8DR & PY2FIT, then on to 28MHz for FY5YE, UA9KCJ, HK1HKK, YU3AG/MM off Mauritania, VK6WT, V47NXX, PY6XO & VK2BJ.

Tony Anziani (Amlwch, Anglesey) mainly listens to 18 and 28MHz, using an FT-102 with a three-element monoband beam for 18MHz and a converted CB 5λ/8 vertical antenna for 28MHz. Tony starts with 18MHz with C6AFW, ZS1VW (Cape Town), Z51CSS in Zimbabwe, 8P6CC, PY2WZ, a load of long-path VK & ZLs, VE2-3-6-7, assorted Ws, long-path JAs & LU9DM. As for 28MHz, it came back with FR5CY, JAs, UL7QBB, XU8DX, CO2RX,

CX1VPO, CX4SB, a variety of Ws including W7s & VKs. Tony says he doesn't like 14 & 21MHz so much, because there is seldom a clear spot.

Angela Sitton (Stevenage) says conditions have been quite up-and-down, with wall-to-wall Ws one day and nothing the next. Angie is a c.w. buff and her very long list covers 3.5-28MHz. I rather like the way she lists her stations - for each band she divides them up into four columns; Ws, USSR, DX and 'local' meaning, of course, the Europeans. The result makes life easier here, if space closes in I can erase just the 'local' or the 'local' and USSR lists by single strokes of the pencil, rather than going right through a long list extracting the small fry.

E. H. Trowell (Sheppey) notes that he could hear UA9 & UL7 amid the static crashes on Top Band, which at the time he wrote in late October was still at the summer S8 level. Nonetheless, on Top Band, ON7BW (s.s.b.) & HB9ANJ (c.w.) were mentioned, plus on 7MHz H18A, 4S7WP, W9XR, 6W1QB, on 10MHz KL7U & SV9ADH. The 14MHz band yielded RA0/UV3DA, ZC4HMS, H18DMX, UL7LD, HC2TI & CO8LY; on 18MHz, c.w. he found YU3AG/MM, the MV Kocevje off Rabat, N2DAN, VE7SR & K3DMG. On 28MHz, Ted noted K7UOT (Utah), K7WK (Arizona), W7LR (Montana), JF5HVI & YV1AD. Ted also found conditions rather patchy this time round.

Finally, **Pat Parmentier** (Kortrijk), who sticks to the c.w. ends of the bands; on 14MHz he located 4K4/EK0AK, ZL7TZ, FP/G3LMD, ZL150SA, 807JP, ZX8CW, A35XK & GW3YDX/VP9. The 24MHz band accounted for CT0B, JH1QDB/JD1, 7Q7JA, FK8FS & A35XK. With 21MHz producing BY4RSA, 7Z1AB, HR1LW, 3D2AG, 4K3BB, ZL150A, HLOB, A35XK & FR5AI/J. Turning finally to 28MHz, A43DX/A, V47NXX, K1EFI/VP9, BY5RA, ZD8CUE, V31SW, KH6IJ, JT1CO, CP8/DJ4SN, H18A, TI7SS, 8Q7JP, GW3YDX/VP9 & 7Q7JA were all logged.

Finis

That's it again. Your deadline for next time is to arrive by January 20 addressed, as usual, to the address mentioned above. Meanwhile enjoy the Festive Season, keep out of mischief and may the year 1991 bring you all the DX in the world!

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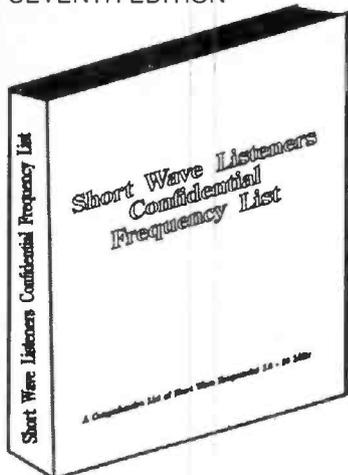
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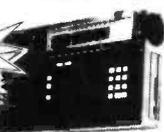
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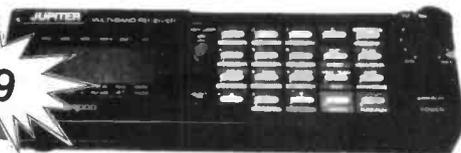
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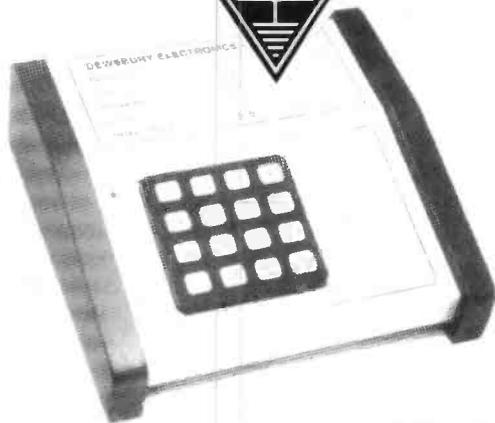
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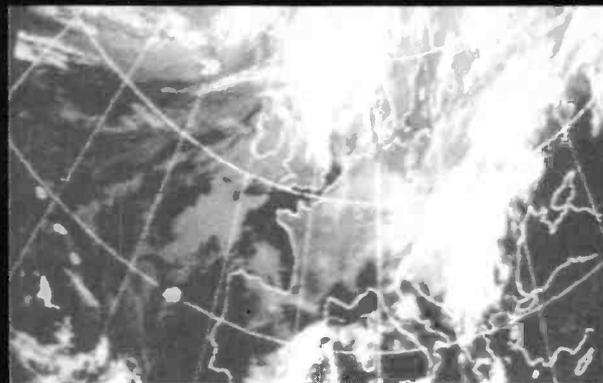
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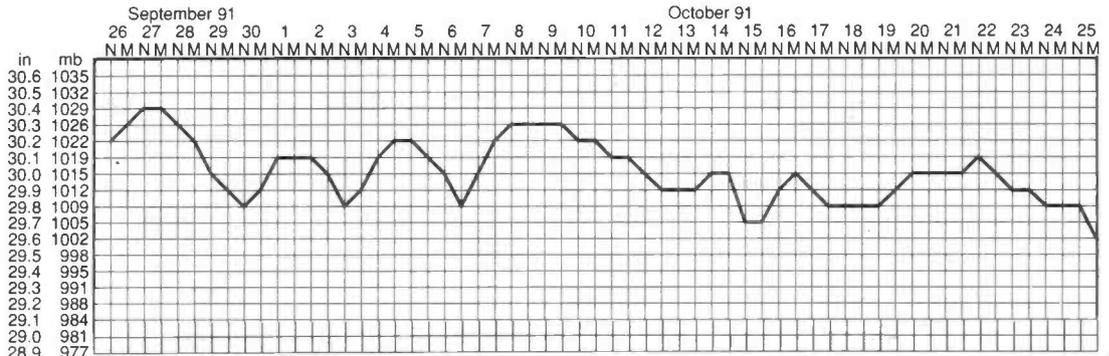
dxtv round-up

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

Previously in this column, I have confined my chat to those international television signals that increase their normal range for a short period while some form of atmospheric disturbance was in progress. However, from now on, you should read the new 'Propagation' column in conjunction with this column. This will enable you to compare your results, on a particular day, with the experiences of other users on nearby bands. For instance, the influence of a good Sporadic-E disturbance is not just restricted to Band I TV, it often stirs things up from 20 to 100MHz. If a healthy tropo really opens the v.h.f. and u.h.f. television bands, then you can be sure that the radio amateurs will be working or hearing DX on 144 and 432MHz. The success of this cross-referencing idea depends largely upon the details in your reports so, as always, I will be pleased to hear from you.

Band I

Although we only expect a few reasonable Sporadic-E openings throughout the winter months, **Simon Hamer** (New Radnor) had a good haul on October 31. He logged test-cards from stations in Czechoslovakia (CST), Denmark (DR), Finland (YLE), Germany (ARD), Hungary (MTV1), Iceland (RUV Island), Italy (RAI-UNO), Sweden (SVT), Switzerland (+PTT/SRG1), the USSR (TSS) and Yugoslavia (JRT). This



Barometric pressure chart for 26 September to 25 October 1990.

proves that it's worth making frequent checks in Band I, especially in the mornings. Check around Chs. E2 (48.25MHz) and R1 (49.75MHz) for those unexpected pictures from short-life, random openings. These channels should also be watched during the winter period for 'smear', 'distorted' and often unidentifiable pictures from afar due to disturbances in the upper, F2 region of the ionosphere.

Such conditions almost certainly prevailed when **John Woodcock** (Basingstoke) heard East European utility stations, at the low end of Band I, during the early mornings of October 23, 24, 25, 26, 30 and 31. He heard public services from the USA, "with very strong signals", during the afternoon of the 23rd.

To add more weight, Simon Hamer identified pictures on Ch. E2 from Dubai and Iran (IRIB) on the 23rd and Australia on Ch. A0 (46.25MHz) at 0740 on the 27th.

He also saw unidentifiable pictures on Chs. C1 (49.75MHz), E2 and R1 around 0740 and on Chs. E2 and E3 (55.25MHz) at noon on the 27th.

Picture Archives

David Glenday, uses a Philips 26CS5770 u.h.f. receiver with Triax BB grid bowtie antenna and 40055 mast-head amplifier. Back in 1989, he logged Denmark Radio's TV2 clock logo, **Fig. 1**, at 2314 on May 4 and their 'TVR' Reklamecaption, **Fig. 2**, at 1750 on the 17th, both on Ch. E30. He also saw a chat show on the programme *Tele 5*, **Fig. 3**, from a West German relay station, "possibly Dusseldorf", on Ch. E36 at 0018 on June 18. "Note the mini-logo" (top left), said David.

Russ Burke (Northampton) checked the bands at 0545 on September 28. He found a test card with the inscription 'Canal Sur TV', **Fig. 4**, on Ch. E4

(62.25MHz) and another, with what looks like 5680 in the centre (**Fig. 5**) appeared while he was using his up-converter on October 7. Russ would like to know the origins of both Figs. 4 and 5 if anyone can help. Drop me a line and I will pass the gen on to Russ. On the subject of 'Canal Sur', **Les Jenkins** (Godalming) also received this, **Fig. 6**, from Spain via the satellite, Eutelsat 1F2.

It is obvious from the archives of **Lt. Col. Rana Roy** (Meerut, India) that he had a good DXTV haul via Sporadic-E openings in June. He received an unidentified caption from SE. Asia, **Fig. 7**, on Ch. E2, at 1800 on the 15th, an announcer from the USSR, **Fig. 8**, on Ch. R1, at 1935 on the 17th and a picture of King Hussein of Jordan, **Fig. 9**, from Dubai TV, on Ch. E2, at 2040 on the 21st. In addition he logged the 'Soviet TV' logo at 1915 on July 28, **Fig. 10**.

Tropospheric

"Not much DX to report for September, but tropospheric reception during October was very good sometimes," wrote David Glenday. Reference to the **barometric pressure chart** will show the declining atmospheric pressure which coincided with the tropospheric openings around October 12/13 and 22/23.

While on holiday in Deal on October 12, Les Jenkins received strong pictures from Belgium (BRT), France (ANT2, FR3, LE CINQ, M6 and TF1) and Holland (NED1 and 2). He was using a Salora multi-band portable receiver and a Triax 'BB GRD' antenna only 3m a.s.l. He reports that the pressure was high at 1032mb (30.5in) at the time.

John Woodcock received negative pictures from France (Canal+) for most of the day-time on October 14, 15 and 24, the



Fig. 1: Denmark.



Fig. 2: Denmark.



Fig. 3: West Germany.

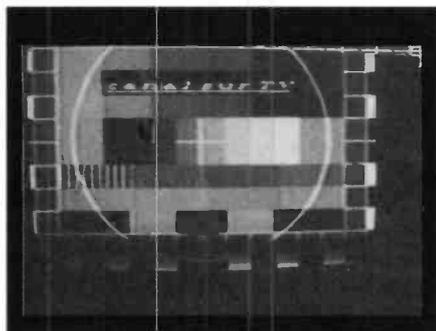


Fig. 4.



Fig. 5.



Fig. 6: Spain.

morning of the 28th and afternoon of November 1. David Glenday was amazed to receive pictures in the u.h.f. band from Poland (TVP1) on Ch. R30 for several hours and (TVP2) for a short while, on Ch. R35, during the evening of the 22nd. David thinks that these signals came from Jelenia Gora on the Polish-Czechoslovakian border. "Signals were so good that I resolved Teletext - the Polish Teletext header is 'PRITV'", said David and continued, "I watched in amazement as trailers for American films such as *The Hustler* and *Robocop 2* appeared with Polish subtitles! Also near midnight on came American *Cable News Network!*" He also

reports that page 104 of the Polish Teletext service had the latest news headlines in English.

It was a good opening for David because he logged, for the first time, Germany's DFF-1 on Ch. E37 and noted that, "the 'Technischer' header on DFF Teletext has gone", and it now has a "simple 'DFF' header" with the title page similar to ARD/ZDF 'videotext' page 100. Other goodies came for him on the 22nd in Band I when he logged tropospheric enhanced signals from Denmark (DR) on Ch. E3 and Norway (NRK) on Ch. E4.

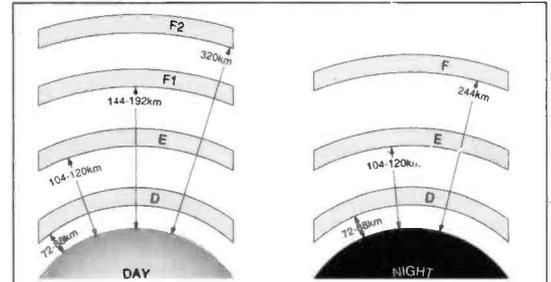
Despite aircraft flutter playing havoc with some signals, Simon Hamer received pictures from Denmark (DR), Norway (NRK) and Sweden (SVT1) in Band III and Denmark (TV2) and Sweden (SVT2) on several spots in the u.h.f. band during the good conditions on the 23rd.

SSTV

Many of you with h.f. communications receivers may not have realised that the variable 'twittering' signals which periodically appear around 14.230MHz are the pulses from slow scan television transmitters operated by a number of amateurs throughout the world. Briefly, the pictures build up slowly, between 8 and 32 seconds, depending on the system being used and are decoded on to a screen by feed-

ing these audio tones either through dedicated equipment or a suitable home-computer. Readers wishing to know more about SSTV software and its availability for their particular computer should have a word with Grosvenor Software, 2 Beacon Close, Seaford, East Sussex BN25 2JZ, J&P Electronics Ltd, Unit 45, Meadowmill Estate, Dixon Street, Kidderminster DY10 1HH, or Technical Software, Fron, Upper Llandwrog, Caernarfon LL54 7RF and no doubt there are others whose adverts I have not seen.

There is a lot of enjoyment to be had from this mode of communication, especially when the h.f. bands are open and, don't forget, I am always pleased to use such reports in this column. Among the slow-scan enthusiasts is **Steve Charles** (Rustington, Sussex) who follows his Lowe HF-125 communications receiver with a Spectrum computer loaded with the Technical Software RX4 software and



Sporadic-E: A layer of intense ionisation that appears unpredictably in the E-layer. It can lead to the propagation of v.h.f. signals over anomalously great distances.

an Alphacom 32 printer to produce the hard copy of the pictures he has received. A good example is the 'CO', Fig. 11 and part of a QSO with a Russian station, Fig. 12, which he copied from EA2J0 and EA1ACT respectively in Spain last August. Such pictures, which include callsigns, messages, photographs and some clever and amusing graphics can be stored on disk or tape. Operators can also look for SSTV contacts around 3.73, 7.04, 21.35, 24.925 and 28.65MHz.

Abbreviations

a.s.l.	above sea level
Band I	45-68MHz
Band III	175-230MHz
Ch.	channel
DX	'long distance'
DXTV	'long distance' television
h.f.	high frequency
in	inch
m	metre
mb	millibars
MHz	megahertz
SSTV	slow scan television
TV	television
u.h.f.	ultra high frequency
v.h.f.	very high frequency

Teletext

In addition to broadcast programmes, many TV companies now use a few lines of their transmission to send out information in text form, which can be decoded by anyone having a suitable TV set. This is generally known as Teletext, though the advertised name varies from country to country. The information can be accessed by calling up specific page numbers, and usually includes information about the TV company and its programmes, news, sport, business and travel information. Teletext services are normally available throughout the time that regular programmes are on the air, and often at other times when a test card is being transmitted. *WRTH*



Fig. 7: SE Asia.



Fig. 8: USSR.



Fig. 9: Dubai.

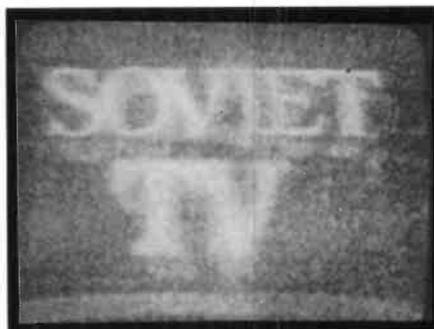


Fig. 10: USSR.



Fig. 11.



Fig. 12.

Godfrey Manning G4GLM
SWM Editorial Office, Enefco House, The Quay, Poole, Dorset BH15 1PP.

It's great to discover, for real, something that was previously theoretical.

Christopher Hasman (Arthingworth, near Leicester) found the site of the well-known Grantham relay for the London Air Traffic Control Centre. Leaving Melton Mowbray via the A607 to Grantham, Christopher passed through Waltham on the Wolds; about a mile later, and to the right (south-east), the relay can be seen at about 400m distance. As Christopher also claims to be able to travel at "2500ft QNH" I assume he has a private pilot's licence! (A or H?). To clear up about Wallasey, Christopher, my records still show an n.d.b. (331.5kHz) and a v.o.r./d.m.e. (114.1MHz) both identifying as WAL.

On the subject of navigation, **P. Sillifant** (Walsall) wants the Concorde North Atlantic routes. These are fixed, with two main routes to the UK and two more to France. Eastbound routes are named SL* (where * is a numeral) and westbound are likewise SM*. Some routes cross over, and each has acceleration and deceleration points (which change slightly seasonally). As the routes run generally east/west and are constant, it is necessary only to know which route is being followed and the progress in degrees longitude in order to fix a position. Jeppesen publish a full chart and the supplier is The Oxford Airport Shop, Oxford (Kidlington) Airport, Kidlington, Oxfordshire OX57RA, Tel: 0865 841234 (this answers via the CSE Aviation switchboard).

