VOL. 48 ISSUE 12 DECEMBER 1990

ON SALE NOVEMBER 22

JANUARY ISSUE ON SALE DECEMBER 21

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Short Wave Magazine

short wave magazine

Look out on the bookshelves for the new style front cover logo on the next issue. See Dick's Leader on page 4 for further details.

REGULARS

SEEN & HEARD

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GOOD LISTENING

A WORD IN EDGEWAYS

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

The letter from M. Turvey regarding the availability of software for the Tatung Einstein caught me attention as I have two of these excellent little machines myself which I use for RTTY reception amongst other things.

I have written an assembler program which I use in conjunction with the Maplin Audio Filter, RTTY decoder (somewhat modified) and my Matsui MR4099 short wave receiver.

The program is designed for use with the 80-column card, but it would work with the 40-column mode, apart from the lack of the status line indicating baud rate.

Alternatively the UK Einstein User group may have something available. The address is: UKEUG, Enterprise House, Unit 15, Riverside Industrial Park, Ipswich, Suffolk IP2 8JX.

The advantage of the Einstein is that the serial port can be programmed from 45 baud to 9600 baud, without the external baud rate converters needed by IBM PCs.

Anyone wanting a copy of the program should send a ready formatted 3in floppy disk to me, using a padded envelope containing a return address label and sufficient postage stamps to cover the return postage.

JOHN M YOUNG
62 Llantwit Road
NEATH
West Glam
SA11 3LB

Please note. The software is provided free but no user support is available.

Readers will also have included on the disk the Assembler Source File for those who want it, and a fairly basic READ.ME file to help users get going.

Dear Sir

May I be permitted to comment on a recent experience of buying my first scanner.

As a 70-year old who is so thick that he even has to get his schoolboy grandson to reset the car clock, I had a sudden urge to find an alternative to the current rubbish TV programmes and looked through your pages to find the most convenient dealer.

I visited SRP Trading at Belbroughton, Stourbridge and bought the claimed top of the range hand-held model, which had better remain nameless.

I should have known my capabilities better than that, for I found the instructions to be incomprehensible.

I then telephoned to ask if I could make a return visit to be given a period of instruction, for which I was quite willing to pay for the time involved, but the manager would not hear of it and put himself at my disposal.

I went back, but he soon realised what a clot he was dealing with and immediately offered a full refund which I gratefully accepted.

Realising my disappointment, however, he offered to let me try a nearly new, Bearcat 20XLT, which he claimed I would be able to cope with. How right he was. My wife and I are utterly amazed at what we are able to listen to.

Rarely in my long lifetime have I ever been treated with such kindness and helpfulness as I have been by the manager of SRP Trading, and I would like to be able to place my thanks on record.

R G COLLETT
CHELTENHAM

We are always pleased to hear from readers who have found better than can be expected service from one of our advertisers. A welcome trend in this day and age.

Dear Sir

Some time ago I came across a book Learn the Morse Code in 7 Days. *For those readers whose appetite has been whetted by the recent correspondence on this subject, I enclose a method mentioned in the book for learning the letters, the first step.*

Words are used which begin with the letter one is trying to learn and the accented part of the word is the 'dah' and the remainder are the 'dits'.

The table given will make this clear, I hope.

Letter	*Sign*	*Word*	*Sound*
A	.-	*a-HOY*	*di dah*
B	-...	*BOIS-ter-ous-ley*	*dah di di dit*
C	-.-.	*CAL-a-DON-ia*	*dah di dah dit*
D	-..	*DROWS-i-ly*	*dah di dit*
E	.	*egg*	*dit*
F	..-.	*fum-i-GAT-ion*	*di di dah dit*
G	—.	*GREAT GRAMD-ma*	*dah dah dit*
H	....	*he he he he*	*di di di dit*
I	..	*it is*	*di dit*
J	.—	*Ja-PAN PAN PAN*	*di dah dah dah*
K	-.-	*KING-ly KING*	*dah di dah*
L	.-..	*lu-CID-i-ty*	*di dah di dit*
M	—	*MORE MICE*	*dah dah*
N	-.	*NINE-ty*	*dah dit*
O	—	*OH OH OH*	*dah dah dah*
P	.—.	*pro-LONG LONG-er*	*di dah dah dit*
Q	—.-	*QUEEN QUEEN the QUEEN*	*dah dah di dah*
R	.-.	*re-TURN-ing*	*di dah dit*
S	...	*sit in it*	*di di dit*
T	-	*TAKE*	*dah*
U	..-	*un-der-STAND*	*di di dah*
V	...-	*ve-ry im-MENSE*	*di di di dah*
W	.—	*w-WILD WOLVES*	*di dah dah*
X	-..-	*EX-cel-lent WINE*	*dah di di dah*
Y	-.—	*YOUNG-ish young YOUTH*	*dah di di dah*
Z	—..	*ZINC SINK it is*	*dah dah di dit*

Some are a bit far-fetched, but they serve the purpose.

C. STAPLETON
TORQUAY

Dear Sir

I would like to tell all SWM readers of the superb after-sales service ERA Ltd of Warrington, Cheshire, gave me.

I ordered an ERA Microreader, it arrived soon after it was ordered. However, it had a slight fault, after a very helpful telephone call I was asked to return it to Warrington. It was despatched by post at 4pm/ The next day at 10am a replacement arrived. This was obviously sent to me before they received my faulty set. The new set works prefect and is an excellent addition to my receiving station. I now know of stations I didn't know existed before. I also received full postal costs and a very apologetic letter from the directors. Wouldn't it be marvellous if all retailers were up to the standard of ERA.

ALAN CURRY
STOCKTON-ON-TEES

Dear Sir

I purchased a new Signal R535 from Lowe Electronics, What an excellent machine.

I went out to my local airfield (Manchester), switched on the v.h.f. mode and heard nothing but screeches and bad ground noise. After much thought the squelch and antennas were checked out and found to be OK. The only thing left was the car phone glowing at me.

I turned the phone off and by magic all the bad noise disappeared and v.h.f. was perfect. A little experimenting afterwards found that if the phone was switched on you had the bad ground noise three to four metres away from the vehicle!

Maybe other readers have had the same problem, and not realised this was the cause. Many thanks to Hank at the Darlington Branch of Lowe Electronics, nothing seems to be any problem to them.

GORDON ROBINSON
BURNLEY

A WORD IN EDGEWAYS

When we published the letter from Graham Marsden in the October SWM, little did we realise what we were starting! Here you will find extracts from just a few fo the letters we received. Some agreed with Mr Marsden, others disagreed, some even had new ideas as to what they would like to see in the columns.

Dear Sir

Surely Mr Marsden must realise that conditions do vary and 'real DX' is sometimes difficult to log!

Also the columns rely on reader participation and reporting the logs that are sent in for the benefit of other s.w.l.s.

If Mr Marsden has any interesting loggings of DX, I suggest he sends them in so we may all benefit.

I K HARLING
EASTBOURNE

Dear Sir

The general trend of his remarks remind me strongly of the sometimes seen train buff with the 24 stop watches and a full library of time tables analysing every puff of steam going past the window. Most of the other travellers are getting interest and... dare I say it FUN out of the journey.

I manage to get a lot out of the 'LM&S' columns and there must be many others doing the same. Perhaps I cannot raise Serge Suit at 0100 from Vladivostock, but comparing notes with the logs sent in to Mr Oddy gives me a lot of pleasure. They are wide-ranging and must be of interest to almost all who likes radio.

In time, I may get to be as selective as Mr Marsden, but until then I will be happy to listen fairly widely and will use 'LM&S' as the best guide through the air waves that I have, so far, met.

THOMAS A BARNETT
SLOUGH

Dear Sir

In these days of megawatt transmitters and high performance receivers anything the other side of the Channel can no longer be regarded as DX. When I see Daventry quoted in 'S&H' just because it was relaying Canada International, the situation becomes just laughable. I feel that you and G3FEX might get together and decide just what 'LM&S' is all about.