As for the polar tracks I know of no broadcast information. Flight operations departments would expect to obtain these from the controlling authority, e.g. by Telex. I suggest that **Mike Dawson** (Woodley, Berkshire), who asked about this, could obtain a polar chart from the above address.



Fig. 1.

Follow-Ups

The An-225 didn't display on Farnborough Sunday (November 'Airband') due to a fault with the nose door, according to **Paul Hilton** (Newbury, Berkshire).

The ROOK callsign (requested in the same issue by **P.J. Salisse**, Highgate) belongs to TR1A 'spyplanes' of the United States. They fly from RAF Alconbury under 95th Reconnaissance Squadron, 17th Reconnaissance Wing and often reach in excess of FL600. Thanks for the information go to Paul Hilton, **J. Layden** (Worksop, Notts), **John Locker** (West Kirby, Wirral), **P.T. Martindale** (4 The Crayke, Marton Fields, Bridlington, E. Yorkshire, YO16 5YP), and **S.W. Phillips** (39 Bryn Terrace, Brynithel, Abertyle, Gwent, NP3 2HG). S.W. Phillips welcomes direct correspondence about callsigns and I feel sure that Paul in particular would find this an interesting offer to take up. P.T. Martindale also offers direct correspondence if P.J. Salisse would care to write to him.

Now on to navigation and

Jon Harrowing's (South Humber-side) questions from November which are answered by J. Layden. SHACK is at Alconbury 045°R 22d; EAST FIX is an Upper Heyford reporting point centred over Cambridge; GATE ALPHA is an East Coast Range exit point. KAREN is at Woodbridge 068°R 39d; DALE is at Bentwaters 072°R 21d. Note: °R is a radial from a TACAN, d represents distance from the TACAN in nautical miles. Was P.J. Salisse's question really about the TROUT (not KRAUT) reporting point? P.T. Martindale spotted this north-east of Aberdeen on route B2D (see *Aerad* chart EUR/3).

October's request for information on my Elliott Ground Speed & Drift Setting Unit AA 5665-1, while producing interesting theories, has not really been solved. **Tony Clarke** (Leicester) remembers a system to turn the aircraft's main wheels in line with the runway when landing with drift correction in a crosswind. Unfortunately, Belfasts currently flying do not have the system which Tony describes. An industry source connected the unit with a sonobuoy

locator as fitted to Shackletons. Personally I still favour the Doppler theory. Thanks for the suggestions, but the case continues and any further information would be welcome.

Frequency & Operational News

Looking at *Aeronautical Information Circular* 83/90 from the Civil Aviation Authority I see that at Chichester (Goodwood) the parallel 15/33 runways have been re-designated 14/32 and that at Wick 14/32 is now 13/31. *Air Britain News*, November page 599, states that at Andrewsfield there are now two (parallel) 09/27 runways whereas before there was only one.

What would J. Layden expect to be allocated on 74-75MHz? Well, 75MHz is the frequency of airways and i.l.s. marker beacons. The *Table of UK Frequency Allocation* (Dept. of Trade and Industry) puts the rest of this sub-band in the land mobile radio allocation. As for 5.685MHz, **David Middlemiss** (Eyemouth) will be interested to

know that RAF Operations and Edinburgh Rescue Co-ordination Centre share this frequency.

Lucky **Jeffrey Henderson** (Irvine, Ayrshire) has a p.p.l. but recently flew as a passenger on an Air Canada Tristar from Manchester. The h.f. radio controller is on the roof panel above the first officer and on this flight was set to 10.051MHz (Gander Weather) and 13.291MHz (Oceanic control). Also over the Atlantic, the NAT-B frequencies may have been replaced by NAT-E (3.476, 6.628, 8.906 & 11.309MHz) according to **A. Harris** (W. Bromwich, W. Midlands). You're ahead of me - I have no official confirmation on this.

October's column listed 8.949MHz as Air Zimbabwe's company frequency. **Nigel Tucker** (Harare, Zimbabwe) points out that Affretair (cargo) and Qantas share the frequency, especially at night; in the day, 17.944MHz is available. Thanks for the local info, Nigel.

The Battle of Britain Memorial Flight was described as using the local display frequency in the November issue. P.T. Martindale understands that 120.8MHz is also used for communication between the aircraft in the flight.

Christmas Quiz

This year's quiz is by popular request: you've often seen my picture in the column but, so far, our photographer, Chris, has remained behind her camera. Now the tables are turned! I took this photo of her, Fig. 3, at a display during the 1990 season. Included is an aircraft, of course. As the previous competitions seem to have been too easy, the clues this time have been kept to a minimum. Identify the aircraft from the close-up! In the event of a tie, I will draw the winner at random from the correct entries.

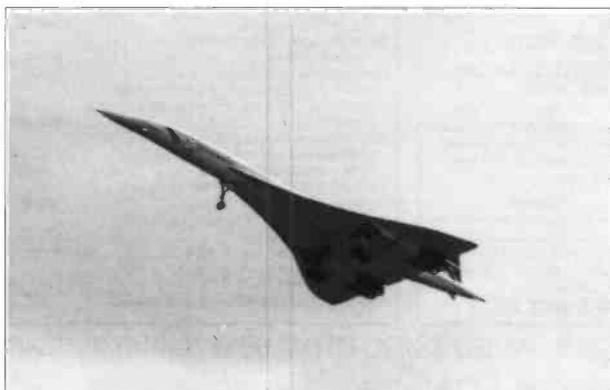


Fig. 2.



Fig. 3.



Fig. 4.

If there is no correct entry I will allow the nearest "best guess." Deadline to get your entries to the address at the top of the column is the 31 January 1991. The prize is an aircraft instrument. Entries in the name of C. Mlynek will be disallowed. My decision is final.

Watch your MTWA when eating and drinking all those Christmas goodies!

All readers please note that no direct replies can be made to enquiries - there are just too many to deal with in this way. Instead, any answers always appear in this column, or if the

information is not to hand, the question will be put to the readership in general.

The next deadlines (for topical information) are; January 11 and February 8; note the revised dates. All correspondence to the address at the top of the column.

Abbreviations

An	Antonov
cm	centimetre
d.m.e.	distance measuring equipment
FL	flight level (altimeter set to 1013mb)
ft	feet
h.f.	high frequency
i.l.s.	instrument landing system
kHz	kilohertz
m	metres
mb	millibars
MHz	megahertz
MTWA	Maximum Take-Off Weight Authorised
NAT	North Atlantic
n.d.b.	non-directional beacon
p.p.l. (A, H)	private pilot's licence (Aeroplanes, Helicopters)
Qantas	Queensland and Northern Territories Air Service
QNH	Altimeter pressure setting, reads zero at sea level
R/T	radio telephony
TACAN	TACTical Air Navigation
v.o.r.	very high frequency omni-directional radio range
W	west

AIRBAND TITLES FOR YOUR BOOKSHELF

FLIGHT ROUTINGS 1990

by T.T. Williams
published by T.T. Williams
116 pages, 211 x 146mm. £4.95 plus 85p P&P
Available from the SWM Book Service
ISBN 0-9514431-1-9

This popular guide, which is updated on an annual basis, has been produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified the aircraft's call sign.

Most of the flights to and from British and Irish airports to destinations worldwide and details of many of the overflights to and from Europe and N. America are included. Particulars of scheduled, charter and freight flights are covered. This edition has been completely updated using information received from the airports and airline companies themselves.

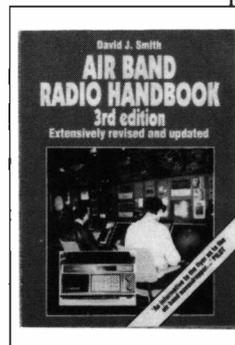
Flight number, departure time, departure airport, arrival time, arrival airport, type of aircraft normally used and day of operation are given for each entry together with any relevant notes on the flight.



AIR BAND RADIO HANDBOOK 3rd Edition

by David J. Smith
published by Patrick Stephens Ltd.
174 pages, 157 x 215mm. Price £6.99 plus 85p P&P
Available from the SWM Book Service
ISBN 1-85260-339-9

When this book, written by an air traffic controller, first appeared it was acclaimed as the best on the subject. Now it has been extensively updated and revised to cover the changes that have occurred in the last three years. As well as describing the types of airband radios available and how to use them to listen to conversations between aircraft those who control them from the ground it explains the intricacies of air traffic control and its jargon so that you will be able to understand what is actually happening overhead.



WORLD HF AERONAUTICAL-MOBILE R/T FREQUENCY ALLOCATIONS

by Tim Christian
157 Mundesley Road, North Walsham,
Norfolk, NR28 0DD.
37 pages. Price £6.99 including UK postage.
(Cash with order)

This booklet lists all the h.f. aeronautical frequencies starting, curiously, with the highest and working down. Alongside each frequency is the user to whom it is allocated. The n.d.b.s with voice modulation are listed separately. The introductory pages suggest that it will find use in professional circles for locating clear frequencies for re-allocation. Readers will have their own ideas as to how to use the information.

THE PAPER AEROPLANE PAD

John Adams Trading Ltd., 32 Milton Park, Milton,
Abingdon, Oxfordshire, OX14 4RT.

Has your author regressed back to childhood? This book is for ages 8 upwards and I think this includes 34 year old museum curators! Plans are provided to make two examples of each of eight, different, paper gliders - simply cut and fold. I recommend folding over a 30cm plastics ruler for neatness - where folds are made from the reverse of the paper, hold the plan up to the light to see the printed line. You will additionally need to provide scissors, a stapler, adhesive tape and paper clips.

Although it's sold as a children's toy, I was amazed to find it contains practical lessons based on real aerodynamic principles. Experiment with flawed designs - and then learn how to correct them. The pad is listed in the catalogues of World Wide Fund for Nature, P.O. Box 49, Burton-On-Trent, Staffs, DE14 3LQ and Save the Children Fund, P.O. Box 40, Burton-On-Trent, Staffs, DE14 3LQ, both at £2.99. As these catalogues seem to be with us all year round, it's not too late for a little extra seasonal shopping.

Godfrey Manning

AR-3000 - The Ultimate Receiver



AR-3000 £765 CARR £10.00

It is an acknowledged fact that AOR are the foremost manufacturer of VHF/UHF monitoring receivers in the world. In the AR-3000, even AOR have excelled themselves, because they have produced what is without doubt the ultimate receiver for wide band monitoring use.

Designed for the professional market, the AOR-3000 is nevertheless affordable by the listening enthusiast, and the specification is enough to make any keen listener want this astounding receiver. Brief details:- Imagine a frequency coverage from 100kHz to 2036MHz: that's from below Radio 4 on the long Wave to beyond satellites on 1.7GHz; and there are no gaps in the tuning range. Any frequency within this astounding range is yours to use as you wish.

Imagine all mode facilities, including AM, FM (communications), FM (broadcast), Upper Sideband, Lower Sideband, and even CW, Yours to command with the AR-3000.

Imagine tuning in 50Hz steps for accuracy on SSB/CW, with any step available at your choice from 50Hz to 100kHz, selectable in 50 Hz increments. For really high speed tuning you can even increase all the steps by a factor of 10 by a touch of the main tuning knob.

Imagine 400 memory channels in 4 banks of 100, with each bank having its own priority channel and each bank having its own programmable search system.

Imagine High speed scanning at 20 channels per second, each memory channel having frequency, mode and RF attenuator setting stored safely in it.

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Imagine having a built in RS-232 computer interface for total control by a personal computer.

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Price £645 Carr £10.00

HF-225



HF-225

Price Carr

HF general coverage Receiver, 30kHz to 30MHz **£425.00 £10.00**

(The HF-225 has been voted "Receiver of the Year" by World Radio and TV Handbook, against all other manufacturers products" Options:

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scanning

Alan Gardener
PO Box 1000, Eastleigh, Hants SO5 5HB.

The Icom IC-R1 hand-held scanner is now becoming more widely available. As I mentioned in the October column, several owners have been experiencing problems with its strong signal handling performance. This limits operation of the search and scan functions in congested areas. However, a solution has now been found by Ray Withers who, as well as selling modified receivers, will be offering a modification service to existing owners. This involves fitting an additional high performance crystal filter that improves the selectivity of the receiver in the narrow band modes, but at the same time still permits the w.b.f.m. i.f. stages to operate normally. So, all the existing features are retained. This is quite an achievement when you consider the limited amount of space available inside the receiver.

This is just the latest in a long line of innovative scanner modifications offered by Ray. Perhaps the best known being those concerned with the Yaesu FRG-9600, which is transformed into a very creditable performer. The company's showroom is due for expansion soon - so if you find yourself passing Junction 2 on the M5 why not pay them a visit. For further details contact: Raycom Communication Systems, 963 Wolverhampton Road, Oldbury, West Midlands B69 4RJ. Tel: 021-544 7124.

Long-range Cordless Telephones

Ploughing my way through a huge stack of specification documents released by the DTI Radiocommunications Division, I came across an interesting new allocation for long-range cordless telephones. This is intended to fill the gap between the current selection of domestic cordless phones, which have a range of around 100m, and cellular tel-

ephones. The new phones are intended to have an operating range of up to 2km from the base station and should appeal to business users such as farmers who want to keep in touch whilst working.

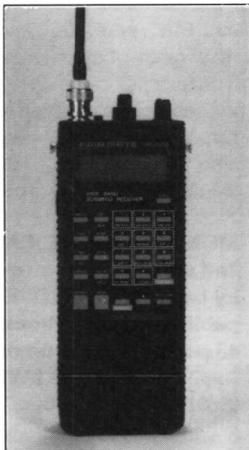
Several different makes of long-range cordless telephones have been on sale some time now. However, these have not been legal in this country mainly due to the choice of operating frequencies. Units I have seen advertised have operated in the 26, 35, 49, 70 and 138MHz bands with transmitter powers ranging from 1W to 100W+, in the case of some of the more expensive models. The most popular choice of frequencies being 49-50MHz base transmit paired with 69-70MHz for the mobile unit. If, like me, you tend to go antenna spotting, you can quite often see the distinctive H-shaped antennas which have two coaxial cable downloads. The new allocation consists of two, paired frequencies. Channel 1 being 47.41875MHz base transmit, 77.5125MHz base receive and

Channel 2 47.41875MHz and 77.500MHz. As far as I am aware, no equipment has been type approved yet, but expect some soon.

This new allocation is an interesting addition to the range of uses being found for the old v.h.f. Band I TV channels which used to occupy the slot between 47-68MHz. This range of frequencies is not really suitable for professional communication systems, as its propagation characteristics tend to make reliable communications over more than a few kilometres difficult. However, because of the relatively low frequencies involved, it is ideal for domestic, short-range, radio operated devices. This is because specialised integrated circuits, capable of operating at these frequencies and combining both r.f. stages and digital circuits, can be produced economically. This opens the way to the development of even more sophisticated radio-linked consumer products that I am sure will appear during the next few years.



Icom IC-R1 hand-held scanner.



Fairmate HP100E hand-held scanner.

Yaesu FRG-9600 v.h.f./u.h.f. communications receiver.

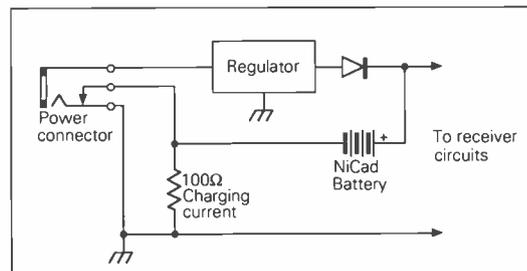


Fig. 1. Typical hand-held scanner external power/charging socket wiring.

Hand-held Battery Charging

Regular reader, **A Sheldon** of Nottingham, has recently acquired a Fairmate HP100 hand-held scanner. He is a concerned about using dry cells in the receiver when it is connected to an external power supply and wonders if it is safe to do this, or should he remove the batteries first.

Many hand-held scanners make provision for both rechargeable NiCad cells or conventional dry cells. This is usually done by providing a separate charging socket, or by having a switch to select the type of battery in use. However, several of the more recent models only have one power socket. This usually permits the scanner to be powered directly from a 12V source, such as a car battery. An internal voltage regulator circuit converts the 12V supply down to the working voltage of the receiver, which is usually around 6V.

In addition to supplying the receiver circuits, a small part of the supply current is also used to charge the internal batteries. This is generally just a series dropping resistor that has the effect of limiting the charging current to a suitable level. Under normal circumstances, this should present no problems when using rechargeable NiCad cells. These are usually charged at 10% of their normal capacity for a period of around 14 hours - so for popular sized AA cells the charging rate should be something like 50mA. Because the cells are being charged inside the receiver, and tend to heat slightly during the process, manufacturers usually reduce this current. A value of around 30mA is often chosen in order to prevent overcharging occurring during prolonged periods of operation. Whilst it is perfectly safe to put a charging current of this level through NiCad cells, it is a

different story with other types of battery.

Despite various comments that appear from time to time in electronics magazines, dry or 'primary' cells are **not** designed to be recharged. It is possible to lengthen the life of such cells by using a special 'dirty d.c.' charging technique, but care must be taken to prevent the formation of gas during this process. NiCad cells have a special pressure relief valve built in to them. The purpose of this is to prevent the build-up of high pressure within the cell during charging. Without this valve the outer casing could explode, resulting in serious damage to the receiver. Dry cells, on the other hand, are generally very well sealed in order to prevent the escape of toxic chemicals, which are produced during the discharge of the battery. In order to be able to 'recharge' such cells, a reversal of the normal chemical process has to take place. This involves the production of heat and gasses, which in a sealed package is asking for trouble, unless special precautions are taken.

Warning

If you use anything other than NiCads in a receiver that does not have a separate charger socket, or 'battery type' selector switch, then beware. It is a good idea to remove the batteries before you connect an external power supply.

If you use a lot of equipment with NiCads, it is a good idea to invest in one of the 'Universal' NiCad chargers. These are fairly cheap and have the advantage of charging cells individually rather than in series. This is important because, under certain circumstances, when NiCads have been used for some time it becomes possible for one or more of series connected cells to become reverse polarised during

the normal charge/discharge process. By charging cells individually, this situation can be prevented from occurring. Some models also offer a faster charging rate, but this should only be used with special types of NiCad.