H. READING, WIMBORNE

Dear Sir

I would refer in particular to 'Long, Medium and Short' and think that this section is an encouraging source of general information back for the newcomer and those who have been involved for longer. When one is well and truly hooked on the hobby, more specialised knowledge can be obtained by joining an appropriate organisation, such as the British DX Club or the International Shortwave League. I think one has to remember that SWM is often the first informative introduction someone has to the hobby, because it is on sale at bookstalls and newsagents. This is a particularly relevant aspect at this time of year when radio receivers are often bought for Christmas presents. In my opinion SWM is a very well balanced publication, catering for all types of hobbyists.

SHEILA HUGHES
MORDEN

Dear Sir

'Seen & Heard' represents a cross-section of what has been received by contributors and to impose a 'DX only' requirement would place an impossible burden upon Brian Oddy in deciding which reports qualify as DX.

It would also totally ignore the requirements of beginners or listeners with modern equipment.The more experienced listener may well be interested in reception SINPO or in changes in frequency of which he was unaware. It is also relevant to point out that some of the more easily received stations contribute much interesting material broadcast in English.

When everything is considered, i.e. receiver, antenna, location, listening time and conditions, DX is not really capable of accurate and absolute definition.

The only serious fault with the l.w., m.w. or s.w. sections of 'Seen & Heard' is that they are excessively compressed to a point that the defy the title of the Magazine and its proclaimed aim - 'For the Radio Listener'.

JIM CASH
SWANWICK

Dear Sir

I think that Mr Marsden in my view has got the wrong end of the stick as far as DX in radio terms. I see by his letter that he is a comparative newcomer to radio and I would in no way tell him to mind his own business, but I would like to point out one or two things. I have been into radio for eight years now and the same thing crops up over and over - the cost and range of radio equipment, the equipment changes so quickly that it is impossible to keep up with the latest and greatest. So what one person regards as DX on his radio of a small budget is vastly exceeded by someone on his more expensive RX gear. I have had radio friends over the years whose marriages have broken up due to vast sums to keep up with the latest radio gear. So, Mr Marsden what do you want? Do you want SWM to cater for only the radio user who has the latest gear and can hear radio Tokyo at the flick of a switch and disregard the other radio user who regards DX as listening to stations from the other end of the UK. I would like to see you write in again in a few years time, just to see if your opinion changes.

Keep up the good work SWM.

JOHN NEWBURN
ASHINGTON

Dear Sir

There are no hard and fast rules, or demarcations, regarding DXing, if there were there would be many thin red lines within the criteria.

A first time listener to short wave, on hearing Radio Moscow, may consider it to be a worthwhile entry to log with its SINPO rating. Anyone will be find the same condition tomorrow? In all probability it will be the same and next week, eventually the signal will be different, probably jammed by Madame Insahe, he can't stand foreigners using his language!

Therefore, because of many unpredictable factors including propagation disturbance, sunspot flares and geo-magnetic influence in addition to man-made upsets render DXing with unlimited boundaries.

Looking at the other side of the coin, i.e. the 'once in a blue moon' reception of a 1 watt e.r.p. from the Antipodes at the peak of the 11-year solar cycle is unlikely to be interesting other than academically, either to short wave listeners of broadcaster concerned with regular services.

International broadcasters have to justify their expenditure and most request letters from listeners and will return QSL cards for confirmed accurate reception reports. I would think that many readers of 'Seen & Heard' not able to spend much time in random searching over the bands, appreciate updating information on many frequency changes for particular stations and programmes. Unfortunately, many of the entries are no longer current when the magazine is read, the same applies to broadcaster's DX shows, the date that a station was logged might help.

I agree with Graham about the 'Personal Congratulation' the names of the DXers are in bold type when it should be the short wave station that is highlighted. In fact, Mr Editor, because the short wave lists are extensive, can the format be changed? A chart would be preferable as it would be different each month, which is more that can be said for the l.w. and m.w. charts which need only appear about twice a year, with changes noted monthly. As far as is possible the charts should be 'as it is' not 'as it was'. End of lesson to the converted!

JAMES HUNT
STOURPORT

DICKS' LEADER

Change

Four years ago I was given the task of changing the editorial direction of this magazine to cater for the listening enthusiast. The title *Short Wave Magazine* was retained for very practical reasons - it was already established on the bookstalls and what else could you call it? That there was a need for a monthly magazine for the short wave listener has been proven by the fivefold increase in circulation, making *SWM* the second largest selling magazine for the radio enthusiast and one of the few magazines to be bucking the trend of downward circulations.

However, things do not stand still and it is now time to change some of the features and improve the magazine. From the January issue the magazine will look different - a new cover, new logo and fresh layout inside. **All your favourite columns will still be there,** but now grouped together instead of being scattered around. 'Seen & Heard' will disappear, but the columns presently under its umbrella heading will still be there, joined by 'Airband' and 'Scanning'. Ron Ham's 'Band II DX' is being renamed 'Propagation' to properly reflect its subject matter and two new columns will appear on satellite TV and h.f. utility listening. 'Bandscan' will take turns with 'DX Letter from America' and 'News from Down-under'. We don't make changes for the fun of it, I listen to what readers tell me and use the information gathered from questionaires. Obviously many readers have their favourite sections of *SWM*, but I have to listen to all points of view.

Junior Listener

In common with other 'semi-technical' hobbies, short wave listening seems to be losing out in the race to attract youngsters. I firmly believe that six years old is not too young to start and that unless a youngster is not hooked on radio by the age of eleven he, or she, is probably lost for ever. They will most likely give up radio between then and the mid-thirties as other more important things come along - exams, the opposite sex, marriage and a family - but how are they to pick it up again unless the seed was firmly implanted very early on? The new 'Junior Listener' page starts next month with this in mind, so, if you know of any six to sixteen year olds make sure that they, or their parents, at least see a copy of the January issue.

Dick Ganderton

WHAT'S NEW

Interested in BBC Nostalgia?

TV Graphics Review is a new quarterly publication for all those who are interested in the development of TV and radio graphics used over the years with particular emphasis on BBC Television and Radio.

Each issue of the A5-size magazine will feature graphics of every description, from Trade Test Transmissions to on-screen identification symbols, from television programme captions to radio publicity material used throughout the world. At present, each quarterly issue will have 20 pages. Although not glossy, the publishers hope that readers will find each issue interesting and informative. Photographs and articles will appear reflecting the graphics used by various services around the world over the past seven decades. The subscription rate is £7.00 and the first issue is out now.

The publishers would particularly like to hear from anyone who may have photographs or videos available showing old BBC test cards, identification symbols, captions, tuning signals, logos, etc., especially those used prior to 1980.

Keith Hamer, 7 Epping Close, Derby DE3 4HR. Tel: (0332) 513399.

Testcard

Testcard is a simple and inexpensive program from Black Star that allows the rapid checking and alignment of computer monitors. The software runs on IBM-PC, XT, AT, PS/2 and 100% compatibles. It can check MDA, CGA, MCGA, ATT400, EGA, Hercules, VGA, IBM8514 and most PC monitors capable of operating in text mode.

All the standard patterns and colours used by professional service engineers are produced by TESTCARD including focus, dots, vertical lines, horizontal lines, grating, shading, checkerboard, high/low intensity colour bars, composite testcard, circle, raster, greyscale and multiburst.

TESTCARD is supplied as standard on both 5.25 and 3.5in floppy diska and comprehensive instructions are included.

Black Star Ltd., 4 Harding Way, St Ives, Huntingdon PE17 4WR. Tel: (0480) 62440.

When Portishead Found Bullseye

During World War Two members of the Special Operations Executive went to great lengths to prevent their radio transmissions being intercepted.

But recently they were involved in a Morse exchange with Portishead Radio which they very much wanted people to know about it. In an event held at Beaulieu Abbey, marking the 50th anniversary of the SOE, they thanked Portishead for its wartime role.

One SOE group, code name Bullseye, had particular reason to be grateful.

In Yugoslavia during the war they lost their radio set and codes. The Yugoslav Partisans helped them to call England and, after checking their identity, Portishead established a link and sent a replacement radio.

In replying to the commemorative message, Phil Lewis, Operational Manager, said: "Portishead Radio remains proud of its wartime service with the SOE.

"We continue to serve the world's airlines and ships, remembering all those men and women who were secretly trained at Beaulieu to fight a lonely battle and provide the peace we all enjoy today."

Courtesy of *Telecom Today* BT staff newspaper, September issue.

WHAT'S NEW

Cable TV Changes

The Government is to introduce a new licensing regime that reflects a more liberal approach towards the installation and operation of cable TV relay systems.

The DTI, in conjunction with OFTEL, the Cable Authroity nad shadow Independent Television commission (ITC), is informing all operators of cable TV relay systems carrying BBC and IBA services of proposed changes in the licensing regime.

From 1 January 1990, subject to Parliamentary approval of the Broadcasting Bill, certain systems which do not presntly require to be licensed by the Cable Authority will need an ITC licence to provide programme services. At the same time certain systems that do not presntly require individual licences from DTI to operate telecommunications systems will be subject to new arrangements.

AOR Mods

After much experimentation, RGW Electronics have now devised a way of extending the coverage of the AOR1000 scanners from the original 8-600MHz and 830-1300MHz to 1-1300MHz continuous.

The process is quite simple and involves taking the unit apart and fitting a newcomponent to the main p.c.b. After this is done a series of keywords is entered into the units keypad and the new coverage is acheived.

Included in the kit are fully comprehensive instructions on what to do and the component required is also supplied.

The modification also works for the Fairmate HP100E scanner.

RGW Electronics, 5 Braunston Place, Rugby, Warks CV22 5JZ.

Frequency Lists

Could SWM readers please note that one of our regular advertisers, SSC, have asked us to say that they are no longer trading. Furthermore, their frequency lists will not be available from any other source.

JOTA aided by Lowes

During the recent JOTA weekend, the station set up by the Scouting Association at Gilwell Park near London was equipped by Lowe Electronics. They supplied a TS-440S and all the necessary accessories for a successful weekend.

The Licence to operate the station was handed over by the then Head of the Radio Communications Division of the DTI, Mr M Coolican. He warmly welcomed the commitment of both Lowe and the Scouting movement in encouraging and educating young people participating in amateur radio.

Catalogues

We've received a few interesting catalogues recently. The new Cirkit Winter catalogue is now published. Included in its 184-pages are: £10 worth of discount vouchers and easy-to-enter competition for an a.f. signal generator as first prize and a 25W soldering iron offer with a subscription to the next two issues of the catalogue.

There are many new products, including p.c.b. drafting software, low-cost l.e.d. displays, a 1000 channel scanning receiver, a battery powered scope, antennas, connectors, filters and torches.

Cirkit Distribution Ltd., Park Lane, Broxbourne, Herts EN10 7NQ. Tel: (0992) 441306.

Lake Electronics have 10-page catalogue available. It contains details on their eight kitss, including the specification, general details and what's involved with the kit. There are also two "simply useful" circuits included on the inside back cover. All prices included cover carriage unless otherwise stated and delivery is normally within 7 days for kits, and 2/3 weeks for ready-built units.

Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX. Tel: (0602) 382509.

The new A F Bulgin component catalogue offers design engineers, buyers and specifiers a complete guide to the company's extensive range of electricaland electronic components.

Full technical data for all products, from battery holders to waterproof switches, are presented in easy-reference format throughout the illustrated 215-page publications. Full odering details, complementary product shots and circuit diagrams enable users to select and design in the appropriate components for their equipment and systems.

The catalogue is sub-divided into six main product headings: battery holders, connectors, fuseholders and fuses, indicators, knobs and switches. There is also a section covering power supply products.

A.F. Bulgin & Co plc., Bypass Road, Barking, Essex IG11 0AZ. Tel: 081-594 5588.

The 1991 Greenweld catalogue is out now. It has 132-pages packed full of components and equipment. New this year are: quantity prices for bulk buyers on many items (resistors from 0.25p and capacitors from 0.5p), an expanded range of speakers, more soldering equipment and tools, new disco and music section, even more semiconductors (over 1250 transistors listed) and a big opto section (l.e.d.s from 3.5p).

Included in each catalogue are the Bargain List pages, plus an extra 16-page supplement and a reply-paid envelope. The catalogue costs £1.50, or £2.50 for the catalogue and six Bargain List Supplements.

Greenweld Electronics Ltd., 27SW Park Road, Southampton SO1 3TB. Tel: (0703) 236363.

GRASSROOTS

Lorna Mower

Acton, Brentford & Chiswick RC: 3rd Tuesdays, 7.30pm at Chiswick Town Hall, Turnham Green, London W4. Nov 20 - Audio Filters by G3IGM, Dec 18 - Surface Mount Construction, A First Try by G3OJX. Paul Truitt G4WQO. Tel: 071-938 2561.

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. Dec 18 - Christmas Party. Geoffrey Milne, 081-462 2689.

Bromsgrove ARS: 2nd & 4th Tuesdays, 8pm. Aston Fields Working Mens Club, Stoke Road, Astonfields, Bromsgrove. Nov 27 - Night on the Air, Dec 11 - Social Evening. J. Yarnall G1JLQ. Tel: (0527) 503024.

Chelmsford ARS: 1st Tuesdays, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Dec 15 - Club Social. Roy Martyr, Chelmsford 353221 ext 3815.

Cheshunt & DARC: Wednesdays, 8pm. Church Room, Church Lane, Wormley. Nov 28 - Rig Security Marking by Paul G0BQF, Dec 5 & 19th - Natter Night, 12th - Christmas Social Evening, 26th - no meeting. Roger Frisby, Hoddesdon 464795.

Coventry ARS: Fridays, 8pm. Baden Powell House, 121 St Nicholas St, Radford, Coventry. Nov 23 - Night of the Air. Neil, Coventry 523629.

Delyn RC: Alternate Tuesdays, 8pm. Daniel Owen Centre, Mold. Dec 4 - Amateur TV demo and talk, 18th - Mince Pie Night. Steve Studdart, Deeside 819618.

Derby & DARS: Wednesdays, 7.30pm. 119 Green Lane, Derby. Nov 28 - DXpedition to WL square by Paul G1WBZ, Dec 5 - Junk Sale, 12th - Constructor's Contest, 19th - Christmas Party, 26th - No meeting. Kevin Jones, Derby 669157.

Dundee ARC: Tuesdays, 7pm. College of Further Eduacation, Graham Street, Dundee. GM4FSB, 30 Albert Crescent, Newport on Tay, Fife.

Dunstable Downs RC: Alternate Fridays. Nov 30 - ERG Race, Dec 14 - Christmas TV Show, 21st - Club Party (members only). Mike Spacey, QTHR.

Fort William Radio Group: 1st & 3rd Thursdays, 7.30pm. British Red Cross Hall, Inverlochy by Fort William. Colin Davies GM6YQA. Tel: Fort William 3344.

Hastings E&RC: 3rd Wednesdays, 7.30pm. Westhill Community Centre, Croft Road, Hastings. Dec 19 - Christmas Social.

Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross (Off Catherington Lane), Horndean. Dec 6 - Weather & Propagation by Ron Lobeck from TVS. S. W. Swain. Tel: (0705) 472846).

Keighley ARS: Thursdays, 8pm. Ingrow Cricket Club, near Hainworth Village, Keighley. Nov 22 - Natter Night, 29th - The Sun by Mr L.M. Dougherty, Dec 6 & 13 - Natter Night, 20th - Christmas Buffet. Kathy, Bradford 496222.