One final tip is to completely discharge NiCad cells before recharging - I put them in a torch which I then leave switched on. This is because NiCads tend to exhibit a 'memory' after a period

of use. If they are only partially discharged, the total storage capacity of the cells becomes reduced. By occasionally fully discharging the cells, this condition can be prevented.

Mail Bag

A big thank you to all those people who have responded to my request in the October column for your views on individual scanning receivers. These have

already been most informative, but I would still like to hear from more readers before I present the results. All I need to know is, what model of scanner you own, what you tend to use it for and what you most like/dislike about it. Just make a brief note and send it to me at the usual address:

PO Box 1000, Eastleigh, Hants SO5 5HB.

Until next month...

Good listening.

Abbreviations

d.c.	direct current
DTI	Department of Trade & Industry
i.f.	intermediate frequency
km	kilometre
m	metre
mA	milliamps
MHz	megahertz
TV	television
V	volts
v.h.f.	very high frequency
W	watts
w.b.f.m.	wide band frequency modulation

TITLES FOR YOUR BOOKSHELF

AN INTRODUCTION TO AMATEUR COMMUNICATIONS SATELLITES BP290

by A. Pickard

Bernard Babani (publishing) Ltd

102 pages, 111 x 178mm. £3.95 plus 85p P&P

Available from the SWM Book Service

ISBN 0-85934-235-2

Communications and broadcast satellites are normally inaccessible to individuals unless they are actively involved in their technicalities by working for organisations such as BT, the various space agencies or military bodies. Even those who possess a satellite television receiver system to not participate in the technical aspects of these highly technological systems.

There are a large number of amateur communications satellites in orbit around the world, traversing the globe continuously and they can be tracked and their signals received with relatively inexpensive equipment. This equipment can be connected to a home computer such as the BBC Micro or IBM compatible PCs, for the decoding of received signals.

This book describes several currently available systems, their connection to an appropriate computer and how they can be operated with suitable software. The results of decoding signals containing such information as telemetry data and weather pictures are demonstrated and will hopefully encourage the reader to become actively involved in pursuing this fascinating activity that embraces many aspects of electronics, engineering and science as well as being an encapsulation of information technology.

DICTIONARY OF ELECTRONICS

by Ian R. Sinclair

published by Collins Reference

378 pages, 130 x 197mm. Price £3.95

Available from all good bookshops

ISBN 0-00-434345-X

The Collins Dictionary of Electronics is a completely new and up-to-date guide to the science and technology of electronics. Containing over 2000 entries, from aberration to zero error, the Dictionary also includes over 100 diagrams, together with

lists of symbols used in electronics.

The Dictionary is directed to the requirements of all who need a source book providing clear, helpful definitions of electronic terms, including advanced school students and those embarking on higher

education courses, as well as technicians and hobbyists. The Dictionary guides the reader through the various fields within electronics such as microprocessor technology, digital electronics, telecommunications, hi-fi, radio and television. The emphasis throughout is on the practical application of concepts and devices, although the theoretical background is also well covered.

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by Langley Pierce

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Well boys & girls, enjoy what's left of this year & good listening.

*From me (that's Peter) & Anita & Lara & of course our Victoria (Radar) (The Daughter).
 Merry Christmas to all our customers (especially K. Allen of Sheffield.)*

43 Friar Street, Worcester WR1 2NA
 Telephone: (0905) 25740



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

Regular readers will, no doubt, be pleased to hear that, as from this month, my space allocation has increased to two pages. Obviously, I want to make sure that the extra space is used for the items you want. So, please drop me a line with ideas for topics that you would like to see included. I have two ideas of my own. The first is station profiles, where I will give the run down on some of the stations that we monitor. I'll include details of equipment, antennas, etc., and operating schedules, where available.

The second area is the more complex data modes, such as the duplex ARQ modes. This is an area that I have tended to avoid, mainly because of the high demand from newcomers for more basic information. However, the additional space will mean that I can detail some of the modes and maybe even include a few tutorials. With these I will attempt to explain the operation of these modes in simple language.

So, there are just two ideas but I'm sure you have ideas of your own. Besides writing with your ideas, I would also appreciate seeing copies of any interesting data you may have received. I know that many stations send a mass of useful gen when replying to QSLs. This is a very good source of information. Don't forget, this is very much your column and its contents are a direct reflection of the mail I receive.

Readers' Letters

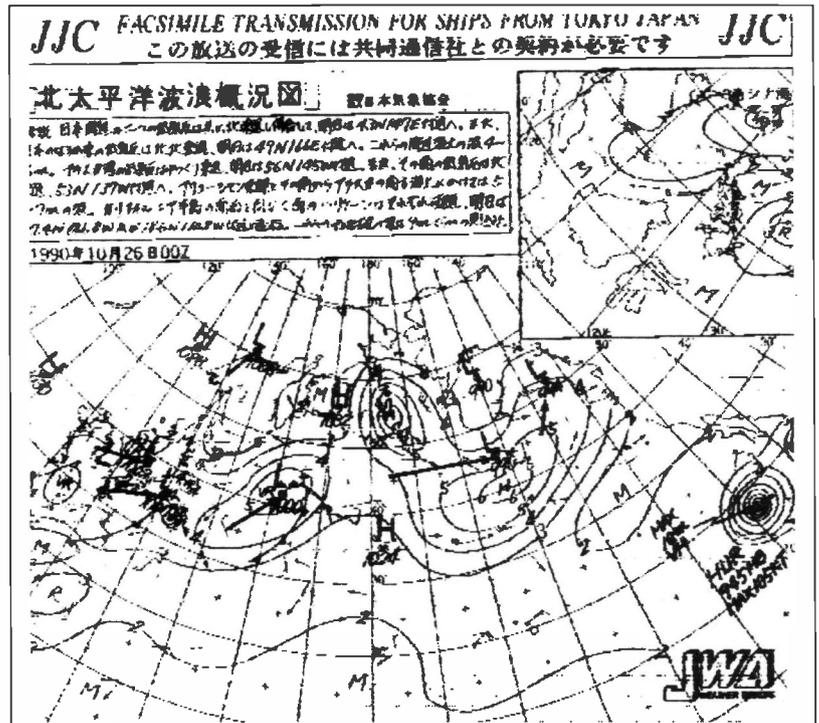
I've received a bumper postbag this month, so thanks to all those who've written and my apologies to those I couldn't mention.

Colin Bates from Yeovil

runs a Kenwood R-2000 receiver with a 54m long wire antenna. For FAX decoding, he uses an ICS Electronics FAX-1 with a Transtel printer. He has also just bought an ERA Microreader and the BP-34 filter for RTTY reception. His prime interest, however, is FAX reception and particularly weather maps from the USA and Canada. The only problem he has is with fading and poor signal strengths. Colin asks if it would be worth changing to a G5RV antenna. Rather than just giving a simple no, I'll give a little background to explain why this is the case.

We really need to start with the origins of the G5RV antenna. The antenna was primarily designed for the amateur radio operator as a simple, all-bands antenna system. Like short wave listeners, amateurs also suffer space restrictions, so there is a demand for a simple, but small, antenna system. There have been countless designs in the past and the subject is by no means finished. The G5RV scores so well because it combines simplicity and versatility. The simple electrical requirement is that it must provide an acceptable impedance match on all the amateur bands. This is achieved by the careful dimensioning of the antenna including the feeder. It is important to remember that the feeder is very much part of the antenna in designs such as this.

So, how does this relate to the short wave listener? The subtle difference between a listener and an amateur is that the listener requires consistent performance throughout the short wave bands. The amateur, on the other hand, is working on just eleven spot frequencies. Because of the varying requirements it's not surprising to find



22539.9MHz, u.s.b., 26-10-90, 0430GMT.

that the antenna design is also different. This is why the G5RV is not necessarily the best choice for the listener.

The important point with all receive antennas is the length and height. My recommendation is to stick with a long wire antenna and mount it as long and high as possible.

Returning to Colin's original problem, one important point is to make sure you are using the best frequency. Most FAX stations transmit on several frequencies simultaneously and it's always worth trying to find the best one.

You may remember that last month I mentioned the problems that readers were having receiving Offenbach Metro. This

was due to interference from a radio-navigational beacon. **Ron Hignett** from London has written with his solution to the problem. Ron uses a Datong FL2 active filter and has managed to almost completely eliminate the interfering signal, so giving a clean FAX copy. The FL2 settings in use are as follows:

- Left hand control set to 0.2kHz
- Centre control set to 1.2kHz
- Right hand control set to 2.2kHz
- Mode set to s.s.b.

The rest of Ron's station comprises a Spectrum ZX+ computer and Alphacom printer. The receiver is a Panasonic, but he doesn't state which model.

If anyone else has any examples of cures for this problem, please drop me a line.

Charlie Barker of Northampton has recently returned to listening after an absence of about 15 years. His current station comprises the popular Matsui MR-4099 receiver with a home-made Practical Wireless Tawlf. converter. The two antennas in use are a long wire and a loop antenna. Utility decoding is achieved using a FAX decoder based on an article in *Elektron* magazine and the RTTY terminal unit is from Radssoft. Charlie is now looking to upgrade with a more sophisticated receiver and some better software for his Amstrad PC-2086 computer.

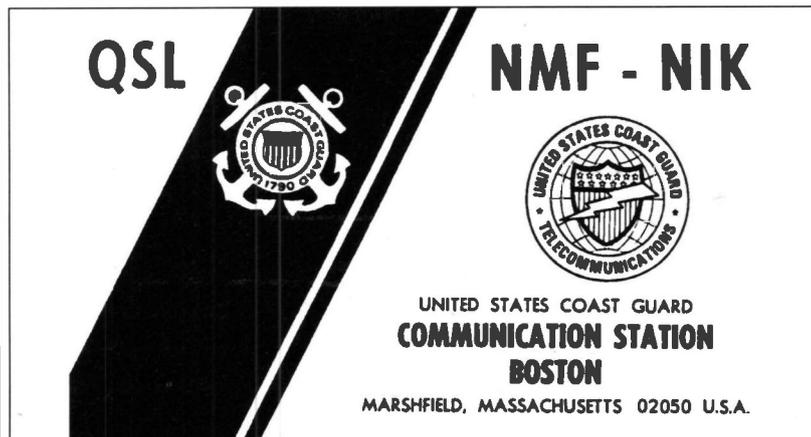
Charlie has also developed a

very handy way of presenting his frequency list. He uses a commercial program called Portex to produce a personal organiser size printout that makes for a very handy reference in the shack.

Lee Cooper writes from Romsey with a plea for help with software. He currently runs a NRD-525 receiver and would very much like to use his Amstrad 6128 computer to decode RTTY, c.w. and FAX transmissions. Can anyone out there help? If so, please drop me a line and I will pass on the information.

Peter Threadgold of Clevedon is another who has recently returned to the hobby, only he has had a break of 40 years! His interest was rekindled when he was asked to check out a Matsui 4099 receiver by a friend. Peter's early experiences started with a crystal set in 1934 and progressed to a single valve receiver using a Mullard PM2DX. The power source was a wet Leclanché unit for the i.t. and several grid bias batteries for h.t. Peter remembers listening to Radio Japan on this receiver via his Blue Spot balanced armature loudspeaker with 12in home-made cone. Peter's current set-up comprises the Matsui MR-4099 with a Microreader decoder for utilities.

The Government surplus R-210 receiver seems to be popular with many readers. The latest to write is **Peter Hall** of Rotherham who uses his to sup-



QSL card issued by Coast Guard Station, Boston.

plement his main station. He reports that the performance is surprisingly good. Incidentally his main station is all Icom with the R-71E and R-700 receivers. On the decoding front Peter uses a Spectrum 48K with RMS 3 and RX4 software and a Microreader for stand-alone decoding.

Gulf News

Maurice Lloyd has kindly written with a few updates that may prove interesting. Regular readers may remember that Maurice was recently approached by a Liverpool family to see if he could help with latest information on the plight of the hostages. Their interest was due to a relative being held hostage. I'm pleased to be able to report that the person concerned, Tony Wilbraham, is now happily reunited with his family. Having spent some time chasing news from the Gulf, Maurice considers that Magreb Arab Press (MAP/RABBAT) in Morocco is the least biased. For those who may be interested, the frequencies and schedule for this station are as follows:

Frequency	Callsign	Beam direction
7.8424MHz	CNM20/1X	W. Europe
10.213MHz	CNM29	E. Europe (1230-1300UTC)
14.76MHz	CNM20/1X	W. Europe
15.7527MHz	CNM66/X2	N. America
15.999MHz	CNM69/1X	S. Africa
18.2209MHz	CNM76/X9	W. Africa
18.4961MHz	CNM80/X11	Middle East
19.1711MHz	CNM85/X11	E. Europe (1400UTC)

If you have found any interesting Gulf stations, please drop me a line with the details.

QSL Addresses

There seems to have been a great deal of interest in the few addresses I have published so I though I would continue the process. This month's selection comes from **Maurice Lloyd** and **Jan Nieuwenhuis**.

US Coast Guard COMMSTA Boston/NMF. Radioman-in-charge, PO Box 608, Marshfield, MA 02050 - 0005 USA.

US Coast Guard Kodiak, PO Box 17, Kodiak, AK 99619, Alaska.

US Coast Guard CAMSPAC. Commanding Officer, 17000 Sir Francis Drake Blvd, PO Box 560, Point Reyes Station, CA 94956-0560 USA.

Agency Telegraphique Albanaise ATA, Tirana, Albania, Attn Technical Dept.

Funkamt Rügen Radio,



QSL card from WLO Radio, Mobile.

Coastal Radio Station, Glowe/Rügen, German Democratic Republic.

Wilhelmshaven Radio, Marinefermeldegruppe 21, Admiral-Armin-Zimmermann-Kaserne, 2940 Wilhelmshaven 31, Federal German Republic.

Rompress Agentie De Presa, Piata, Presei Libere Nr 1, Bucarest, Romania, Attn: Andrei Vretos.

Rome PT Radio, Stazione Radio Costiera PT, Stazione Ricevente, Via Della Cesarina 282, 00139 Rome, Italy

Qatar Coast Radio station, Qatar Public Telecommunications Department, PO Box 217, Doha, Qatar. Attn: Yousuf Al Kubaisi, Senior Engineer Transmission.

Station Profile

This is the first of these features that I hope will help give some useful background information. The station this month is Mobile Marine Radio Inc - WLO Radio which is located in Alabama USA. By the way, don't be fooled by the word Mobile in the title, it's actually the name of the town!

WLO Radio is a commercial marine radio station that operates 24 hours a day, 7 days a week. The services offered include Telex, telegram, phone (h.f. and v.h.f.) weather FAX and time slot broadcasts. The time slot broadcasts are particularly interesting and comprise traffic lists and weather forecasts in plain text. The transmission modes used are c.w. and standard FEC broadcast so are easily received. The times and frequencies used for these transmissions are:

Normal Season (non-hurricane)

Traffic lists on the hour using c.w. and 35 mins past the hour for FEC. Tropical forecasts 0600, 1300 and 1900UTC in c.w. and 0635, 1335 and 1935UTC using FEC. There is also a bulletin

board sent at 0800 and 2000UTC c.w. and 35 mins later using FEC. c.w. and FEC; 4.343, 6.416, 8.514, 12.886, 17.0216z & 22.487MHz.

Hurricane Season

As with the normal season, traffic lists are sent on the hour using c.w. and 35 mins past the hour using FEC. In addition, storm and hurricane warnings are sent at 35 mins past the hour in c.w. and on the hour using FEC.

FEC; 4.4725, 6.344, 8.534, 12.992, 16.9967 & 22.3185MHz. c.w. as per normal season.

One peculiarity with this station is that it uses the Morse character · · · · (German accented U) to indicate a carriage return. This will probably confuse many decoding programs.

For Telex operation WLO uses a Thrane and Thrane multi-channel radiotelex system with a HP-T1000A computer. The system operates to the standard TOR modes and features fully automatic store and forward of messages. One great advantage of this system is that ships

placing a message are sent an acknowledgement when the message is finally delivered. WLO operates its Telex service in the standard maritime mobile frequency allocations in the following bands: 4, 6, 8, 12, 16, 22 and 25MHz. Another feature of their Telex network is that they can accept several baud rates from land lines. The standard Telex network operates at 50 baud which is rather slow for today's high quality land lines. To help speed the data transfer process, WLO operate a number of data lines that can accept data at 300 and 1200 baud. For the user this means reduced costs as more information can be sent in a given time.

The WLO telegram service operates using c.w. 24 hours a day on the following frequencies: 434kHz, 2.055, 4.2575, 6.344, 6.4465, 8.4455, 8.4735, 8.658, 12.66, 12.7045, 12.992, 13.0249, 16.9685, 16.9976, 17.1724, 22.32, 23.348MHz.

The call "CQ de WLO1, WLO2, WLO3 or WLO4" is made on all free frequencies. This is a useful feature as it means that if nothing is heard on a channel then it is active and may be worth monitoring.

Weather FAX

A Service that is always popular with listeners is weather FAX and WLO currently transmits on 6.852MHz and 9.1575MHz. The format used is the standard 120 RPM with a IOC of 576. Normal start and stop tones are also used, so full automatic reception is possible. The schedule of transmissions is:

0310UTC Off-shore marine forecast

0900UTC 0600 Gulf surface analysis
0910UTC 18/36 hour Gulf surface prognosis
0920UTC Coastal marine forecast
1100UTC North Gulf aviation forecast
1440UTC Radiofax schedule (Monday only)
1450UTC 1200 Gulf surface analysis
1500UTC 1200 North American surface analysis
1510UTC Off-shore marine forecast
1900UTC North Gulf aviation forecast
2030UTC 1800 Gulf surface analysis
2040UTC Oceanographic products (when available)
2050UTC 18/36 hour Gulf surface prognosis
2100UTC Coastal marine forecast

That about concludes the main features of this station, which, I hope you have found interesting.

Frequency Lists

Another very good response this month so I would like to thank the following for their contributions: Ted Rickett, Day Watson, Zacharias Liangas, Eric Sillick, Tony Leavesley, Cyril Kellam and Chris Durkin.

So, on to this month's selection of frequencies. The format is the usual; frequency, mode, speed, shift, callsign, time and notes.