Kidderminster & DARS: Alternate Tuesdays, 8pm. The Queens Head, Wolverly, near Kidderminster. Nov 27 - Tour of the Shacks Video, Dec 11 - Club Social Night.

Lothians RS: 2nd & 4th Wednesdays, 7.30pm. The Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. Nov 28 - Underground Radar by John McDonald, Dec 12 - Packet Radio by GM0EWJ & GM4ZOA. P.J. Dick GM4DTH, QTHR.

Mansfield ARS: 1st Thursdays, 8pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. Dec 6 - Social evening with buffett, family and friends welcome. Mary G0NZA. Tel: (0623) 755288.

Midlands AX-25 Packet Radio Users Group: 1st Mondays, 8pm. The Community Centre, Perton, Nr Wolverhampton. Greg Lwein G0NEN. Tel: (0785) 840186.

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St John Ambulance HQ, 61 Emscote Road, Warwick. Nov 27 - Antenna Analysis by Glen G8MWR, Dec 11 - Christmas Pies and Wine. Mike Newell, Kenilworth 513073.

Norfolk ARC: Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norfolk. Nov 28 - Informal and committee meeting, Dec 5 - FETs and MOSFETs made easy by G3YIA, 12th - Christmas Party. Mike Cooke, (0362) 850591.

Rhyl & District ARC: Dec 10 - Christmas Dinner. Edward Shipton. Tel: (0745) 336939.

Salop ARS: 2nd & 4th Thursdays. The Bucks Head, Frankwell, Shrewsbury. Nov 22 - An Introduction to the Novice Licence by Derek Pearson of Jandek Kits, Dec 6 - DXTV by Bill G4FBZ, 20th - Christmas Social. J.R.M. Bumford, G0GTN.

Shefford & DARS: Thursdays, 8pm. Church Hall, Ampthill Rd, Shefford. Dec 6 - The Constructor's Contest. Nigel Leaney, Royston 71149.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc, Bridge Farm House, East Dundry Rd, Whitchurch. Nov 28 - 20m DX RX Evening, Dec 5 - Judging for Terry Dunsford Trophy, 12th - HF Contest Evening, 19th - Christmas Party. Len Baker, Whitchurch 832222.

South East Kent (YMCA) ARC: Wednesdays, 8pm. The YMCA, Leyburne Road, Dover. Nov 28 - Tracing the Family History by G0ADK, Dec 5 - Natter Night, 12th - Visit by RSGB RLO (tbc), 19th - Christmas Social.

Stevenage & DARS: Tuesdays, 7pm. Ground Floor Lecture Room, D Block Ridgemond Training Enterprise, Ridgemond Park. Nov 26 - RAE Course, 27th - HF Night of Air to Twin Towns. Peter G0GTE. Tel: (0438) 724991.

Stoke-on-Trent ARS: Thursdays, 7.30pm. Sacred Heart RC Church Hall, Jasper Street, Hanley, Stoke-on-Trent. D. Wroe G0MXD. Tel: (0782) 639476.

Stourbridge & DARS: 1st & 3rd Mondays. Robin Wood's Community Centre, Scotts Road, Stourbridge. Dec 3 - Natter Night, 17th - Forensic Scientist or Quiz. Dennis Body G0HTJ, QTHR.

Sutton & Cheam RS: 3rd Thursdays, 7.30. Downs Lawn Tennis Club, Holland Ave, Cheam. 1st Mondays in the Downs Bar. Dec 3 Natter Night, 20th - Christmas Get-together. John Puttock G0BWV, QTHR.

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

Verulam ARC: 2nd & 4th Tuesdays, 7.30pm. RAF Association HQ, New Kent Rd, St. Albans. Nov 27 - Packet Radio by Mr P Andrews, Dec 18 - AGM. Andy Ince G0BZS, QTHR.

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

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road, SW19. Nov 30 - Design of Direct Conversion Receivers by Steve G8CYE, Dec 14 - Christmas Social. Nick Lawlor, 081-330 2703.

Yeovil ARC: Thursdays, 7.30pm & Fridays, 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Nov 22 - Ideas for Club Events in 1991 by G3MYM, 29th - Natter Night, Dec 6 - Low Pass Filters by G3MYM, 13th - The VK/G Propagation Phenomenon by G3MYM, 20th - Mince Pies and on the Air Night, 27th - Natter Night and Committee Meeting. David Bailey G0NMM, QTHR.

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

RALLIES

* Short Wave Magazine and Practical Wireless in attendance

December 9: The Leeds & District ARS have their Christmas Rally in The Civic Hall, Dawsons Corner, Pudsey (junction of the Leeds Outer Ring Rd and Bradford Road A647). Talk in on S22. All usual facilities. Admission is by programme only, 50p. Doors open 10.45. **Geoff on Leeds (0532) 585801.**

***December 9**: The 6th St Albans (Verulam) Rally will be held at Hatfield Polytechnic, Hatfield. Doors are open from 11am to 5pm. All the usual attractions, club stands, talk-in on S22, Trade stands, prize draw, Bring & Buy, catering and bar. Entrance £1.

1991

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 refreshemnts. Doors open at 10am. There will be extensive free car parking and easy access to The 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 raaly 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.**

March 31: The Centre of England Amateur Radio Rally will be held at the Motorcycle Museum, Bickenhill, near the NEC Birmingham.

April 7: The 5th Launceston Amateur Radio Rally will be held at Launceston College. There will be a large Bring & Buy, well-known traders, hot snacks and a bar. Also official Morse Tests (pre-booked *via* the RSGB) will be held at the Rally. Doors open at 10.30am with talk-in on S22. **Maggie. Tel: (040921) 219.**

April 27/28: The RSGB will be holding their National Amateur Radio Show at the National Exhibition Centre, Birmingham.

TRADING POST

FOR SALE Bronica ETRS complete AE11 finder, speedgrip, 120 back, filters, mint and boxed, £550.00 o.n.o. **WANTED** Icom R-7000, will exchange. P Jackson. Tel: (0228) 20509.

WANTED Denco valve type general purpose coils, red, yellow, blue, green, ranges 2, 3, 4, and 5. Full or part set. All letters answered. Price and details to F. Burns, 72 Winchester Road, Brislington, Bristol. BS4 3NH.

FOR SALE or **EXCHANGE** Tandberg TD20A-SE 10in tape deck, cost £1250 new, less than five hours use. Looking for good quality cassette deck (twin) with cash adjustment or sell. Ray. Tel: Earby (0282) 842124 anytime.

WANTED Philips 209U/15 (c1947). Good price for model in good condition. Also Philips 141U required only for good Perspex loudspeaker grille, so condition of rest immaterial. Paul. Tel: (09278) 3846 (Bucks).

FOR SALE Sony ICF-7600DS eight months old, excellent condition, £75.00 o.n.o. **FOR SALE** R210 receiver, £30.00, buyer collects. J. Myers, 47 Trevor Road, Orrell Park, Liverpool L9 8DY. Tel: 051-521 8650.

FOR SALE Philips D2999 synthesised receiver 0.15 to 30MHz a.m./s.s.b. plus f.m. broadcast, 7W audio. Similar size/configuration to Trio R2000. Excellent condition, £125. Delivery may be possible. M. Farmer. Tel: Bury St Edmunds (0284) 704152.

FOR SALE Marconi signal generator TF144H component bridge TF1313, complete Q-meter outfit TF1245, attenuator, a.f. output meter, Variac, antique Wheatstone bridge, various HRO spares, WW2 manuals, B2 spyset info wanted, B40D receiver, details. Tel: Crawley (0293) 885701.

FOR SALE Realistic PRO-2005 scanner, 25-1300MHz, as new in box. Five months warranty left. JIM M-100 antenna pre-amp, frequency guide books, etc. Tel: (0425) 277986 after 7pm.

FOR SALE BBC B, Micronet, Wordwise, ADFS, printer, Opus 40/80 disc, tape recorder, modem, plinth, joysticks, blank disks, books, games, MFI 3-drawer desk (am saving for FRG-8800) all very good condition. Mick Beazley. Tel: Reading (0734) 414605 after 6pm or weekends.

FOR SALE 44Mb high speed hard disk for IBM compatible XT/AT, would consider exchange for communications receiver. **FOR SALE** 20Mb hard disk, would consider exchange for scanner or c.w./RTTY software. Tel: Kilsyth (0236) 821635.

FOR SALE Bearcat 200XLT hand-held only used twice, still boxed with accessories, £165, buyer collects. J. Spink. Tel: Birmingham 021-351 6249 evenings.

FOR SALE Yaesu Musen FRG-7, digital frequency readout, Cushcraft antenna, £150 o.n.o. Tel: 081-807 0406 (Palmers Green).

FOR SALE Philips D1835 Compass World Band Receiver, 9 s.w. bands, m.w., l.w. and f.m. Good condition in original box, £30. Keith. Tel: (0623) 795077 (Nottingham).

FOR SALE AOR1000, hand-held scanner, new and unused with NiCads and accessories, unwanted gift. £210 o.v.n.o. Mr Lambert. Tel: (0865) 278500 (Oxford).

FOR SALE RX4 program plus TIF1 interface, for use with Spectrum +2, decodes RTTY, c.w., SSTV, AMTOR, £35. Datong automatic speech processor, £50. Racal RA17, 0.5-30MHz, buyer must collect £110. G. Marshall. 11 Ettington Road, Anfield, Liverpool L4 2SX. Tel: 051-260 8893.

FOR SALE Racal 17L receiver, of special interest to Rugby area gentleman previously contacted. Ken. Fairfields, Shelton, Newark, Notts NG23 5JL. Tel: (0949) 50640.

FOR SALE Lowe HF225 communications receiver, plus direct entry keypad, little used, complete with box and manual £400. Maplin a.t.u. £20. Bowden. Tel: (0453) 842419 (Wotton-under-Edge).

FOR SALE Panasonic RF-B65D as new, boxed with guarantee, £120. **WANTED** AR800 scanner. Tel: (0432) 263295 (Hereford).

FOR SALE Bearcat 200XLT hand-held scanner, 200 memories, includes charger and NiCads, case, rubber duck and telescopic antenna, hardly used as new and boxed, £150. Tel: Aylesbury 89895.

WANTED Communications receiver, e.g. 9600, AX7000, R100, R72, FRG8800, R71E, R5000, R200, can collect in south-east UK area. Tel: (0268) 762936 (Wickford).

WANTED small Sony short wave receiver, i.e. ICF SW1E or ICF-7600. Must be in excellent condition and realistic price. Mr Newton. Combe House, Forest Hill, Bideford, North Devon. Tel: (0237) 478205.

FOR SALE Icom IC-R100 communications receiver, mint condition, £400. S. Foster. Tel: (0283) 67193 (Burton-in-Trent).

FOR SALE Yaesu Musen FRG-7700 receiver with FRV-7700 v.h.f. converter. Little used, mint condition, boxed as new, £395. J. Barker. Tel: Leicester (0533) 675441.

FOR SALE ERA Mk II Microreader, six months old, very good condition, little used, £50. Tel: (0823) 42391 evenings or weekends.

FOR SALE Signal R535 v.h.f./u.h.f. airband monitor, Revco discone, mobile antenna, cable and all fittings. Also IF535 computer interface and cable. Excellent value at £180. Tel: (0480) 431285 (Huntingdon).

FOR SALE Realistic PRO2021 scanner, 200 channel, excellent condition, £95. K Wright. (0403) 66228 (Horsham).

FOR SALE Tatung TMR7602, excellent condition, clean, world reception, frequency 0-30MHz all mode. £100. Tel: (0742) 464186 (Sheffield).

FOR SALE Philips D2935, excellent condition, almost new, world reception, frequency 0-30MHz all mode. Tel: (0742) 464186 (Sheffield).

WANTED Lowe Electronics HF-225 short wave receiver. M Barber. Tel: Coventry 614492 evening and weekends only.

WANTED Digital frequency display suitable for FRG-7/SRX30. B P Lockwood. 31 Abbot Close, Oakwood, Derby DE2 2BQ. Tel: (0332) 882024.

FOR SALE Sony AIR-7, nearly new, £150. AOR1000, 150. Casio 2in l.c.d. colour TV, £40. Psion Organiser LZ64, 64K datapak, leather case, £150. Tel: (0252) 547564 (Farnborough) evenings.

FOR SALE Kenwood R-2000 150kHz-30MHz all modes, s.s.b., c.w., am.m, memory scan, programmable band scan, boxed as new, hardly used, £310. Tel: 091-477 3581 evenings and weekends (Gateshead).

FOR SALE Signal Communications Corp R-5375 a.m. band radio 118-136MHz with ear phone, extending and flexible antennas, 1 year old, £40. My new AR1000 makes it redundant. Peter Martin. (0905) 353319 (Worcester).

FOR SALE Icom R7000 communications receiver with discone antenna, cable and manual, excellent condition, £650 o.v.n.o. F. Upstone. Tel: (0684) 73366 (Brendon).

FOR SALE or **EXCHANGE** Realistic 2021 base-mobile scanner, excellent condition, original box and instructions, £160 or exchange for hand-held model, must have airband. M Whiting. Tel: (0422) 379023.

FOR SALE Sony receiver, model ICF-7600D f.m., l.w., m.w., s.w., a.c. power supply, Waveguide, original box, £90. Tel: (0229) 89364 (Kirkby in Furness).

FOR SALE Jupiter 2 hand-held scanner, in mint condition with case, £200. Signal 532 airband scanner with accessories, £150. Signal 537S airband receiver with case, £50. Tel: (0923) 672346 (Garston).

FOR SALE Kenwood R2000 receiver with VC10 converter, perfect, £420. AOR AR2002 scanner, as new, £300. Eddystone 840C communications receiver, working, £55. Realistic PRO-32A 200 memories scanner, as new, £130. Tel: 081-643 5063 (Carshalton, Surrey).

FOR SALE 13.8V d.c. 25A linear p.s.u., fan cooled, fully protected, twin metering, good condition, £35.00. 13.8V d.c. 15A linear p.s.u., current metering, etc., £25.00. Large box of mains transformers, TX p.s.u.s, meters, etc., £10.00 the lot. G4FZG, QTHR. Tel: (0242) 580329 (Cheltenham).

FOR SALE Grundig Yacht Boy700 digital world receiver, s.s.b., as new, boxed with instructions, £55. D. Rochford. Tel: (0253) 891908 evenings (Blackpool).

FOR SALE Realistic PRO-32A 200 memory, 23 000 frequencies scanner, excellent condition, plus new 40-channel synthesised transceiver, both with NiCads, chargers, antennas and manuals, £220. Tel: Warrington 574445.

FOR SALE Realistic PRO30 hand-held scanner with manual, mains adaptor and car adaptor, £125 o.v.n.o. Tel: (0489) 786721.

EXCHANGE mint Sony Air-7 plus cash, for PRO2005 or Jupiter 6000. **FOR SALE** Yaesu headphones, boxed as new and 100-1000MHz discone, £10 each. Tel: (0270) 874148 (Stoke-on-Trent).

FOR SALE Supra STV-660 (identical to JVC CX-60GB) 6in PAL/SECSM VHF/UHF TV with manual 5.5/6.0/6.5 sound switching, with mains supply, external antenna socket, very sensitive, £120. Citizen TC532.5in v.h.f./u.h.f. l.c.d. pocket TV and 4 NiCads, £50. Both items mint condition. Tel: (0273) 503958 (Brighton).