7.902MHz, ARQ-E3, 100, 350, FIT75, -, Paris
8.1051MHz, ARQ-E, 72, 400, RFFX, -, Versailles
8.165MHz, RTTY, 50, 170, -, 2210UTC, Nairobi Aero
8.498MHz, CW, -, -, SAG4, 1858UTC, Goeteborg Radio
8.649MHz, CW, -, -, ICB, 1940UTC, Genova Italy
8.662MHz, CW, -, -, TAH, 2321UTC, Istanbul Radio
9.43MHz, RTTY, 50, 425, ZAT, 0900UTC, ATA Tirana
10.169MHz, ARQ-E, 72, 850, RFTJ, -, Dakar
10.610MHz, RTTY, 50, 425, -, 1800UTC, Mena Press
19.171MHz, RTTY, 50, 425, -, 1052UTC, MAP Press
12.212MHz, RTTY, 50, 425, -, 1054UTC, Tanjug Press
14.497MHz, RTTY, 50, 850, -, 1400UTC, Santa Maria Aero
19.2966MHz, ARQ-E3, 100, 400, RFQP, -, Jibouti.

Abbreviations	
ARQ	Automatic ReQuest Repeat
c.w.	continuous wave (Morse)
FAX	facsimile
FEC	Forward Error Correction
h.f.	high frequency
h.t.	high tension
kHz	kilohertz
l.f.	low frequency
l.t.	low tension
m	metre
MHz	megahertz
QSL	acknowledgement of receipt
RTTY	Radio TeleType
s.s.b.	single sideband
UTC	Universal Co-ordinated Time
v.h.f.	very high frequency

STOP PRESS... I have just learnt that Ruegen Radio has changed its callsign from Y5M to DHS.

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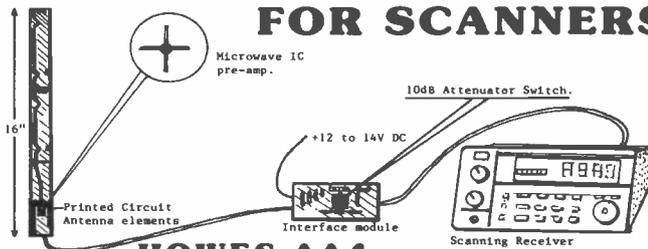
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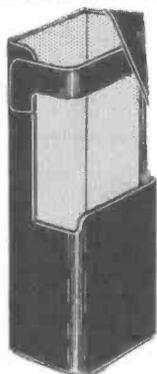
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Our VHF & UHF Frequency Listings are both updated to late November and must be the most comprehensive available. Our VHF list includes ICAO 3-letter designators, callsigns, sqawk codes and much more, while the UHF lists includes stud numbers, range and other frequencies. Both lists have LATCC transmitter site/frequency tie ups.



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Current Activities

It seems that no two weeks are the same amongst the Russian METEORS. During early October, the transmissions on 137.30MHz were from METEOR 2/18, but by the middle of the month there was a change to METEOR 2/17 on the same frequency. This carried on for a couple of weeks while changes took place with METEOR 3/2 on 137.85MHz. One day it could be on and the next day off. Anyone testing out a new satellite receiving system could be forgiven for losing track of what they could hear!

During November, NOAA 9 was switched off while it clashed with NOAA 11. This conflict usually lasts about a month, so NOAA 9 should be back on during December. Interestingly, it is only the v.h.f. a.p.t. transmissions that are switched off during conflicts.

I had a call from Dave **Cawley** who is developing an advanced h.r.p.t. unit at Timestep Weather Satellite Systems and he told me that he was picking up perfect signals from NOAA 9 in the 1690MHz band during this time. This is probably because reception of these signals requires a dish that is pointed at the satellite and wouldn't therefore suffer from interference in the same way that the v.h.f. transmissions do when we use large beamwidth antennas.

Meanwhile, as I was writing this column just before the publication deadline, METEOR 2/17 was switched off and METEOR 2/20 was switched on. METEOR 2/20 is a new satellite which I first heard a few hours after launch, and, like METEOR 2/19, it remained silent as if resting before starting work!

The final (?) surprise is METEOR 2/16 which came on again on 137.85MHz transmitting slow scan, infra-red pictures.

FENGYUN 1B

On November 3, the Chinese satellite FENGYUN 1B stopped transmitting infra-red images but resumed two days later. The American NOAA satellites and METEOSAT occasionally have a decontamination session and their infra-red sensors are switched off, so this was probably what was happening.

Teletext

A letter from **Graham Smith G1JVZ** reminded me to mention

that Oracle (ITV Teletext) carries some satellite and space news during the weekends on page 568.

IBM PC Cards

More and more letters arrive asking about the addition of satellite cards to personal computers of the IBM PC type, which an increasing number of people have. These enquiries come at a most interesting time, because the manufacturers of satellite equipment are developing these cards to make use of the standard facilities that these computers have.

A letter from **Claude Markham** writing from Rabat in Malta told me that he has an IBM PC AT 80286 computer fitted with an SVGA monitor and would like to buy a card to input weather satellite data.

Framestores

For the benefit of readers who are new to weather satellite signals and the different ways that they can be processed, it is worth mentioning that until about a year or two ago the usual way to decode the v.h.f. signals was by using a framestore. The most well-known model was the YU3UMV circuit. I built my first framestore some four years ago, but I must admit that it was not a pretty sight. It worked excellently after a friend from the Plymouth Radio Club debugged it for me!

It cost me some £200, which was about a quarter of the price of a commercial unit and I was delighted to be able to convert the "beep-beep" sound that came out of my v.h.f. receiver into a very good quality image of North Africa! Building such units

is very satisfying for the enthusiastic hobbyist, but my interest was purely scientific. Having heard that the Russians were using their weather satellites to monitor ice conditions around the world by using radar on board satellites, I just had to get a framestore!

The main problem with framestores is their inability to process data after the event. Once you have got your picture you cannot adjust it further to enhance detail that might be there. This limitation does not stop you being able to monitor the numerous satellites that transmit a.p.t. signals, and I still use my own unit on many occasions.

Claude already has an excellent computer for this purpose and so he needs to choose a suitable card. These are electronic circuits fitted on to a p.c.b. that slot into one of the available connectors usually found inside the computer. The card has an audio connector into which you plug the output from your receiver. It then digitises the signal, and the software processes the resulting numbers to convert them to a meaningful picture.

Another factor is the screen quality. The original IBM screen was called a CGA and this is probably what most people have, for instance the lower priced Amstrad PC1512 has this type. More advanced models have the better quality ECD and the best quality is the VGA or SVGA. Do be very careful before buying a supposed VGA card for your computer. Some advertisements are a little misleading, even if the advertiser is not doing it intentionally.

There are several satellite cards to choose from, and I would

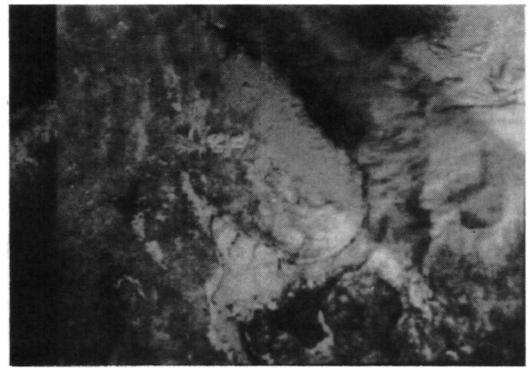


Fig. 1: A visible light picture of the Kola Peninsula, which is to the east of Sweden, in early spring when the ice surrounding the area is just starting to melt. The picture shows ice all around the coast line.

love to be able to compare them all. Reviews are not always up-to-date and one published elsewhere of the Timestep VGASAT software was somewhat inaccurate (I use this myself) and so I would recommend Claude to contact the retailers or manufacturers of the various cards and request the specifications of their latest issues.

Finally Claude is also interested in FAX so perhaps a glance at Mike Richards' 'Decode' column, which looks at those systems, might be of help.

More Letters

C. Archer of Bangor in Northern Ireland wrote on behalf of the Grammar School Science Club to ask about the equipment needed to set up a satellite receiving station from scratch. They have a BBC Master computer and a printer. I will be sending some details to him including a summary of antennas, receivers and software. All the frequencies requested are published in this column.

The last question is about foreign language broadcasts from satellites. There are such broadcasts, but they are more easily monitored using a normal radio tuned into one of the many terrestrial radio stations. The satellite broadcasts use non-a.p.t. satellites, usually one of the transponders on a TV satellite.

A reader recently asked about satellite predictions software for the Spectrum computer. I have had a letter

from **David Martin G1JQJ** who tells me that he has made considerable modifications to another satellite predictions program to run on a Spectrum, preferably using the PLUS-D interface which runs a 3.5in disk drive. David can be contacted by sending an s.a.e. to 27 St Andrew's Road, Stratton, Bude, Cornwall EX23 9AG to receive details of the program.

Predictions

As well as including a set of predictions here for the weather satellites I am including both SERT 2 and TRANSIT 5BN 5 which have been transmitting (non-a.p.t.) regularly for all to hear. A set of Kepler elements for METEOR 2/20 is also included since this satellite has recently started its operational life using 137.30MHz. Following the pattern of previous tables the satellite identification is given, then its acquisition time a.o.s. (UTC), then loss of signal l.o.s. The maximum elevation of the satellite is given with its direction (east or west), and finally the direction of travel, whether southbound or northbound. These times shown in **Table 1** should be accurate to within about two minutes.

METEOR Predictions

We cannot know which METEOR weather sats will be operating over the Christmas period and so I have run predictions for all the satellites from METEOR 2/16 onwards for December 22 shown in **Table 2**.

For those wanting to test

Table 1. Saturday December 22

Satellite	AOS	LOS	Maxel	Dir
FENGYUN 1B	0947	1001	20W	SB
METEOR 3/3	1014	1034	45E	SB
METEOR 3/3	1205	1224	44W	SB
OKEAN 2	1226	1238	19E	NB
METEOR 3/2	1318	1336	24E	SB
NOAA 11	1327	1343	68E	NB
TRANSIT 5BN 5	1500	1517	33E	-
METEOR 3/2	1508	1529	85W	SB
NOAA 11	1509	1523	21W	NB
NOAA 9	1610	1625	27E	NB
TRANSIT 5BN 5	1645	1703	52W	-
SERT 2	1724	1741	30E	SB
NOAA 9	1750	1806	59W	NB
FENGYUN 1B	1801	1817	50E	NB
NOAA 10	1827	1842	65E	NB
SERT 2	1909	1927	60W	-
FENGYUN 1B	1943	1959	31W	NB

Table 2. Saturday December 22

Satellite	AOS	LOS	Maxel	Dir
METEOR 2/18	0856	0910	18E	SB
METEOR 2/20	0915	0931	24E	SB
METEOR 2/20	1100	1117	70W	SB
METEOR 2/18	1225	1240	19W	SB
METEOR 2/16	1347	1404	33E	SB
METEOR 2/19	1414	1431	56E	SB
METEOR 2/16	1532	1549	49W	SB

new receivers or antennas on satellite transmissions the most reliable satellites are the NOAAs listed above. The Chinese FENGYUN 1B satellite seems to be transmitting reliably now but the METEORS continue to throw unexpected surprises each week. Bear this in mind when you try to tune into an expected METEOR transmission.

Frequencies

NOAAs 9 and 11 transmit on 137.62MHz.

NOAA 10 transmits on 137.50MHz.

FENGYUN 1B transmits on 137.80MHz.

METEORS may transmit on 137.30, 137.40 or 137.85MHz.

OKEAN 2 transmits on 137.40MHz.

Non APT Satellites

I have included the times of TRANSIT 5BN 5 and SERT 2 passes which should be heard on the following frequencies:

TRANSIT 5BN 5 transmits on 136.65MHz.

SERT 2 transmits on 136.23MHz.

This should keep everyone busy tuning around the satellite band during the holiday season and perhaps you will let me know whether the list is of use for testing your equipment or simply of general interest.

The New: METEOR 2/20

Kepler Elements
EPOCH: 90304.06792294
INCLINATION: 82.5259
RAAN: 120.1108
ECCENTRICITY: 0.0012664
ARG OF PERIGEE: 157.3730
MEAN ANOMALY: 202.7990
MEAN MOTION: 13.83234206
DECAY: 1.06E-6
ORBIT: 453

The Old: SALYUT 7

This satellite has been in orbit for several years and is attached to COSMOS 1686 and so has a total mass of some 39000kg and a total length of about 27m. Its orbit is decaying rapidly and the Russians are not boosting it again and so re-entry is expected to happen within a few days either side of December 31. **Geoffrey Falworth** of Penwortham tells me that several sections will survive including the bulkheads and the docking ports and parts of the COSMOS craft.

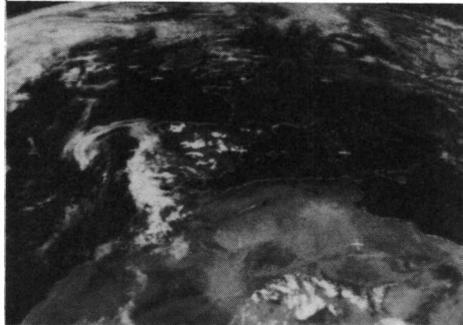


Fig. 2: A summer picture from METEOSAT showing the C2D visible light image. The mountains of north Africa can be clearly seen and morning and evening views are very dramatic.

The orbit of SALYUT 7 has an inclination of about 51° which takes it over Britain and so there is a small chance of seeing some debris fall but the oceans or parts of Europe are more likely to see the fireworks.

Detail

The computer that I bought in summer for satellite monitoring has the VGA screen mentioned earlier and has revealed far more detail in these METEOR pictures than I knew existed. Each section of this picture contains extra grey scales and also other markers in the bars which may mean something to someone!

The Russian Weathersats

Part 4: Previous articles in this short series have covered the METEOR 1, 2 and 3 series of orbiting weather sats. The experience gained during the exploitation of these satellites has been complemented by the Cosmos 1500 type of satellite, now referred to as the OKEAN series.

The Russians are developing their meteorological satellites to create a single comprehensive system including geostationary and polar orbiters. These will monitor not only visible and infra-red radiation but also ultra-violet water vapour and ozone concentrations. The geostationary satellites will be similar to our METEOSAT and the American GOES in providing near-continuous transmissions with high resolution pictures.

The OKEAN series of oceanographic satellites started off under the general name of COSMOS, probably due to the early Soviet reluctance to acknowledge problems if such

satellites failed to operate properly. Early examples of these satellites include COSMOS 1500, 1689 and 1766 which sent down good images though having problems with other on-board equipment.

These satellites carry radar and microwave sounders and can therefore measure the amounts and thickness of Arctic and Antarctic ice cover, as well as watching reservoir and river ice. The earliest ones were called METEOR-PRIRODA and carried multi-zonal scanners of low (MSL) and medium (MSM) resolution: MSL spectral ranges in four channels, 0.5 to 0.6µm, 0.6 to 0.7, 0.7 to 0.8 and 0.8 to 1.0; resolution 1000 by 1700m with a swathwidth of 1900km and a scanning angle of 106°. MSM spectral range has two channels, 0.58 to 0.7µm and 0.7 to 1.0; resolution is 140 by 240m with a swathwidth of 1380km and a scanning angle of 90°.

Other equipment carried in the early satellites was classed as experimental and included opto-mechanical scanners of both moderate (175 by 24m) and high (45 by 60m) resolution, and a 'Fragment' multi-zonal scanner. COSMOS 1689 was a later development which was launched in 1985 to collect regular data on earth resources as well as meteorology and contained similar equipment but built to a higher specification. These satellites have been used to identify parts of the earth's crust and to prospect for oil.

My thanks once more to the USSR State committee for Hydrometeorology, State Research Centre for Earth Resources Exploration for providing the information on which this data is based. There will be a further article on the orbits of the METEORS.



Fig. 3: A close-up of a typical METEOR visible light image. It shows the set of phasing bars on the right-hand side which give the signal its characteristic sound. The grey scale vertical strip is next and then the rectangular six black-and-white aperture indicator. At the top of the picture the six bars are mostly black indicating that the sensor aperture is almost fully open. The bars represent binary numbers with black equal to 1.

Offers

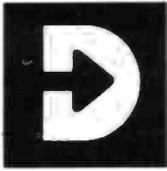
In order to help those of you trying to test out new equipment I can supply the latest set of Kepler elements to update your satellite predictions programs if you simply send me an s.a.e. The second offer is for those wanting a tape recording of a.p.t. signals; please let me have a pre-paid package containing a cassette tape and I will record either a NOAA, METEOSAT or METEOR signal, depending on your request.

Season's Greetings

This column will appear just before Christmas and so may I wish all our readers a happy and peaceful New Year. Please continue to send in reports of your satellite work and any suggestions for particular items in the column that you would like to see.

Abbreviations

a.o.s.	acquisition of signal
a.p.t.	automatic picture transmission
CGA	Colour Graphics Adaptor
ECD	Enhanced Colour Display
FAX	facsimile
h.r.p.t.	high resolution picture transmission
in	inch
kg	kilogram
km	kilometre
l.o.s.	loss of signal
m	metre
MHz	megahertz
MSL	Multi-zonal Scanner Low resolution
MSM	Multi-zonal Scanner Medium resolution
p.c.b.	printed circuit board
s.a.e.	stamped addressed envelope
SVGA	Super Versatile Graphic Array
TV	television
UTC	Universal Co-ordinated Time
v.h.f.	very high frequency
VGA	Versatile Graphic Array



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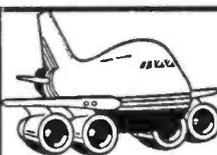
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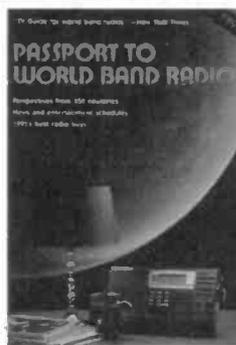
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During 1990, R. HCJB in Quito, Ecuador decided to experiment with the single sideband (s.s.b) plus pilot carrier system advocated at the last World Administrative Radio Conference (WARC) on h.f. broadcasting. Encouraged by the reception reports, they soon established an 11m u.s.b. (30kW) broadcast service to Europe.

This mode offers a number of advantages over the original amplitude modulation (a.m.) system, so it is to be hoped that receiver manufacturers will produce some low-cost s.s.b. portables during 1991.

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT).