SWM DECEMBER 90 TP

Write out your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it, together with your payment of £2.30, to Trading Post, Short Wave Magazine, Everbay House, The Quay, Poole, Dorset BH15 1PP. You must send the flash from this page, or your subscription number as proof of purchase of the magazine. Advertisements from traders, apparent traders or for equipment which it is illegal to possess, use or which cannot be licensed in the UK will not be accepted.

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The NRD-525 from JRC

In America, they refer to the NRD-525 as JRC's superset, and it's not a bad description, because there is little doubt that the NRD-525 stands in a class of its own. Whatever you want a receiver to do, it's likely that the NRD-525 will do it; whatever you want to hear, the NRD-525 will allow you to listen to it.

What will the NRD-525 do for you? In a space so limited as this page, I cannot possibly cover all the answers, so I will let a respected reviewer make some comments for you. Here's what Rainer Lichte, author of "Radio Receivers — chance or choice" said about it:-

Accuracy and stability
"The tuning accuracy and the matching display are impressive indeed, Still the more impressive is the receiver's frequency stability. Drift is virtually non-existent, it was measured at less than 5Hz/hour."

And about dynamic range:-
"ICP 3rd order (3rd order intercept point) was measured at +17dBm at 7MHz and +14dBm at 25MHz. These are excellent values, and they are not the result of decreased sensitivity. The NRD-525 is amongst the most sensitive receivers I've measured so far. . . . Dynamic range was computed to 102dB, an equally outstanding value."

All very well you may say, but what does this technical jargon mean in real life? Let me quote Rainer Lichte again:-

"The signal quality under adverse conditions is remarkable, e.g. the 40 metre band here in Europe is fairly cluttered with high-power stations and most receivers just quit when you try to extract some intelligence from a weak radio amateur signal. The NRD-525 is unimpressed and functions in a truly professional manner."

In other words, there is virtually nothing you cannot resolve. If it cannot be received by the NRD-525, it cannot be received by anything. As a final quote from the review, let me give some conclusions:-

"The receiver is a joy to operate and a joy to listen to."

"The new NRD-525 very impressively manifests itself as the No. 1 receiver outside the commercial/military bracket."

"Performance-wise, the NRD-525 is way ahead of the competition because this receiver delivers outstanding results in all modes of operation."

When you try an NRD-525 for yourself, all that Rainer Lichte has said will be clearly true, but that's not the end of the story, because the NRD-525 has a range of options which will extend its use even further; to VHF/UHF with an internally fitted converter; to more demanding applications with a range of high performance IF filters; to almost anything you want it to do.

For more advice on this outstanding receiver, just send for details, or call in here at Matlock, or at any of our branches across the country. You will find us helpful, knowledgeable and competent, and when you buy from us you have the comforting thought that you have the backing of Europe's best service team should you require it. That's why JRC, Kenwood, AOR, Signal, Daiwa, and all the other well known names have chosen us to be their sole UK distributors. Others may sell the radios, but we do so much more. Try us and see.

NRD-525	90kHz to 34MHz	**£1095**
Options		
CMK-165	VHF/UHF converter	**£391**
CMH-530	RTTY demodulator	**£102**
CMH-532	RS232 interface	**£91.75**

The NRD-525 is fitted with 12kHz, 6kHz and 2.4kHz filters as standard. Option filters are available for 300Hz, 500Hz, 1kHz and 1.8kHz bandwidths.

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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 pencells 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.)

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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 the AOR range, we also distribute receivers from Signal Communications an WIN, two of the top names in Airband radio. 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.

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DECEMBER 1990

DOUBLE REVIEW

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BANDSCAN

Peter Laughton

In September, for instance, a bomb explosion damaged one of the short wave antenna towers at the Voice of America relay station located in Capas Town, around 90km north of Manila. The attack took place just hours before talks opened on the future of American military bases in the Philippines. The bomb made a large crater at the base of the transmitter tower, but it didn't affect the overall operations. It still hasn't yet been established who exactly was behind the incident, it could either be communist guerillas or army rebels seeking to destabilise the Aquino government.

Meanwhile one of the main VoA relay stations serving Africa has gone off the air. No transmissions from the VoA relay station in Liberia have been noted since 1415UTC on Monday September 17. As a result, extra transmitters at Greenville, Bethany, Delano and the Philippines started up 1600UTC on the September 18 to fill the gap. At the moment it is unclear exactly what has happened, although it seems the staff and transmitters are safe. By the time you read this, the station may be back on the air.

Deutsche Welle in Cologne has put its Sri Lankan relay station off the air again, until the guerilla war in the north-east of the country dies down again. Part of the problem is getting oil up to the site from the port in Colombo. If that wasn't enough, a civil war broke out in Rwanda during October, which affected the operations of DW's main outlet for Africa. Extra transmitters were put on from DW's facilities in Germany.

ELWA - Eternal Love Winning Africa.

Now to a report about a religious station in Monrovia, Liberia which disappeared from the airwaves at the start of July. Since then, reports of the stations activity, and possible role in the civil war there, have been confused. ELWA was an operation by a world-wide evangelical organisation called the Sudan Interior Mission. Stan Brunning works for their office in North Carolina USA and was in Liberia when they were forced to close the station down because thousands of refugees were moving into the stations premises. He told us that they switched the station off on July 5 because they were afraid warring factions would attack the compound. On July 27 the station went back on the air for a brief period under the orders of Charles Taylor. It seems that government troops then attacked the former religious broadcasting station and damaged the power supply plant and the studio complex.

Members of the Sudan Interior Mission still hope they can return to the country and put the station back on the air. But it will need a major input of voluntary funds to do so. When it operated, the station ran news, information, as well as inspirational programming in English and 14 vernacular languages in Liberia. These were put together in Monrovia. But the station also received and transmitted religious programmes in 40 other languages which it broadcast to other parts of Africa.

Running an international broadcasting operation can have its worrying moments. In the last few weeks, several international broadcasters have wondered whether their relay stations would simply disappear.

Gulf Update

One of Radio Baghdad's English services has changed its name to The Voice of Peace from Baghdad. The programmes contain the elements addressed to US troops in the region, and appear for two hours at 1000, 1600 and 2000UTC on 11.860MHz. Jerome van der Linden, who is in Riyadh, says that he can also hear 17.915MHz at 1600 though it's much weaker. It seems the same programme is also available on medium wave in the region.

Radio Baghdad's broadcasts to Europe at 2000UTC have moved between 13.660 and 13.600MHz. It is almost as if there is a switching problem at the transmitter site, or the operators simply forget to type in a '6' in the computer system. The facilities in Baghdad were only recently rebuilt by the French. At 2055UTC I've noted messages from foreign nationals in Baghdad. Most governments refer to them as hostages, Radio Baghdad calls them 'guests'. Again, because of the situation, all the times given are subject to change.

Radio Netherlands has started a special weekly broadcast intended for Royal Dutch Navy personnel serving in the Gulf area. A programme of greetings and music requests now goes out on Sundays from the Flevo transmitter site 0900-1000UTC on 21.745 and 25.970MHz. Radio France International has also increased its transmissions to the Gulf in both French and Arabic.

As of Wednesday September 12, the Armed Forces Radio and Television Service began operating an f.m. radio-network in Saudi Arabia for the US military troops there. It consists of a number of low-power f.m. transmitters, ranging from 30 to 300W and each covering a radius of about 50km. Melvyn Russell, the assistant director of AFRTS explained to *SWM* that they feed the programmes in by satellite and that there is no need for a short wave relay. Television is starting up shortly.

One Watt Tests

Medium wave conditions were excellent at the start of October, and as a result listeners on the continent reported hearing a test tone.