Writing from Edinburgh, **Paul Gibson** says that although he has heard Atlantic 252 as late as midnight, reception is rendered almost impossible at times by the co-channel interference from Lahti, Finland (200kW) and Tipaza, Algeria (1500kW). Atlantic 252 has been monitored by **John Stevens** in Largs since its inception. He has noticed a considerable reduction in the signal strength during the last few months, at one time it was more potent than BBC Radio 4 via Westerglen, but now it is much weaker and reception is very poor after 1800. The marked reduction in strength of their daylight signal was also noted by **John Hepburn** in Ashington (Northumberland) and by **Roy Patrick** in Derby.

MW Transatlantic DX

Listening in Grimsby, **Jim Willett** found conditions to be rather poor compared with last month. The broadcasts from CJYQ in St. John's, NF on 930 were the first to reach him, they peaked SIO333 at 0115. The signal from WINS in New York 1010 was rated SIO222 at that time. The only broadcast received from S. America came from R. Globo in Rio, Brazil on 1220, rated SIO222 at 0320.

Listeners interested in this aspect of DXing, but unable to search the band at night, could try using a time-switch controlled receiver and tape recorder to monitor a specific frequency. Some receivers have a suitable time-switch built-in, but an alternative is to plug an a.c. time-switch into the mains outlet used to power the receiver and tape

Medium Wave DX

Freq (kHz)	Station	Country	Power (kW)	DXer	Freq (kHz)	Station	Country	Power (kW)	DXer
531	Ain Beida	Algeria	600	H*	990	SER R. Bilbao	Spain	10	U*
531	Torshavn	Faroe Is.	5	O*	999	Hoyerswerda	Germany	20	M*
531	Leipzig	Germany	100	D*, J*, K.L.*	999	Torino	Italy	20	M*
531	Oviedo	Spain	10	D*, L*	999	R. Popular, Madrid	Spain	20	D*, J*
531	Beromunster	Switzerland	500	J*	1008	Hilversum-5 Flevo	Holland	400	H.L.M*, S.T.
540	BRT-2 Wavre	Belgium	150/50	K.L.M.S.T	1017	Wolfsheim	Germany	600	J*, L*, M*, U*
540	Soft	Hungary	2000	M*	1035	Milan	Italy	50	O*
549	Bayreuth	Germany	200	B*, K.L*, M.S.T	1035	Prog.3 Lisbon	Portugal	120	D*, M*, U*
558	Valencia	Spain	20	D*, R*	1044	Burg	Germany	250	M*
558	Cima di Dentro	Switzerland	300	O*	1053	BBC-R1 Stagshaw	UK	50	L
567	RTE-1 Tuilamore	Ireland (S)	500	D*, K.L.M.S.T.U	1062	Kalundborg	Denmark	250	J*, M*, S
576	Stuttgart	Germany	500	J*, L*, M*, T	1071	Brest	France	20	D*, S
585	FIP Paris	France	8	D*, E*, J*, L.S.T	1071	Lille	France	40	M
585	RNE-1 Madrid	Spain	200	J*, M*, N*	1089	Krasnodar	USSR	300	I*
594	Frankfurt	Germany	400	D*, L*, N*, S.T	1098	Bratislava	Czechoslovakia	750	J*
594	Muge	Portugal	100	M*, O*	1107	AFN via Munich	Germany	40	M*
603	Lyon	France	300	N*	1107	RNE-5 Barcelona	Spain	20	M*
603	Sevilla	Spain	20	D*	1125	La Louviere	Belgium	20	J*, L*, M*
603	BBC-R4 Newcastle	UK	2	M,N*	1125	BBC Llandrindod Wells	UK	1	M*
612	RTE-2 Athlone	Ireland (S)	100	D*, L.M.N*, S.T	1134	Valencia	Spain	10	J*
621	RTBF-1 Wavre	Belgium	80	D*, J*, K.L.M*, N*, S.T	1134	Zadar	Yugoslavia	1200	E*, M*, S
630	Vigra	Norway	100	D.J*, M*, N*	1143	AFN via Stuttgart	Germany	10	K.L
630	Sta. Isabel	Portugal	50	M*	1143	Century R. Dublin	Ireland (S)	?	D.J*, M
630	Tunis-Djedeida	Tunisia	600	U*	1143	Kaliningrad	USSR	150	E*, M*
639	Liblice	Czechoslovakia	1500	L*, M*, N*	1152	Lerida	Spain	10	O*
639	La Coruna	Spain	100	N*	1152	Ras Al Khaima	UAE	50	I*
648	Palma de Mallorca	Spain	10	D*	1179	Solvesborg	Sweden	600	J*, L.M*, P*, O*, S
648	BBC Orfordness	UK	500	J*, L.M.N*, S	1188	Kuurne	Belgium	5	L*, O*
657	Burg	Germany	250	N*	1188	Szolnok	Hungary	135	E*
657	Napoli	Italy	120	N*, U*	1197	VOA via Munich	Germany	300	B*, M*, O*
657	RCE-2 Madrid	Spain	20	D*, U*	1197	BBC-R3 Enniskillen	Ireland (N)	1.0	J*
657	BBC-R. Wales Wrexham	UK	2	D	1197	BBC-R3 Bournemouth	UK	0.5	L.S
666	Bodenseesender	Germany	300/180	D*, N*, S	1206	Bordeaux	France	100	D*
666	R. Vilnius	USSR	500	B*	1206	Wroclaw	Poland	200	D*, H*
675	Marseille	France	600	D*, J*	1215	BBC-R3 Moorside Edge	UK	100	L
675	Hilversum-3 Lopic	Holland	120	H.L*, M.N*, S.T	1224	Vidin	Bulgaria	500	J*
684	RNE-1 Sevilla	Spain	250	J*, M*, U*	1224	Abadan	Iran	?	I*
683	BBC-R5 Stagshaw	UK	50	L*	1224	COPE Madrid	Spain	20	D*, H*
702	Aachen/Fleensburg	Germany (W)	5	A*, M*	1233	Melnik	Czechoslovakia	400	D*, M*
702	Zamora	Spain	5	E*	1233	Tanger	Morocco	200	O*
711	Rennes 1	France	300	L*, M.S.T	1233	Al Khafisah	Qatar	100	I*
720	BBC-R4 Lots Rd London	UK	0.5	L.M*, S	1251	Marcali	Hungary	500	E*
729	RTE-1 Cork	Ireland (S)	10	J*, M*, S	1251	Tripoli	Libya	500	H*
729	Oviedo	Spain	50	J*, M*	1251	Huisberg	Netherlands	10	H*
738	Paris	France	4	A*, M*	1260	VOA via Rhodes	Greece	500	L
738	Poznan	Poland	300	H*	1260	Valencia	Spain	20	H*, J*, M*
738	RNE-1 Barcelona	Spain	250	D*, E*, M*	1269	Neuminster	Germany	600	C*, D*, H*, J*, L*, M*, S
747	Hilversum-2 Flevo	Holland	400	J*, K.L*, M.S.T.U	1278	Strasbourg	France	300	M*
756	Brunswick	Germany	800/200	A*, D*, J*, M*	1278	RTE-2 Dublin/Cork	Ireland (S)	10	D*, F*, H*, L
756	Luci	Romania	400	U*	1287	Litomysl/Liblice	Czechoslovakia	300/200	H*, L*, M*, O*
765	Sottens	Switzerland	500	A*, E*, M*	1296	San Sebastian	Spain	5	J*
774	BBC-R4 Enniskillen	Ireland (N)	1	J*	1296	BBC Orfordness	UK	500	H*, L.M*
774	RNE-1 San Sebastian	Spain	60	J*	1305	Rzeszow	Poland	100	H*
783	Burg	Germany	1000	D*, J*, M*, S	1314	Kvitsoy	Norway	1200	E*, H*, J*, K.L*, M.R.S
782	Limagas	France	300	J*	1323	R. Moscow via Leipzig	Germany	150	D*, M
792	Sevilla	Spain	20	A*	1332	Rome	Italy	300	E*, L*, M*, U*
801	Munich	Germany	420	M*	1341	BBC-Ulster Lisnagarvey	Ireland (N)	100	D*, H*, L.M.S
810	BBC-Scot. Westerglen	UK	100	D.L.M.S	1350	Nancy/Nice	France	100	J*, L*, M*
819	Batra	Egypt	450	O*, M*	1359	Berlin	Germany	250/100	D*, J*, M
819	Warsaw	Poland	300	L*	1368	Manx Radio, Foxdale	I.O.M.	20	D.G.J.L*, M*
828	Hanover	Germany	100/5	D*	1377	Lille	France	300	H*, K.L*, S.T
837	Nancy	France	200	J*, L*	1386	Kaunas	USSR	1000	D*, H*, L*, R
846	Rome	Italy	540	L*, M*, U*	1395	R. Tirana via Lushnje	Albania	1000	B*, E*, J*, L*, P*
855	Murcia	Spain	125	E*, J*, M*	1395	Leon	Spain	5	D*
855	Santander	Spain	20	N*	1404	Brest	France	20	J*, L.R.S
864	Paris	France	300	J*, L.S.T	1413	RCE Zaragoza	Spain	20	N*
873	AFN via Frankfurt	Germany	150	D*, J*, M*, U*	1422	Heusweiler	Germany	1200/600	D.J*, L*, M*, N*, S
873	R. Ulster, Enniskillen	UK	1	J*	1431	Dresden	Germany	250	J*, M*
882	BBC-Wales Washford	UK	70	D.H.J*, L.M.S.T	1440	Marnach	Luxembourg	1200	D*, J*, L*, M.R.S
881	Algiers	Algeria	600/300	H*, J*, U*	1458	R. Tirana, Lushnje	Albania	500	D*, M*
881	Huisberg	Holland	20	T	1467	TWR Monte Carlo	Monaco	1000/400	D*, H*, J*, M*
900	Milan	Italy	600	A*, J*, M*, S	1476	Wien-Bisamberg	Austria	600	D*, J*, M*
900	Qurayyat	Saudi Arabia	1000	B*, P*	1494	Clermont-Ferrand	France	20	D*, L*, M*
909	BBC-R5 Moorside Edge	UK	200	L	1503	Stargard	Poland	300	B*, E*, F*, H*, L*, M*, P*
918	R. Intercont. Madrid	Spain	20	J*	1512	BRT Wolveterm	Belgium	600	B*, D*, H*, L.M*, P*
918	R. Lubljana	Yugoslavia	600/100	M*	1521	Kosice	Czechoslovakia	600	M
927	BRT-1 Wolveterm	Belgium	300	H*, J*, L.M.S.T	1530	Vatican Radio, Rome	Italy	150/450	B*, D*, H*, M*, N*
927	RRE Evora	Portugal	1	O*	1539	Mainflingen	Germany	700	D*, J*, L*, M.S
936	Bremen	Germany	100	D*, J*, K.L*, M	1557	Nice	France	300	D*, M*
936	Lvov	USSR	100	O*	1575	Burg	Germany	250	D*, L*
945	Toulouse	France	300	D*, J*	1575	Genoa	Italy	50	O*
954	Dobrochov	Czechoslovakia	400	M*	1584	Hamadan	Bahrain	1	I
963	Porl	Finland	600	C*, D*, J*, P*	1584	Pamplona	Spain	2	D*
963	Paris	France	8	D*, L	1593	Langenberg	Germany	400/800	D*, J*, L*, M*, N*, R.S
963	RRE Sexual	Portugal	10	O*	1593	M. Chic	Romania	14	D*
972	Hamburg	Germany	300	D*, J*, L*, M*, S.T	1602	R. Orienteinte	Spain	2	M*, R*
981	Alger	Algeria	600/300	H*, J*, M*, S	1611	Vatican Radio, Rome	Italy	5	R*
990	Berlin	Germany	300	D*, M*					

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

recorder. The receiver should be set to a suitable frequency, e.g. 930kHz and the recorder left in the record mode.

Other MW DX

While listening in Sunderland, **Leo Barr** picked up the sky wave component of the 1MW transmission from Qurayyat, Saudi

Arabia on 900 at 2255. The signal was only audible for about five minutes and peaked 34434 before fading out.

The sky wave signals from some N.Africa stations have reached here after dark. In Gt. Yarmouth, **Ted Walden Vincent** logged Algiers, Algeria 891 (600-300kW) as SIO444 at 2045 and Djedeida, Tunisia 630

DXers:

- A: Ted Agambar, Norwich.
- B: Leo Barr, Sunderland.
- C: Andy Cadier, Folkestone.
- D: Scott Caldwell, Warrington.
- E: Jim Cash, Swanwick.
- F: Ron Damp, Worthing.
- G: Paul Gibson, Edinburgh.
- H: Sheila Hughes, Morden.
- I: Roderick Illman, Oman.
- J: Eddie McKeown, Co Down.
- K: David Middlemiss, Eyemouth.
- L: George Millmore, Wootton IOW.
- M: Chris Nykiel, Leeds.
- N: John O'Halloran, Harrogate.
- O: Roy Patrick, Derby.

- P: Chris Shorten, Norwich.
- Q: Alan Smith, Northampton.
- R: John Stevens, Largs.
- S: David Todd, Basingstoke.
- T: Phil Townsend, London.
- U: Ted Walden-Vincent, Gt. Yarmouth.

long medium & short

Tropical Bands

Freq (kHz)	Station	Country	UTC	DXer	Freq (kHz)	Station	Country	UTC	DXer	Freq (kHz)	Station	Country	UTC	DXer
2.560	Xinjiang	China	2315	C	4.760	R.Moscow (Dushanbe)	USSR	1855	F,L	4.895	Voz del Rio Arauca	Colombia	0250	S
3.200	TWR	Swaziland	2250	G,S	4.765	Brazzaville	P.R.Congo	2013	D,F,J,L	4.905	R.Nat.N'djamena	Chad	2010	C,J,L
3.255	BBC via Maseru	Lesotho	0319	H,S	4.765	R.Moscow	via Cuba	2345	K,O	4.910	V of People Kampuchea	Cambodia	2305	S
3.270	SWABC 1, Namibia	S.W.Africa	1900	G,L	4.770	FRON Kaduna	Nigeria	1818	C,L,S	4.910	R.Zambia, Lusaka	Zambia	1820	L
3.300	R.Cultural	Guatemala	0330	S	4.775	BRI Jakarta	Indonesia	1630	C	4.915	R.Ghana, Accra	Ghana	2116	D,L,O,Q
3.365	GBC Radio 2	Ghana	2230	D,G	4.785	R.Baku	USSR	1734	L	4.915	Voice of Kenya	Kenya	1730	L
3.905	AIR Delhi	India	1720	G,N	4.790	R.Atlantida	Peru	0120	S	4.920	R.Quito	Ecuador	0425	S
3.915	BBC Kranji	Singapore	1900	I,J,L,S	4.790	TWR Manzini	Swaziland	1819	L	4.930	R.Moscow	USSR	2010	B,F,H,K,L
3.950	PBS Qinghai Xining	China	2325	C	4.795	R.Douala	Cameroon	2015	L	4.935	Voice of Kenya	Kenya	2010	B,J,L,R
3.955	BBC Daventry	England	2156	B,E,F,H,O,R	4.800	PBS Xinjiang	China	2252	C	4.940	R.Kiev 2	USSR	2010	F,H,I,K,L,R
3.960	RFE/RL Munich	W.Germany	2300	K,O	4.800	LNBS Lesotho	Maseru	2055	S	4.958	R.Baku	USSR	1918	H,J
3.965	RFI Paris	France	2330	F,H,K	4.810	R.Yerevan 2	USSR	2009	L	4.970	PBS Xinjiang	China	1555	C
3.970	RFE Munich	W.Germany	2230	O	4.815	R.diff TV Burkina	Ouagadougou	1820	L	4.970	R.Rumbos, Caracas	Venezuela	0330	H
3.975	BBC Skelton	England	1915	F	4.820	E.Prov Huila	Angola	0400	S	4.975	R.Uganda, Kampala	Uganda	1728	L
3.980	VOA Munich	W.Germany	2155	F,H,K,O,R	4.820	R.Moskva 4 (Khanty-M)	USSR	1850	F,K,L	4.980	Ecos del Torbes	Venezuela	0458	C
3.985	R.Beijing, China	via SRI Berne	2135	C,E,F,H,O,P,R	4.825	R.Moscow	USSR	2100	G	4.985	R.Brazil Central	Brazil	0845	C
3.985	SRI Berne	Switzerland	1920	B,F,G	4.830	Gaborone	Botswana	1737	L,S	4.990	AIR via Madras	India	2042	M,R
3.985	DW Cologne (Julich)	W.Germany	2300	F,H,K,O,R	4.830	R.Tachira	Venezuela	0300	H,S	4.990	FRON Lagos	Nigeria	1728	D,G,L,M
4.080	R.Ulan Bator	Mongolia	2310	S	4.832	R.Rejo	Costa Rica	0640	C	5.000	R.Nacional, Beta	C.Africa	2155	J,L,S
4.220	PBS Xinjiang	China	1840	C	4.835	RTM Bamako	Mali	2015	H,J,L,M	5.035	R.Bangui	C.Africa	0430	C
4.460	R.Beijing	China	2050	J	4.845	ORTM Nouakchott	Mauritania	0004	H	5.035	R.Alma Ata	USSR	2300	A,D,H
4.500	Xinjiang	China	2315	C	4.850	R.Yaounde	Cameroon	2045	B,C,D,K	5.040	Vos del Upano, Macas	Ecuador	0135	S
4.735	Xinjiang	China	2300	C,D,H,I,K	4.850	AIR Kohima	India	0050	S	5.055	Faro del Caribe	Costa Rica	0300	S
4.740	R.Afghanistan	via USSR	1855	H,L	4.860	AIR New Delhi	India	1750	L	5.065	R.Candip, Bunia	Zaire	2200	H,J,K
4.760	Yunnan Kunning	China	1530	C	4.865	PBS Lanzhou	China	2355	C,K	5.075	Caracol Bogota	Colombia	0400	H,J,P
4.760	ELWA Monrovia	Liberia	1904	H,K	4.870	R.Cotonou	Benin	1733	D,L	5.085	R.Sutatenza, Bogota	Colombia	0500	S
										5.260	R.Alma Ata 2	USSR	1815	A,F,H,J

DXers:
A. Denis Boshier, Dolgellau.
B. Robin Clark, Plymouth.
C. David Edwars, Wallsend.
D. Bill Griffith, London.
E. Robin Harvey, Bourne.
F. Sheila Hughes, Morden.
G. Rhoderick Illman, Thurrait, Oman.
H. Eddie McKeown, Co. Down.
I. David Middlemiss, Eyemouth.
J. John Nash, Brighton.
K. John O'Halloran, Harrogate.
L. Fred Pallant, Storrington.
M. Roy Patrick, Derby.
N. Philip Rambaut, Macclesfield.
O. Alan Roberts, Quebec, Canada.
P. Chris Shorten, Norwich.
Q. Alan Smith, Northampton.
R. Ted Walden-Vincent, St. Yarmouth.
S. Jim Willett, Grimsby.