It seems that South Shropshire Communications has been granted a Test & Development Licence by the government's Radio Telecommunication Agency to run a 1W transmitter on 1.512MHz from Villa Farm, near the town of Ludlow. The licence is initially for six months to allow research into low power, special event transmitters and antennas. No music can be played by the station, just tones and station identification.

ANARC to fold?

Recently the 26th Annual Convention of the North American Radio Clubs took place in Virginia Beach, Virginia. It may well have been the last. Sheldon Harvey, the acting secretary of ANARC surprised everyone at the meeting by announcing that he was winding up the umbrella organisation of DX clubs in North America, due to lack of support and general interest. Sheldon took over from Robert Horvitz who did some pioneering work in representing the views of the short wave listeners at many US government hearings.

Sheldon Harvey's approach has been that ANARC should return to being the inter-club forum for those involved in the writing and publishing of articles, and not trying to compete with a Newsletter. However, in the process, those behind ANARC have discovered that club officials are so busy making rules and regulations they forget to listen to the radio.

Even though it looks like that there will not be an ANARC convention next year, the European DX Council has already released its first notice concerning next years conference. It will run in Barcelona between May 17 - 20, and if the brochure is anything to go by, the conference may well mark a new lease of life for the hobby aspects of short wave listening. If you want to get on the mailing list for further information drop a line to EDXC 91, Box 1275, 08080 Barcelona, Spain.

Meanwhile the Association of Pan-Asian Radio Clubs has announced a two day convention to take place in Calcutta

at the end of December this year. The organisers say that plans are being made to welcome 300 participants, although we haven't seen an agenda as to the topics that will be discussed. More details from S.M. ZAKIR HOSSAIN, AT-BHAGA, PO Dhubi Nagadi, Via-Debagram DT. Nadia, West Bengal 741137 India.

RTBF

Tuning around recently, I ran into Frans Vossen of the BRT, reading a press review. He provided an update on the future of the French language RTBF service on short wave. It seems that there is a chronic shortage of funds in the French language public radio service, and one of the options will including stopping the external service RTBF-4.

BRT, the voice of the Flemish speaking community, on the other hand seems to have expanded its output. The transmitter on 1.512MHz now runs all day with the external service, though the day-time transmissions are rather weak in the UK.

BBC Europe

BBC 648 is no more. It has now being relaunched as 'BBC for Europe', not to be confused with the separate satellite TV service called BBC Europe. Andrew Taussig is controller of BBC's European output, and says that during the 80s the BBC tried several times to present some live programmes in two or more languages at once. But in the case of BBC for Europe, the idea is to connect together the English, French and German language services in the morning and evening transmission blocks.

You may have noticed that Radio 5 carries World Service late at night and early in the morning. But it is a different 'World Service' to the programmes going out live on 648kHz. It seems there is a separate continuity booth in Bush House which puts together this 'best of' service for Radio 5. Before the change-over to winter time, a strange relay took place at 2200 on Sunday night. The programme *Newshour* started on World Service live at 2200. Radio 5 took the same programme, but delayed it by 5 minutes using a digital delay. That was fine except the time checks were then 5 minutes off, and the promise that Newshour was back at the same time on Monday was never fulfilled. The fact that World Service keeps programmes running in sync with UTC, but Radio 5 moves with British Summer Time must create some scheduling nightmares.

Swiss to Eastern Europe

The new transmission schedule from Swiss Radio International indicates that for the first time they are broadcasting to Eastern Europe between 1615-1700UTC on 11.955MHz with programmes in English, French and German, 15 minutes each. Many people speak German in countries like Czechoslovakia and Hungary, but English is less well known. The exception to this could be Romania. Maybe you recall the on-the-street interviews during the revolution in Romania in December last year.

Farewell RBI

For most of September, Radio Berlin International, the Voice of the German Democratic Republic had been announcing that it would switch off at midnight on October 2. That lead to some confusion because they actually meant 2300UTC on October 2.

On the last Sunday, the English section took the opportunity to read from listeners' letters and there was an interesting interview with Wolfram Bielenstein, head of RBI's English Service. He apologised for the reports they couldn't broadcast, including the activities of neo-Nazi groups in East Germany, and the secret police. He also tried to explain that the team in Berlin had tried to report on some of the human aspects of life behind the wall.

Certainly the RBI after the breakdown of the wall was a very different station to the broadcasts under the Communist government. I recall the voice of John Peet, a former Reuters correspondent who went across the wall the other way, and ran weekly commentaries on RBI during the 1970s. He had a similar accent to Lord Haw Haw, except that the enemy in this case was not Britain or Russia, but the wicked West Germans. Maybe one day someone will run a documentary as to where these people are now.

It was clear that the staff at RBI were disappointed and disillusioned that just as the reporting restrictions had been taken off them, they were not to be allowed to be part of a new German external service.

On Tuesday October 2, all the English language programmes signed off for good. Fifteen minutes before midnight local time approached, RBI's programmes running in French and Italian signed off, and the station broadcast a few more minutes of the well-worn interval signal.

And then 14 minutes of silence. It was broken at midnight by an interesting switch. All RBI's short wave frequencies went to a live programme being presented by Deutsche Welle (DW) in German, whilst the RBI medium wave transmitter on 1.359MHz started to carry the Deutschlandfunk service. The feeds seem to have been coming via satellite because the programmes were a fraction later than the programmes coming from DW transmitters at Julich and Wertachtal.

Next to the DW building in Cologne is the slightly smaller facility of Deutschlandfunk which broadcasts in German, plus a host of European languages. It seems that DW may well take over the foreign language services of DLF, including the English service which broadcasts nightly to the UK.

The BBC and Radio Canada International will keep their transmitters in Berlin for the time being. And the international agreement probably includes letting Radio Moscow continue broadcasting to Europe from a transmitter site in Leipzig. In fact, Radio Moscow has approached DW with an offer to help them put a better signal into Asia, while their relay station in Sri Lanka is off the air. Who would have predicted this even four years ago?

As this is my last column for 1990. Let me take this opportunity to wish you a pleasant Christmas and a prosperous 1991. No doubt there will be plenty to listen to on short wave in these changing times, and international radio provides a front row seat. □

SCANNING

Alan Gardner

Strong signals from nearby transmitters can create havoc with reception on your scanner. Alan Gardner discusses this and makes some practical suggestions to help you overcome the problem.

Several readers are experiencing problems with strong signals from f.m. broadcast stations or finding that paging transmitters interfere with reception. This has become an increasing problem over the past couple of years due to the gradual upgrading of high power BBC v.h.f. f.m. stations to mixed polarisation and the installation of a new national paging system operating at around 138MHz. The interference is not generated by the transmitter but is produced in the receiver because of the very strong signal levels which overload the amplifier and mixer stages.