(600kW) as SIO333 at 2200. At 2250, **Sheila Hughes** (Morden) noted Ain Beida, Algeria 531 (600kW) as 34333 and Tripoli, Libya 1251 (500kW) as 22222 at 0030. In Co. Down, **Eddie McKeown** rated Alger 981 (600/300kW) as 33443 at 2310. The signals from Batra, Egypt on 819 (450/50kW) were heard on several evenings in Derby.

W.M. Local Radio DX

In Co. Wexford, **Bart O'Brien** added several new stations to his list of local radio DX including West Sound. Their daylight broadcasts have since been confirmed by a nice QSL and letter. He says, "I love the challenge of identifying the stations - I must say my geographical knowledge of Britain has improved by leaps and bounds". Having heard great praise for the m.w. hexagon loop by the late John Ratcliffe (April '89 *SWM*), Bart decided to make one. He says, "I was amazed at the improvement - signal strength and directional properties are great".

Two more ILR stations have split the programming of their m.w. and v.h.f. outlets. **Jason Faulkner** (Leicester) informs me that Chiltern R. adopt the name 'Chiltern Super Gold' during the day for broadcasts on 792, 828 & 1557kHz. At night, they revert to Chiltern R. **Francis Hearne** (Bristol) tells me that Red Dragon R. use the name 'Touch AM' during their m.w. broadcasts on 1305 and 1359kHz, which specialise in music from the past and operate 24 hours a day. The latest 'pop' music is carried by their v.h.f. outlets on 97.4 and 103.2MHz under the original name 'Red Dragon R.'.

Short Wave Reports

At times, high levels of solar noise have made reception on the h.f. bands poor, or even impossible, in some areas, good reception has been noted at other times. The present high level of solar activity is likely to continue, so more disturbances can be expected.

Most broadcasts in the **25MHz (11m)** band are aimed outside Europe, so only a few signals reach the UK via back scatter and reception is generally poor. However, good reception of the signals to Europe from R. HCJB Quito 25.950 has been noted in the UK nearly all day. Using a scanning receiver in London, **Ron Galliers** rated their u.s.b. plus pilot carrier signal as 44333 at 1228. **Alan Roberts** (Quebec) monitors the signal daily. Quite often the strength is insufficient to lock the synchro-

nous detector in his receiver, so a typical rating is 45233 at 1220. The most potent signals come from R. Norway Int., Oslo 25.730 and RFI Paris 25.820, both rate as 55555. In contrast, R. Nederland's Sunday broadcasts on 25.970 (Ou to C/W.Africa 1030-1125) rate 25222 at 1120.

The **21MHz (13m)** broadcasts from R. Australia to S. Asia via Carnarvon 21.775 (Eng 0100-1300) sometimes reach the UK. In the early morning, **Kenneth Reece** (Prenton) noted signal variations ranging from inaudible to 43433. Their signals to C. Asia via Darwin 21.525 (Eng 0100-0900) was logged by **Jim Cash** in Swanwick as 21221 at 0823. Good reception of their signal to the Gulf area via Carnarvon 21.775 (Eng 1300-1500) was noted by many in the UK. The 54344 from **Alan Smith** in Northampton at 1322 being a typical example.

Long Wave DX

Freq (kHz)	Station	Country	Power (kW)	DXer
153	Dornbach	Germany	500	B,H,I,K*,L
162	Allouis	France	2000	B,C*,D*,G*,H,I,K*,L*
171	Kaliningrad	USSR	1000	B,G*,H*,K*
171	Moscow	USSR	500	I
177	Oranienburg	Germany	750	B,G*,H*,K*
183	Saarlouis	Germany	2000	B,C*,D*,G*,H,I,K*,L*
189	Motala	Sweden	300	B,H*
189	Tbilisi	USSR	500	C*
198	BBC Droitwich	UK	500	A,G*,H*,K*,L
198	BBC Westerglen	UK	50	B,D
207	Munich	Germany	500	A*,B,C*,G*,H*,I,K*
216	Roumoules	Monaco	1400	B,D*,G*,H,I,K*,L
216	Oslo	Norway	200	B,C,H*
225	Konstantinow	Poland	2000	A*,B,D*,G*,H*,I,K*
234	Junglinster	Luxembourg	2000	B,H,I,K*
243	Kalundborg	Denmark	300	A*,B,G*,H*,I,K*
252	Tipaza	Algeria	1500	C*,H*,I,K*
252	Atlantic 252	S.Ireland	500	A*,B,C,D*,E*,F,G*,H,I,J,L
261	Burg	Germany	200	D*,H*,K*,L*
261	Moscow	USSR	2000	B,D
270	Topolna	Czechoslovakia	1500	B,D*,G*,H*,I,K*
279	Minsk	USSR	500	B,H*,K*

Note: Entries marked * were logged during darkness. All other entries were logged during daylight.
DXers:
A: Ted Agambar, Norwich.
B: Kenneth Buck, Edinburgh.
C: Scott Caldwell, Warrington.
D: Robin Clark, Plymouth.
E: Paul Gibson, Edinburgh.
F: John Hepburn, Ashington.
G: Sheila Hughes, Morden.
H: Eddie McKeown, Co. Down.
I: Fred Pallant, Storrington.
J: Roy Patrick, Derby.
K: Phil Townsend, London.
L: Ted Walden-Vincent, St. Yarmouth.

Some broadcasts to Europe in this band are from R. Japan via Yamata 21.500 (Russ, Sw, It, Ger, Fr, Eng, Jap 0530-0830), rated SIO444 at 0740 by **Cyril Kellam** in Sheffield; R. Pakistan, Islamabad 21.520 (Eng 1100-?) 34423 at 1130 by **John Nash** in Brighton; WCSN Scotts Corner, MN 21.780 (Eng 1400-1600) 55544 at 1450 by **Andy Cadier** in Folkestone; UAE R. Dubai 21.605 (Ar, Eng 0600-1640) 44444 at 1615 in Morden; also 21.67555545 at 1615 by **Darren Beasley** in Bridgwater; R. Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 44344 by **Denis Boshier** in Dolgellau; RCI via Sackville, Canada 21.525 (Russ, UK, Pol, Eng, Fr, Ger 1430-1800) 55555 at 1730 by **Ron Damp** in Worthing; WYFR via Okeechobee, FL 21.615 (Eng, Ger, It 1600-2145, also to Africa) SIO455 at 1900 by **Kenneth Buck** in Edinburgh; R. HCJB Quito 21.480 (Eng 1900-2000) 44344 at 1934 by **Ted Gould** in London.

The 13m signals to other areas include R. Moscow, USSR 21.790 (Eng to Australia 2300-0900), 43333 at 0837 by **Ted Agombar** in Norwich; BFBS via Daventry, UK? 21.735 (Eng to Gulf area 0930-1000) 33433 at 0930 by **Rhoderick Illman** in Thurrait, Oman; SRI via Schwarzenburg, Switzerland 21.695 (It, Eng, Ger, Fr to S. Asia 0745-1030) SIO344 at 1030 by **David Middlemiss** in Eyemouth; R. Austria Int, Vienna 21.490 (Ger, Eng to E. USA 1100-1300) 45554 at 1132 by **David Edwars** in Wallsend; R. Moscow, USSR 21.465 (Russ, Fr, Ar to W. Africa 0800-2000) SIO444 at 1250 by **John Coulter** in Winchester; RFI via Issoudun, France 21.770 (Eng, Fr

Transatlantic DX

Freq	Station	Location	UTC	DXer
USA				
1010	WINS	New York, NY	0115	A
1050	WEVD	New York, NY	0245	A
1210	WUGL	Philadelphia, PA	0300	A
1510	WKUU	Boston, MA	0312	A
Canada				
580	CJFX	Antigonish, NS	0425	A
590	VOCM	St. John's, NF	0150	A
680	CJYQ	Grandfalls, NF	0210	A
930	CJYQ	St. John's, NF	0115	A
970	CFIO	Harbour Grace	0320	A
1200	CFGO	Ottawa, ON	0350	A
South America				
1220	R.Globol	Rio, Brazil	0320	A

DXer:
A: Jim Willett, Grimsby.
to SE. Asia 1400-1600) 43333 at 1400 by **Chris Shorten** in Norwich; R. Portugal via San Gabriel 21.530 (Port, Eng to S. Asia, Middle East 1500-1630) 32233 at 1615 in Co. Down WCSN Scotts Corner 21.640 (Eng to E. Africa 1600-1800) SIO555 at 1655 by **John O'Halloran** in Harrogate; BBC via Ascension Island 21.660 (Eng to S. Africa 0700-2115) 45554 at 1835 by **John Parry** in Northwich.

Good reception of R. Australia's **17MHz (16m)** signals to the Gulf has been noted in Oman. Rhoderick rated their broadcast on 17.630 via Carnarvon (Eng 1300-1700) as 44333 at 1431. They have also been received well in Edinburgh as SIO444 at 1515. Their signals to E/C. Asia via Darwin 17.750 (Eng, Chin, Fr 2300-0900) was rated 24333 at 0019 in Swanwick.

Some days, the broadcasts to Pacific areas from R. New Zealand Int, via Rangataiki (N. Island) have reached the UK. Their 100kW signal on 17.675 (Eng 2105-0610 Mon-Fri; 2300-0545 Sat; 0100-0700 Sun) was rated SIO343 at 2210 by **Simon Hamer** in New Radnor and 32222 at 0627 in Norwich.

Among the morning 16m

long medium & short

signals, were the BBC via Mahe, Seychells 17.885 (Eng to E.Africa 0500-0630), rated 24323 at 0604 in Prenton; R. Moscow, USSR 17.625 (Eng to N.Africa 0400-1000) SIO322 at 0615 in Bristol; R. Romania Int, Bucharest 17.805 (Eng to SE.Asia 0645-0715) 34433 at 0653 in Sunderland; R. Japan via Yamata 17.890 (Eng, Jap to SE.Asia 0500-1000) 54444 at 0720 in Norwich; BBC via Kranji, Singapore 17.830 (Eng to SE.Asia 0600-0915) SIO333 at 0810 by **Philip Rambaut** in Macclesfield; Voice of Greece, Athens 17.535 (Gr, Eng to Australia 0800-0850) 44444 at 0840 in Morden; R. Finland via Pori 17.800 (Eng, Fin, Sw to E.Asia 0830-0957) 4444 at 0812 in London; R. Beijing, China 17.710 (Eng to Australia 0830-1035) 53543 at 0940 in Bridgewater; KHBI Saipan, N.Mariana Is 17.555 (Eng to Oceania 0800-1000) 22332 at 0955 in Worthing; SRI via Schwarzenburg 17.830 (Eng, Fr, Ger, It to SE.Asia 1045-1300) was logged as 41333 at 1105 in Co. Down.

Later, VOA via Tinang, Philippines 17.790 (Chin to C.Asia 1000-1600) was noted as 33333 at 1435 in Northampton; RTVM Tanger, Morocco 17.595 (Fr, Eng to N.Africa, Middle East 1400-1700) 43544 at 1530 in Brighton; R. Sweden via Horby 17.880 (Eng to USA 1530-1600) 55555 at 1542 in Folkestone; R. Pakistan, Islamabad 17.555 (Eng to Europe 1600-1630) SIO444 at 1635 in Winchester; R. RSA Johannesburg, S.Africa 17.790 (Eng to Africa 1700-1800) 44444 at 1700 by **Darran Taplin** in Brenchley; RCI via Sackville 17.820 (Eng to Africa 1800-1830) 53444 at 1808 in Dollgellau; R. HCJB Quito 17.790 (Eng to Europe 1900-2000) SIO555 at 1900 in Harrogate; WYFR via Okeechobee 17.612 (Ar, Fr, Port, Eng to Europe, Africa 1600-2300) 43434 at 2120 by **Cliff Stapleton** in Torquay.

Good DX reception was noted in the **15MHz (19m)** band. The signals from R. New Zealand Int, Wellington on 15.485, intended for Pacific listeners, reached here at remarkable strength some evenings. In Slough, **Thomas Barnett** rated their signal (Eng 1645-2105 Mon-Fri; 1745-2105 Sun) as SIO444 at 1700. Some signals from R. Australia via Shepparton have been heard here in the early morning. Their transmission to SE.Asia 15.465 (Eng 2100-0730) was rated 43443 at 0705 by **Donald Blashill** in Cheltenham; to S.Pacific 15.240 (Eng 2200-0830) as SIO444 at 0800 in

Sheffield.

Broadcasters using the 19m band to reach Europe include RTL Luxembourg 15.350 (Eng 1000-1400; Fr 1400-1000; also to E.USA) heard at 1100 in Ashington; WWCN Nashville, TN 15.690 (Eng 1200-0100) 53343 at 1919 by **Robin Clark** in Plymouth; R. Korea, Seoul 15.575 (Ar, It, Eng, Sp, Port, Ger 1645-2300) 44333 at 1800 in Norwich; R. Pakistan, Islamabad 15.605 (Ur, Eng 1645-1900) 44444 at 1800 by **Scott Caldwell** in Warrington; R. Bangladesh, Dacca 15.255 (Eng 1815-1900) 23322 at 1859 in Sunderland; R. HCJB Quito 15.270 (Eng 1900-2000) 13342 at 1928 in Folkestone; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) 34343 at 1930 in Torquay; WYFR via Okeechobee 15.566 (Ger, It, Eng, Sp 1600-2245) 43333 at 1944 in Swanwick; RCI via Sackville 15.325 (Fr, Eng 1900-2000) SIO344 at 1945 in Edinburgh; R. Damascus, Syria 15.095 (Fr, Eng 1805-2105) 55545 at 2010 in Norwich; RAE Buenos Aires, Argentina 15.345 (Ar, Eng, Ger, Fr, It 1800-2300), heard at 2050 in Largs; WINB Red Lion, USA 15.185 (Eng 2003-2245) 34133 at 2106 in Co. Down.

Various languages are broadcast to other areas, often with segments in English. Those noted were from R. Japan via Montsinery, Fr. Guiana 15.325 (Jap, Eng, Sp to C.America 0200-0400) 24433 at 0310 in Prenton; RFO Papeete, Tahiti 15.170 (Fr, Tah to SE.Pacific areas 1600-0930) SIO343 at 0435 in New Radnor; BFBS via BBC 15.205 (Eng to Gulf area 0930-1000) 34433 at 0930 in Oman; SRI via Schwarzenburg 15.570 (Eng, Fr, Ger, It to SE.Asia 1045-1300) 44344 at 1058 in London; R. Finland via Pori 15.400 (Eng, Fin, Sw to USA 1050-1400) 33233 at 1105 in London; AIR via Aligarh, India 15.020 (Sin to S.Asia 1300-1500) 35343 at 1430 in Northampton; R. RSA Johannesburg, S.Africa 15.270 (Eng to E.Africa, Middle East 1700-1800) 33343 at 1730 in Morden; RCI via Sackville 15.260 (Eng, Fr to Africa 1800-2000) 44334 at 1816 in Dollgellau; VOA via Greenville, USA 15.410 (Eng to W.Africa 1600-2200) 33333 at 1900 in Harrogate; Africa No.1., Gabon 15.475 (Fr, Eng to W.Africa 1600-1800) 45443 at 1800 in Northwick; KUSW Salt Lake City 15.590 (Eng to E.USA 7-2200) 45233 at 1905 in Brighton; SLBC Colombo, Sri Lanka 15.120 (Eng to ?) 53543 at 1917 in Bridgewater; RNE Noblejas, Spain 15.375

Local Radio DX

Freq (kHz)	Station	IBA BBC	Power (kW)	DXer	Freq (kHz)	Station	IBA BBC	Power (kW)	DXer
558	Spectrum R.	I	7.50	J.P.S	1161	R.Tay	I	1.40	E.L.*
585	R.Solway	B	2.00	I.*K	1161	Viking R.(C.Gold)	I	0.35	K.M
603	Invicta Snd(Coast)	I	0.10	H.J.S	1170	Ocean Sd.(C.Gold)	I	0.12	J.P
603	R.Gloucester	B	0.10	J.P.S	1170	R.Orwell	I	0.28	S
630	R.Bedfordshire	B	0.20	J.K.P.S	1170	Signal R.	I	0.20	C*
630	R.Cornwall	B	2.00	J.L	1170	Swansea Sound	I	0.58	L
657	R.Clywd	B	2.00	C*,J.K.P.S	1170	TFM Radio (GNR)	I	0.32	K
657	R.Cornwall	B	0.50	L	1242	Invicta Snd(Coast).	I	0.32	C.H.Q.S
666	Devon Air R.	I	0.34	I.*J.L	1242	Isle of Wight R.	I	0.50	D.I*,J.L.O.*P
666	R.York	B	0.80	J.K	1251	Saxon R.	I	0.76	H.M.P.Q.S
729	BBC Essex	B	0.20	J.S	1260	GWR (Brunel R.)	I	1.60	J.L.*P.S
738	Hereford/Worcester.	B	0.037	J.K.L.P.S	1260	Leicester (GEM-AM).	I	0.29	C.F.*Q.S
756	R.Cumbria	B	1.00	I.K	1260	Marcher Sound	I	0.64	*.O
756	R.Shropshire	B	0.63	J.K.L.P.S	1260	R.York	B	0.50	K
765	BBC Essex	B	0.50	A*.J.K.L.P.S	1278	Pennine R.(C.Gold).	I	0.43	C.K
774	R.Kent	B	0.70	H.J.P.S	1305	R.Hallam (C.Gold)	I	0.15	K.S
774	R.Leeds	B	0.50	C.K	1305	Red Dragon (Touch).	I	0.20	H.I*,J.P.S
774	Severn Sound	I	0.14	J.L	1323	R.Bristol	B	0.63	*.L
792	Chiltern R.	I	0.27	H*,J.K.L.P.S	1323	Southern Sound	I	0.50	H.J.P.Q.S
801	R.Devon	B	2.00	I.*J.K*.L.M.S	1332	Hereford R.	I	0.60	H.K.Q.S
819	Hereford/Worcester.	B	0.037	L.P.S	1332	Wiltshire Sound	B	0.30	L.*P
828	Chiltern Radio	I	0.20	H*.P.S	1359	Essex R.(Breeze)	I	0.28	A*.H.S
828	R.Aire(Magic 828)	I	0.12	K.R	1359	Mercia Snd(Xtra-AM)	I	0.27	*.S
828	R.WM	B	0.20	C*.L	1359	R.Solent	B	0.85	*.J.L.*P
828	2CR	I	0.27	D.J	1368	R.Lincolnshire	B	2.00	K.S
837	R.Cumbria	B	1.50	L.N	1368	R.Sussex	B	0.50	H.J.Q
837	R.Furness	B	1.00	I.K	1368	Wiltshire Sound	B	0.10	C.J.L.*P
837	R.Leicester	B	0.45	H.J.K.L.P.Q.S	1413	Sunrise R.	I	?	J.P.Q.S
855	R.Devon	B	1.00	L	1431	Essex R.(Breeze)	I	0.35	H.Q.S
855	R.Lancashire	B	1.50	*.K.L	1431	Radio 210	I	0.14	H.J.P
855	R.Norfolk	B	1.50	A*.H.I*.J.K.N.Q.S	1449	R.Cambridgeshire	B	0.15	S
873	R.Norfolk	B	0.30	C*.H.J.K.N.P.Q.S	1458	GLR	B	50.0	H*.J.K*.P.S
936	GWR (Brunel R.)	I	0.18	H.J.L.P	1458	MGR	B	50.0	C*.K*.L*
945	R.Trent (GEM-AM)	I	0.20	*.J.K.L.P.S	1458	R.Cumbria	B	50.0	I.N.O
954	Devon Air R.	I	0.32	J.L	1458	R.Devon	B	2.00	J
954	R.Wyvern	I	0.16	L.P.S	1458	R.Newcastle	B	2.00	K.L*
990	R.Aberdeen	B	1.00	B	1475	Cty Snd(1st Gold).	I	0.50	H*.J.L*.M.P.S
990	R.Devon	B	1.00	J.K	1485	R.Humberside	B	1.00	K.L*.S
990	Hallam R.(C.Gold)	I	0.25	K	1485	R.Merseyside	B	1.20	I.L*.O
990	Spectrum	I	?	A*.P.S	1485	R.Oxford	B	0.50	P.S
999	R.Solent	B	1.00	H.J.P	1485	R.Sussex	B	1.00	H.J
999	R.Trent (GEM-AM)	I	0.25	S	1503	R.Stoke-on-Trent	B	1.00	*.K.L*.S
999	Red Rose R.	I	0.80	C*.J.K.L	1521	R.Mercury	I	0.64	H*.P.S
1026	R.Cambridgeshire	B	0.50	A*.H.K.Q.S	1521	R.Nottingham	B	0.50	*.S
1026	R.Jersey	B	1.00	H.J.L.P	1530	KCBC Kettering	I	0.025	S
1035	Northsound Radio	I	0.78	B.G.N	1530	Pennine R.(C.Gold).	I	0.74	K.L*
1035	R.Kent	B	0.50	A*.H.J.P.S	1530	R.Wyvern	I	0.52	P
1035	R.Sheffield	B	1.00	K	1548	Capital R. (Gold)	I	97.5	A*.H*.J.P.S
1035	West Sound	I	0.32	E.J.L	1548	R.Bristol	B	5.00	*.L*
1107	Moray Firth R.	I	1.50	I	1548	R.City (City Talk).	I	4.40	C*.L*
1107	R.Northampton	B	0.50	H.J.K.P.S	1548	R.Cleveland	B	1.00	K.N
1116	R.Derby	B	1.20	K.L.S	1548	R.Forth (Max AM)	I	2.20	*.K*.L*.O
1116	R.Guernsey	B	0.50	H.J.L.P.S	1548	R.Hallam (C.Gold)	I	0.74	*.K
1152	LBC (L.Talkback R.)	I	23.50	J.P	1557	Chiltern R.	I	0.76	B*.K*.L*.S
1152	Metro R. (GNR)	I	1.80	L*	1557	Ocean Sound(C.Gold)	I	0.50	A*.C*.J.K*.P
1152	Piccadilly R.	I	1.50	C*.K.L*	1557	R.Lancashire	B	0.25	J
1152	Plymouth Sound	I	0.32	L	1584	Watwick	I	?	*.P
1152	R.Broadland	I	0.83	K*.L*.S	1584	Heathrow	I	?	H*.O.P.S
1152	R.Clyde (Clyde 2)	I	3.60	E.K*.L*	1584	R.Nottingham	B	1.00	K.L*.S
1161	GWR (Brunel R.)	I	0.16	K*.L*.P	1584	R.Tay	I	0.21	O
1161	R.Bedfordshire	B	0.10	S	1602	R.Kent	B	0.25	H.J.D.Q.S
1161	R.Sussex	B	1.00	H.J					

DXers:

A: Ted Agambar, Norwich.
B: Leo Barr, Sunderland.
C: Scott Caldwell, Warrington.
D: Robin Clark, Plymouth.
E: Paul Gibson, Edinburgh.
F: Robin Harvey, Bourne.

G: John Hepburn, Ashington.
H: Sheila Hughes, Morden.
I: Eddie McKeown, Co. Down.
J: George Millmore, Wootton, IOW.
K: Chris Nykiel, Leeds.
L: Bart O'Brien, Co. Wexford.
M: Roy Patrick, Derby.

N: John Robertson, Alnwick.
O: John Stevens, Largs.
P: David Todd, Basingstoke.
Q: Phil Townsend, London.
R: Jim Willert, Grimsby.
S: David Wratten, Cambridge.

(Eng, Fr to Africa 1900-2057) 45434 at 1943 in Brenchley; R. Netherlands via Bonaire, Ned. Antilles 15.365 (Du to S.America 2130-2225) SIO433 at 2130 in Macclesfield; BBC via Ascension Is. 15.260 (Eng to S.America 2000-0330) 23333 at 2202 by **Robin Harvey** in Bourne; WSCN Scotts Corner 15.300 (Eng, Fr to Africa 2200-2355) SIO333 at 2330 in Bristol.

There is plenty of interest in the **13MHz (22m)** band. During the morning R. DW via Julich, Germany 13.790 (Eng, Fr to Africa 0600-0750) was heard at 54344 at 0615 in Norwich; R. Australia via Shepparton 13.705 (Eng to C.Pacific areas 0630-0900) 33433 at 0745 in Prenton; R. Austria Int, Vienna 13.730 (Ger, Fr, Eng, Sp, Ar to Europe 0400-

1700) 55544 at 0750 in Worthing; WSHB Cypress Creek 13.760 (Eng, Sp to C.America, Australia 0800-0955) 24222 at 0800 in Co. Down; AWR Agat, Guam 13.720 (Eng, Ind, Tag to SE.Asia 1000-1300) 13221 at 1000 in Bridgewater; R. Jordan, Al Karanah 13.655 (Eng to Europe 0500-1315) SIO534 at 1200 in Slough; WYFR via Okeechobee 13.695 (Fr, Eng to E.USA 1100-2245) SIO322 at 1215 in Macclesfield.

Later, WSHB Cypress Creek 13.760 (Eng to USA 1400-1555) was rated SIO222 at 1455 in Harrogate; R. Netherlands via Flevo 13.770 (Eng to Middle East, S.Asia 1430-1525) 43444 at 1515 in Dollgellau; SRI via Sottens, Switzerland 13.685 (Eng, Fr, It to Middle East 1515-1700) 44344

at 1527 in London; R. Pakistan, Karachi 13.665 (Eng to N.Africa, Middle East 1600-1630) SIO444 at 1600 by **Neil Wheatley** in Lytham St. Annes; UAE R. Dubai 13.675 (Ar, Eng 1605-2055) 43344 at 1600 by **Harold Wood** in Manchester; R. Australia via Carnarvon 13.745 (Eng to S.Asia 1530-1700) 44544 at 1649 in Wallaseid; Voice of the UAE in Abu Dhabi 13.605 (Ar to N.Africa, S.Europe 1600-2135) SIO444 at 1615 in Edinburgh; ISBS Reykjavik, Iceland 13.855 (Ic to Europe 1855-1930) 55555 at 1855 in Brighton; R. Australia via Shepparton 13.745 (Eng to Pacific areas, USA 1930-2130), heard at 1945 in Largs; WHRI Nashville, USA 13.760 (Eng, Sp, Port, Yu 1700-0000) 45434 at 1954 in Brenchley; R. Baghdad,

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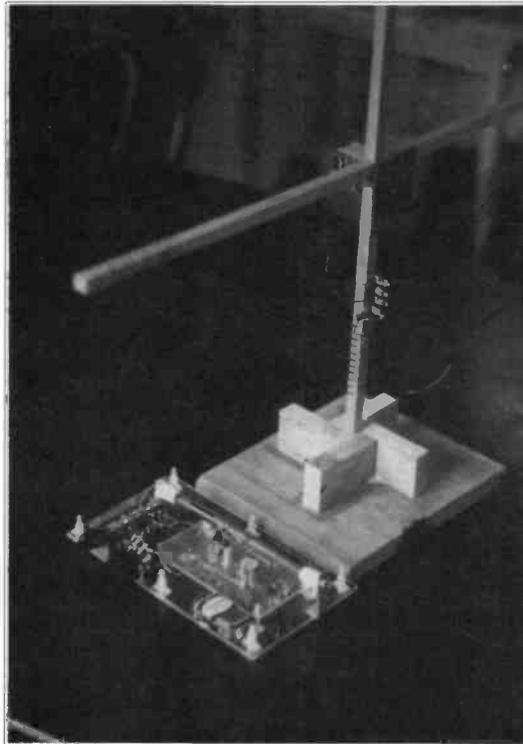
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Iraq 13.660 (Eng to Europe 2000-2200) 55555 at 2030 by **Bill Griffith** in London; RCI via Sackville 13.720 (Port, Sp, Eng to S.America 0100-0300) 22332 at 0117 in Swanwick.

During the day there are many **11MHz (25m)** broadcasts to Europe. Those noted were from KFBS Saipan Is. 11.650 (Russ 0900-1400, also to N.Asia), rated SIO422 at 1030 in Macclesfield; RFI via Issoudun 11.995 (Fr 1600-1700) SIO444 at 1605 in Winchester; Voice of Vietnam, Hanoi 12.020 (Eng, Russ, Viet, Fr, Sp 1600-2130) 53343 at 1610 in Norwich; R. Cairo, Egypt 12.050 (Ar 1430-2250, also to USA) SIO333 at 1630 in Harrogate; AIR via Aligarh 11.620 (Eng, Hi 1845-2230) 43544 at 1853 in Brighton; R. Pakistan, Islamabad 11.570 (Ur, Eng, Fr 1900-2015) 44433 at 1923 in Plymouth; R. Sophia, Bulgaria 11.660 (Eng, It, Ger, Fr 1830-2100) SIO455 at 1958 in Edinburgh; R. Portugal, Lisbon 11.740 (Eng 2000-2030) SIO333 at 2015 by **Aif Gray** in Birmingham; R. Damascus, Syria 12.085 (Ger, Fr, Eng 1805-2105) 55555 at 2045 in London; R. Beijing, China 11.500 (Russ, Ger, Eng 1700-2155) SIO444 at 2100 in Lytham St Annes; RTV Tunis, Sfax 11.550 (Ar 0430-2345) 34343 at 2100 in Torquay; VOFC Taipei, Taiwan 11.805 (Eng 2200-7) 33333 at 2200 in Derby; R. Japan via Moyabi 11.835 (Jap, Eng 2200-0000, also to N.Africa) 43344 at 2300 in London.

Some broadcasts for outside Europe were also noted: R. RSA Johannesburg 11.900 (Eng to ? 0400-0455), 34333 at 0440 in Prenton; RHC Havana, Cuba 11.820 (Eng to USA 0000-0600) 44343 at 0550 in Northampton; R. Korea via Sackville 11.715 (Eng to USA 1030-1100) 44444 at 1030 in Norwich; VOIRI Tehran 11.790 (Fa, Eng to SE.Asia 1030-1225) 24333 at 1220 in Oman; AWR Agat, Guam 11.980 (Chin/Eng, Jap to C.Asia 0900-1600) 33333 at 1320 in Morden; TWR Agana, Guam 11.650 (Eng to S.Asia 1500-1636) 44444 at 1600 in Bridgwater; RNB Brasilia, Brazil 11.780 (Port to E.South America 0800-2300) 21221 at 1854 in Swanwick; R. Australia via Carnarvon 12.000 (Eng to SE.Asia 1900-2130) 32333 at 1906 by Ron Galliers; VOIRI Tehran, Iran 11.895 (Tur, Ger, Fr, Eng, Sp to N.Africa, S.Europe 1700-2130) 44444 at 2027 in Brenchley; RAI Rome, Italy 11.800 (Eng to Middle East 2025-2045) 53433 at 2030 in Folkestone; AIR via Aligarh 11.715 (Eng to Australia



MW reflex RX and loop built by Geoff Harris.

2045-2230) 22222 at 2210 in Bourne; Voice of Israel, Jerusalem 11.605 (Eng, Heb to USA (2130-2330) SIO333 at 2230 in Bristol.

Sometimes, the **9MHz (31m)** signals to Pacific areas from R. New Zealand Int., Wellington reached the UK. Their signal on 9.855 (Eng 0610-0730 Mon-Fri, 0545-0900 Sat) was rated 34523 at 0825 in Wallsend and on 9.695 (Eng 0900-1000 Sat) as SIO333 at 0900 in Sheffield. The broadcasts to Pacific areas from R. Australia via Shepparton have also been audible here. Ron Damp rated the signal on 9.580 (Eng 0830-2100) as 33343 at 0935.

Many broadcasts to Europe in this band come from R. HCJB Quito 9.610 (Eng 0700-0800), rated 44554 at 0718 in Northwich; TWR Monte Carlo, Monaco 9.480 (Eng 0640-0825) 45434 at 0807 in London; WCSN Scotts Corner 9.840 (Eng 0800-1000) SIO444 at 0900 in Macclesfield; R. Netherlands via Flevo 9.715 (Eng 1130-1225) 33442 at 1133 in Sunderland; R. Pyongyang, N.Korea 9.325 (Eng 1500-1600) 34333 at 1505 in Brighton; R. Tirana, Albania 9.480 (Fr 1600-1630) 55555 at 1600 in London; RFE/RL Munich, Germany 9.725 (Russ 1600-1755) SIO444 at 1605 in Winchester; R. Norway Int, Oslo 9.655 (Eng 1700-1730 Sat/Sun, also to Africa) 44444 at 1715 in Morden;

R. Sweden via Horby 9.655 (Eng, Sw 1800-1900) 44444 at 1900 in Cheltenham; VOIRI Tehran, Iran 9.022 (Eng 1930-2030) 45434 at 1936 in Swanwick; R. Cairo, Egypt 9.900 (It, Ger, Fr, Eng 1800-2245) 34233 at 2115 in Co. Down; R. Beijing, China 9.920 (Ger, Eng 1800-2155) 44444 at 1928 in London; R. Polonia, Warsaw 9.525 (Fr, It, Ar, Eng, Sp, Esp, Pol

- Equipment Used**
Ted Agombar (Norwich): Grundig Satellit 400 + r.w.
Thomas Barnett (Slough): Kenwood R2000 + r.w.
Leo Barr (Sunderland): Matsui MR4099 + r.w. in loft.
Darren Beasley (Bridgwater): Philips D2935 + hexagon loop or a.t.u. + 10m r.w.
Donald Blashill (Cheltenham): Grundig Satellit 400 + built-in whip.
Denis Boshier (Dollington): Matsui MR4009 + r.w.
Kenneth Buck (Edinburgh): Lowe HF225 + r.w. in loft or loop.
Andy Cadier (Folkestone): Saisho SW500 + 40m r.w. or Datong active antenna.
Scott Caldwell (Warrington): Saisho 2000 + r.w. or Toshiba RT-SX1 + loop.
Jim Cash (Swanwick): Kenwood R5000 + trap dipole.
Robin Clark (Plymouth): Saisho SW5000 + 16m r.w.
John Coulter (Winchester): Yaesu FRG-7 + r.w.
Ron Damp (Worthing): Racal RA17 + chimney mounted whip.
David Edwardson (Wallsend): Trio R600 + trap dipole 22m long
Ron Galliers (London): Fairmate HPT00E + built-in whip.
Paul Gibson (Edinburgh): Sony ICF 2001 + 25m r.w.
Ted Gould (London): Sony ICF7601L + built-in whip.
Aif Gray (Birmingham): Codar CR70 + PR30 pre-selector + a.t.u. + Ex-Army rod antenna.
Bill Griffith (London): Matsui MR4099 + 25m r.w.
Simon Hamer (New Radnor): Lafayette HE30 or Grundig S1400 + loop with pre-amp.
Robin Harvey (Bourne): Matsui MR4099 + s.w. loop.
Francis Hearne (Bristol): Sharp GFA3 cassette radio + r.w.
John Hepburn (Ashington): Selena Vega 215 portable + Archer antenna on chimney.
Sheila Hughes (Morden): Sony ICF7600DS; Vega 206 + loop; Panasonic DR48 + 15m wire.
Roderick Illman (Thurait): Sony ICF7600DS + 23m r.w.
Cyril Kellam (Sheffield): Sony ICF7600DS + 5m vertical wire.
Eddie McKeown (Co. Down): Tatung TMR7602 portable.
David Middlemiss (Eymouth): Yaesu FRG-7 + r.w.
George Millmore (Wootton, IDW): Tatung TMR7602 + loop.
John Nash (Brighton): Kenwood R5000 + Datong AD370 active antenna.
Chris Nykiel (Leeds): Matsui MR4099 + r.w.
Bart O'Brien (Co. Wexford): Sony ICF2001D + hexagon loop.
John O'Halloran (Harrogate): Racal RA17 receiver.
Fred Pallant (Storrington): Trio R2000 + r.w. in loft.
John Parry (Northwich): Realistic DX-400 + 33m r.w.
Roy Patrick (Derby): Lowe HF125 + 44m wire.
Philip Rambaut (Macclesfield): Int. Marine Radio R700M + r.w.
Kenneth Reece (Prenton): Icom R9000 + delta loop or Kenwood R5000 + vertical wire.
Alan Roberts (Quebec): Lowe HF225 + 31m dipole.
Chris Shorten (Norwich): Matsui MR4099 + 10m r.w.
Alan Smith (Northampton): Matsui MR4099 + Mizuho KK-3 a.t.u. + vertical dipole.
Cliff Stapleton (Torquay): Philips D2935 + built-in whip.
John Stevens (Largs): Hammarlund HQ180 or Icom R70 + r.w.
Darran Taplin (Brenchley): Lowe HF225 + Global 1000 a.t.u. + 30m r.w.
David Todd (Basingstoke): JR NR0525 + r.w.
Phil Townsend (London): Lowe SRX30 + loop with source-follower.
Ted Walden-Vincent (Great Yarmouth): Grundig Satellit 1400L + r.w.
Neil Wheatley (Lytham St Annes): Sangean ATS803 portable.
Jim Willett (Grimsby): RCA AR77 + Diawa CL22 a.t.u. + 4m square fixed loop.
Harold Wood (Manchester): Philips D2935 + 11m wire.
David Wratten (Cambridge): Philips D2999 + m.w. loop.

1500-2355, also to N.Africa) 33333 at 2014 in Plymouth; R. Pyongyang 9.345 (Eng 2000-2050) 35433 at 2029 in Brenchley; Voice of Turkey, Ankara 9.795 (Eng 2100-2200) 44333 at 2118 in Bourne; VOFC Taiwan via Okeechobee 9.852 (Eng 2200-2300), heard at 2200 in Derby; AIR via Delhi 9.910 (Hi, Eng 2000-2230) SIO555 at 2205 in Edinburgh.

Among the signals to other areas noted were the BBC via Antigua, W. Indies 9.840 (Eng to C.America 0500-0815), 32433 at 0613 in Prenton; WSHB Cypress

Creek 9.455 (Eng to USA, C.America 0200-0800) 33222 at 0754 in Norwich; BBC via Kranji 9.740 (Eng to S.Asia 1615-1830) SIO322 at 1805 in Harrogate; AIR via Delhi 9.950 (Eng to W/ N.Africa 1845-2045) 24332 at 1935 in Folkestone; R. Vilnius, Lithuania 9.765 (Eng to USA 2300-2330) SIO555 at 2300 in Lytham St Annes; R. Tirana, Albania 9.760 (Eng, Alb, Sp to C.America 2330-0200) SIO333 at 2330 in Bristol. R. Budapest, Hungary 9.520 (Eng, Hung to USA 2330-0230) 22222 at 0205 in Oman; VOFC Taiwan via Okeechobee 9.680 (Eng to USA 0200-0400) 44344 at 0350 in Norwich.

Good DX reception has been noted in the **7MHz (41m)** band from R. RSA Johannesburg 7.270 (Eng to SE.Africa 0400-0500) 44344 at 0400 in Norwich; Voice of Nigeria, Lagos 7.255 (Eng to W.Africa 0500-0557) 33333 at 0540 in Prenton; AIR via Aligarh 7.412 (Eng to S.Asia 1530-1600) 44243 at 1531 in Brighton; R. Korea, Seoul 7.550 (Eng to E.Africa, Middle East 2030-2130) 23443 at 2048 in Folkestone.

The **6MHz (49m)** broadcasts to Europe include RCI via Sackville 6.150 (Eng 0500-0600) SIO444 at 0645 in Bristol; R. Polonia, Warsaw 6.135 (Eng 1430-1455) 43334 at 1430 in Manchester; BRT Wavre 5.910 (Du, Fr, Eng, Ger 1700-2055) SIO444 at 1701 in Winchester; R. Prague, Czechoslovakia 5.930 (Cz, Fr, Sp, Eng 1900-2215) 44444 at 1920 in Cheltenham; R. Austria Int, Vienna 5.945 (Eng 1930-1955) SIO333 at 1930 in Great Yarmouth.

Abbreviations

a.c.	alternating current	l.w.	long wave
a.m.	amplitude modulation	m	metre
Alb	Albanian	m.w.	medium wave
Ar	Arabic	MHz	megahertz
a.t.u.	antenna tuning unit	MN	Maine
Chin	Chinese	NF	Newfoundland
Du	Dutch	Pol	Polish
DX	'long distance'	Port	Portuguese
DXing	listening for long distance stations	R.	Radio
Eng	English	Russ	Russian
Esp	Esperanto	r.w.	random wire (antenna)
Fa	Farsi	s.s.b.	single sideband
Fin	Finnish	Sin	Sinhala
FL	Florida	SIO	type of signal report code
Fr	French	Sp	Spanish
Ger	German	Sw	Swedish
GMT	Greenwich Mean Time (=UTC)	Tag	Tagalog
Gr	Greek	Tah	Tahitian
h.f.	high frequency	TN	Tennessee
Heb	Hebrew	Tur	Turkish
Hi	Hindi	u.s.b.	upper sideband
Hung	Hungarian	Uk	Ukrainian
Ic	Icelandic	Ur	Urdu
Ind	Indonesian	UTC	Universal Co-ordinated Time (=GMT)
It	Italian	Viet	Vietnamese
Jap	Japanese	WARC	World Administrative Radio Conference
kHz	kilohertz	Yu	Yugoslavian
kW	kilowatt		

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FOR SALE Kenwood R5000, £600. Pine bunk beds, £200. Tel: (0379) 652043 (Diss, Norfolk).

FOR SALE RX8, 8-mode receive system, recent update, £190. Pye 8-band short wave converter for car radio, £30. **WANTED** CFL233 filter for NRD525. Tel: (0745) 886295 (Clwyd).

FOR SALE Drake R7 receiver, general coverage from 10kHz to 30MHz, the following Drake crystals installed - 500Hz, 1.8, 2.3, 4 and 6kHz, perfect condition and working order, boxed with manual, £900 carriage extra. Tel: 081 570 5603.

FOR SALE NRD receiver with key pad, manual, first class, offers? Collins 390A good conditions, offers? Rascal AR17 very good condition, £150, HF225 with fitted a.m. detector, little receiver but does big job, £325. Panasonic DR49, £150. Tel: 081-571 5759.

FOR SALE Valved radio receiver, ex-WD type R107, 1.2 to 17.5MHz in three bands. Data sheets and circuit diagrams available,

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buyer collects. £60 o.n.o. Tel: (0634) 251463 (Medway).

FOR SALE AEA PK232MBX terminal unit, Lowe HF125 receiver, televideo terminal unit, Yaesu FRT-7700 a.t.u., OK1 Microline 182 printer. All leads and manuals, £650 o.n.o. Can be seen working. Tel: (0903) 49002 (Worthing).

FOR SALE/EXCHANGE Sony ICF2001, 150kHz to 29.999MHz plus 76 to 108MHz with p.s.u. and manuals, v.g.c. Sharp XC30 colour video camera, 16 to 32mm zoom. Interested in h.f./v.h.f./u.h.f. w.h.y.? Bill. Tel: 091-273 8866.

FOR SALE/EXCHANGE Chiron CP7M multi-programme 35mm s.l.r. and 75-300mm Miranda zoom, both immaculate condition, £230 or Sony ICF2001D. Tel: (0446) 793223 (South Glamorgan) evenings only.

FOR SALE Yaesu FRG7700 receiver, FRT7700 tuner plus manuals, £200. BlackStar digital frequency counter, £100. Tel: 081-946 0387 (Wimbledon).

FOR SALE Grundig Satellit Professional receiver, l.w., m.w., f.m., six s.w. bands, 150kHz - 30MHz, b.f.o., mains/battery, digital readout, £120 o.n.o., w.h.y.? Tel: (0767) 680253 (Sandy, Beds).

FOR SALE Icom R7000 v.g.c., £650 o.n.o. FT790 Mk1, good condition, NiCads, £200 o.n.o. Mike. Tel: 081-764 9394 after 6.30pm.

FOR SALE Sony Air 7 radio, mint condition, complete with mains unit and rechargeable battery, £145. Mr C Grimm RNAD, Dean Hill, West Dean, Salisbury, Wilts SP5 1EY. Tel: Lockerley 40221.

FOR SALE Fairmate HP100E hand-held scanner, mint condition, boxed complete with NiCads and charger, £120, 27 Dalsetter Wynd, Dunrossness, Shetlands. Tel: (0950) 60312.

FOR SALE Fairmate HP100EMkII wideband scanner, 1000 memories, carry case, belt clip, two antennas, d.c. power cable, earphone, NiCads, mains charger, owner's manual, boxed, as new, £190. Tel: (0243) 582723 (Bognor Regis).

FOR SALE Saisho SW5000 m.w./l.w./s.w./a.m./f.m. radio with nine station pre-sets and twelve s.w. bands. Similar to Sangean ATS803S, £75. AR1000 scanner, £185. Both in excellent condition with original packaging, etc. Tel: 081-346 6088.

EXCHANGE Sony AIR7 receiver in excellent condition. Looking for HP100E or AOR1000. Will cash adjust. Penn. Tel: (0843) 293623 (Margate).

FOR SALE Dragon 32 computer with manual and all leads, plus B&J RTTY modulator and separate tone unit. Also 947 c.w. decode board, £60. Tel: (0633) 214089 (Newport).

WANTED *World Radio TV Handbooks* wanted pre 1970, good prices or will trade books. Harold Sellers, 101 Rutledge Avenue, Newmarket, Ontario L3Y 5T5, Canada.

FOR SALE Yupiteru MVT5000 25-55-, 800-1300MHz, 100 memories, operating manual, £150, cash only. Rankin. Tel: 051-334 5501 (Wirral).

FOR SALE Rascal RA117E h.f. communications receiver, frequency range 1-30MHz including a fine tuning unit type RA218 and fully encased in cabinet complete with technical manuals. Tel: (0646) 600572 (evenings).

FOR SALE Lowe HF125 receiver with keypad and manual, perfect conditions, superb performance, £250, no offers. May deliver. Tel: (0484) 662447 (Huddersfield).

FOR SALE MG125 mag mount airband antenna, £8.00. LAB ground plane airband antenna, £8.00. J. Stevens. Tel: (063877) 8318 (Newmarket).

FOR SALE Kenwood R5000, just over two months old, ill health forces sale, £700 o.n.o. Will deliver within reasonable distance. Tel: (0952) 586973 anytime after 3pm (Telford).

FOR SALE Realistic PRO 34 scanner 68-

960MHz, full switched a.m./f.m. modified, excellent condition with NiCads and manual, original packing. Reason for sale - PRO2006. £175 o.n.o. Jill Brown. Tel: (0977) 550401/673724 (West Yorkshire).

FOR SALE Yaesu FRG8800 with f.m., good condition, £480. M. Croxford, 34 Brington Road, Long Buckby, Northants. Tel: (0327) 842971.

FOR SALE Unused Sony ICF PR080 scanning receiver (150kHz - 108MHz, 115-223MHz) plus BP23 rechargeable battery pack, £265 o.n.o. Barry Hughes. Tel: (0279) 725356 (Sawbridgeworth, Herts).

FOR SALE Sony ICF-2001D receiver, excellent condition, £180. ERA Microreader Mk2, RTTY and Morse decoder with Morse tutor, £105. Tel: (0297) 60261 (day).

FOR SALE Sony ICF-7600DS receiver, including p.s.u., antenna, instructions, etc., boxed in excellent condition, £100. Realistic DX400 receiver, instructions, mains lead, v.g.c., £60. Yaesu FRT7700 a.t.u., v.g.c., £40. Postage extra. John Fryatt. Tel: 081-553 2028.

FOR SALE Sangean ATS-803A (Sony ICF2001 clone) unused, as new, p.l.l. tuner covers 150kHz to 29.999MHz, a.m./c.w./s.s.b., wide/narrow bandwidths, 87.5-108MHz mono/stereo, direct/rotary tuning, auto/manual scanning, 12-programmed short wave bands, 9-programmable memories, built-in l.c.d. clock with alarm/sleep functions, mains power supply, £85. Fieilo, 1 St Andrews Way, Tilmanstone, Deal, Kent CT14 0JH. Tel: (0304 611627).

WANTED Eddystone receiver, especially 888 or EA12. Also wobbulator, any age. Tel: (0202) 288718 (Barnsley).

FOR SALE Drake SPR4, £200, AEA PK232, £200, MM2001, RTTY to TV converter, £100. Buyer collects. Tel: (0582) 422056 (Luton).

FOR SALE Yaesu FRG9600M (60-950MHz), mains adapter and manual, only five months old, £400 o.n.o. A. Peel, 15 The Green, Swinton, Berwickshire. Tel: (089086) 246.

FOR SALE National Panasonic DR48 communications receiver, 6 s.w. bands with digital readout, plus marine, l.w., m.w. & f.m. bands, manual, excellent condition, only £100. Tel: Maivern 572686.

FOR SALE AR800E scanner, 75-105, 118-136, 140-174, 405-495, 830-950MHz, complete with charger, boxed in good condition, £100. N. Phillips. Tel: Poole 670733.

FOR SALE Yaesu FRG7700M with matching a.t.u., v.h.f. converter 'A' (118-150MHz) FFS filter, discone antenna, mint condition, buyer collects, £350 no offers. Tel: 071-223 3223 (Battersea, London).

FOR SALE Two scanners, both in mint condition, with handbooks. Garex 200N mobile/base with unused mobile accessories, £220. Realistic PR030 hand-held, £90. Carriage extra or collect. Tel: (0679) 64393 (Greatstone, Kent).

WANTED Icom R7000HF with h.f. converter or will exchange FRG9600M with b.f. buy, both as new condition plus cash. Tel: 061-797 0186 (after 6pm).

FOR SALE Eddystone 680, £120, Eddystone 770R, £160. Spare valves included. Marine receiver Fukuyama TM56B, £50. Buyer collects. Tel: (0844) 291836. No offers.

FOR SALE Short wave radio, Philips D2935, v.g.c., excellent performer, £100, cheap, all-mode, 0-30MHz. M. Allen. Tel: (0742) 464186 (Sheffield).

FOR SALE Short wave radio, very good condition and performance. Tatum TMR7602, £100. Cheap, all mode with stereo 0-30MHz. M. Allen. Tel: (0742) 464186 (Sheffield).

FOR SALE Airband radio R532, 100 memories, auto and manual scan, £120. Trio R1000 communications receiver, £170 SEM v.h.f. converter, plugs into any h.f. receiver antenna socket, unused, £30. Tel: Edge Hill 749 (Warks).

FOR SALE Fairmate 100E with Raycom converter, power pack and M75 pre-amp, new this August Mizuho KK-2 Sky Coupler. Eddystone pre-war 6-pin plug-in coils, of-

fers? Looking for good h.f. receiver or w.h.y.? Peter. Tel: (0263) 821003.

FOR SALE Telegquipment D1010 dual beam oscilloscope, £70. Tel: (0423) 523509.

FOR SALE CRF 230 World Zone radio, 23-band radio. Unmarked condition, all leads and books, £225. Tel: 061-928 1954 (ansaphone).

WANTED Short wave receiver, must have sideband. Will exchange computer software: dBase 3 Plus, Freelance Plus and Pertmaster. Mike. (0625) 527187.

FOR SALE Icom R100 communications receiver complete with s.s.b. modification, two months old, genuine reason for sale, £400. Tel: (0228) 38884 (Carlisle).

FOR SALE Sony Air 7, complete with car power supply adaptor, good condition, no handbook, £100 including delivery by registered post. B.R. Taylor. Tel: (0276) 856866 anytime.

WANTED Band change switch for Eddystone 940RX. Keith. Tel: (0582) 400547 (Luton).

FOR SALE Lowe HF-125 with active antenna and keypad options and whip antenna, £250. ERA Microreader, new and boxed, £100. ERA audio filter BP34, new and boxed, £70. James Trutwein. Tel: (0628) 27505 (Maidenhead).

FOR SALE AEA Pakratt 232 multi-mode controller, as new, boxed and manual, £220. Com Pakratt software, as new, £25. Microwave Modules M2001 RTTY to TV converter, £50, good condition. J. Stanciliffe. Tel: (0392) 439950 (Exeter).

FOR SALE DX200 Realistic 5-band h.f. communications receiver, 150-400kHz, 520kHz-30MHz, excellent condition, boxed, manual. Buyer collects. £60. Tel: (0842) 813578 (Thetford).

FOR SALE Eddystone 680X and Eddystone 659RX, both require attention. New band switch for FR101 RX, various valves for GEC BR7400RX. Can anyone in the Basingstoke area repair my Spectrum computer? **WANTED** Transistorised signal generator. J. Wright. Tel: (0256) 468649.

FOR SALE SEM h.f. converter converts v.h.f. scanner to receive 100kHz-60MHz, cost £55 accept, £35. Active s.w.l. antenna by Heathkit, covers 300kHz-30MHz, Cost £65 (Maplin) accept £45. Tel: (0642) 827914.

WANTED Jim M75 wide-band pre-amp or similar. Tel: (0642) 827914 (Middlesbrough).

FOR SALE Kenwood RZ-1 wide-band receiver, coverage 500kHz to 1000MHz, excellent condition, complete with original box, £260. Tel: (0782) 261870 (Stoke-on-Trent).

FOR SALE Trio 9R59, 0.5-30MHz, modified with digital readout, handbook included, £60 o.n.o. Tel: (0256) 477002 (Basingstoke).

FOR SALE Trio R1000 receiver, immaculate condition, original box and manual, genuine, had very little use, £230. Tel: (0375) 370232 (Grays, Essex).

WANTED Army v.h.f. receiver R216 and wireless sets Type 21 and 76. Tel: (0233) 76296 (Ashford) evenings.

FOR SALE Signal R535 Airband scanner 108-142.995MHz/220-399.975MHz, complete with manual and p.s.u., £200 o.n.o. Tel: (0926) 497380 after 7pm (Warwick).

FOR SALE Yaesu FRG-7700 0-30MHz a.m., u.s.b., l.s.b., c.w., f.m., one owner from new, £220 o.n.o. Tel: Gloucester 712584.

FOR SALE Four Creder teleprinters two at £15 each, two at £50 each. All in good working order. Paper if required. Tel: (0945) 860525 after 6pm (Wisbech).

WANTED Realistic PRO-34 scanner in good working order. Mike. Tel: (06973) 43378.

WANTED Operators manual/any information on 'Eagle Products' communications receiver 550kHz-30MHz. Made in Japan, serial No. 35798. Model No. & date of manufacture unknown. Please write to C.J. Wood, 15 Lanchester Road, Radford, Coventry CV6 3EY

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