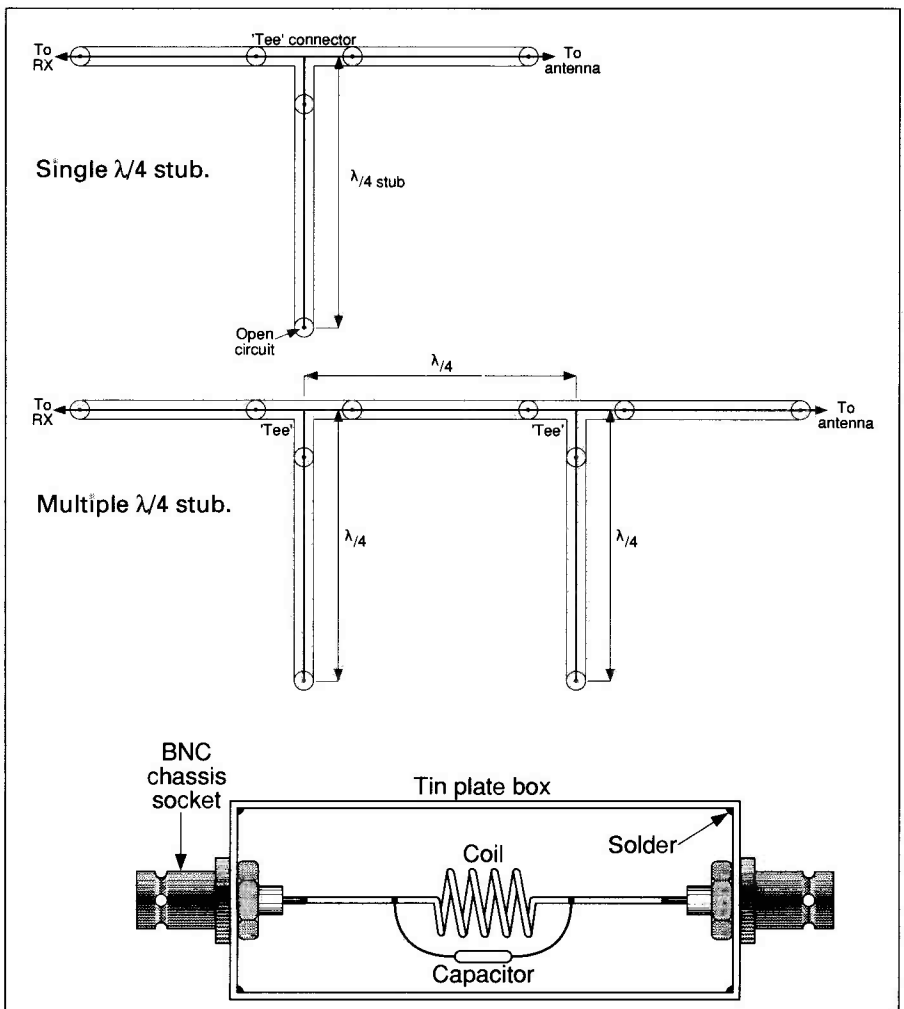
One way of curing this problem is to filter out the offending signals before they reach the receiver. This can be achieved by two different techniques. The first is to select only the wanted signals with a bandpass filter and the second is to 'notch' out the interfering signal by means of a tuned rejector circuit.

Bandpass Filters

A bandpass filter is really only suitable when a large number of interfering signals are involved and there is a large enough frequency spacing between the wanted and unwanted signals. In these circumstances a bandpass design can give a very good degree of rejection to unwanted signals. However, in order to minimise the losses involved in the construction of such a filter most of the components have to be made from materials such as brass which are then silver-plated. Size also becomes a limiting factor on the lower v.h.f. bands.

Notches

Notch filters on the other hand are much easier to construct and are more suited for use with wide frequency coverage scanners where more than one frequency band is required. Notch filters can be made in a number of ways but perhaps the easiest type to construct is one using a λ/4 wavelength stub of coaxial cable as the tuned element. This is connected across the coaxial cable feeding the receiver by means of a 'tee' connector. The stub is tuned by cutting it to the correct length so that it produces the equivalent of a frequency-conscious short circuit across the receiver input. This effectively blocks the unwanted signal but allows others to pass. Other stubs can be added to improve the rejection at the same frequency or provide extra notches at other frequencies as required.



Construction of the parallel tuned circuit notch filter.

Finding The Frequencies

The first step in solving any interference problem must be to find out what frequencies the interfering signals are actually transmitting on. This is usually fairly easy in the case of broadcast stations but it can involve a lot of detective work when no clear identification of the signal is possible. For instance, if the problem is continuous then the source could be a v.h.f. or u.h.f. point-to-point link. Alternatively, if the problem becomes worse in the late evening a local taxi rank may be the source. One tip in this situation is to just use a small telescopic antenna on the back of your scanner with the squelch control turned fully up. By doing this you should only be able to hear really local stations. Use the search facility to check a range of frequencies either side of the band effected by the interference. With a bit of luck you should be able to find the offending signal within the first few searches. If you don't keep on trying the search over increasingly wider frequency ranges until you do.

Once the offending frequency has been found the next stage is to produce a tuned quarter wave coaxial stub. The easiest way to do this is to fit a 'tee' in line with the coaxial cable feeding your receiver. The stub is attached with a suitable connector to the third connector on the 'tee' and the cable trimmed to length. Before you do this it is best to approximately calculate the length of cable required. This is obtained by dividing 300 by the required frequency in MHz. So for 90MHz we obtain the figure of 3.333. This is 90MHz expressed as a wavelength in metres. If we divide this figure by 4 we end up with a quarter wavelength, in this example 0.8333m. Because coaxial cable has dielectric insulating material separating the inner and outer conductors it is necessary to allow for the effect that this has on the speed at which the signal will travel

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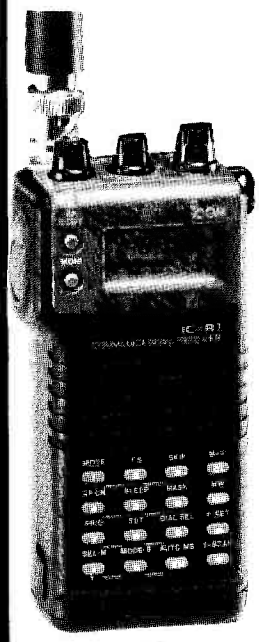

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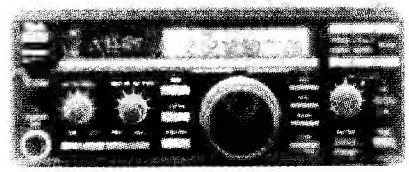

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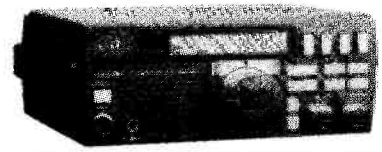

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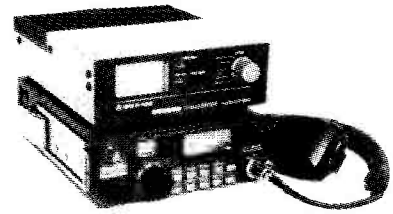

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down the cable. This figure is referred to as the velocity factor and can usually be found by referring to the manufacturers data. The value for most common types of coaxial cable tends to lie at around 0.66 so we have to multiply our figure for a quarter wavelength by this amount giving a final value of 0.55m or 550mm.

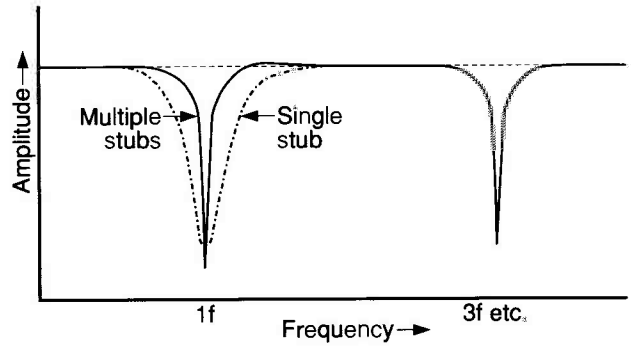
In order to fine tune the stub it is usually necessary to trim small lengths off the end of the cable. This is best achieved by tuning the receiver to a strong signal of a constant level a few MHz below the one that the stub is to be tuned to. Start with the stub a few tens of millimetres longer than the calculated value in order to allow for slight variations in the construction of the cable. Carefully snip off about 10mm at a time from the end of the cable until you start to notice a reduction in the received signal level. Once this starts to happen continue to cut sections off until the signal level reaches a minimum. You will know when you have just gone through this point because the signal level will start to rise again. This is why I suggested tuning to a frequency lower than that which was actually required. If we now tune to the required frequency we get a second chance to get the length right. This time just trim off a few mm at a time until the correct length is obtained. You may have try a few times before you get the best results but you can use any previously cut lengths of cable as a guide during any subsequent attempts.

This type of filter can produce a very high rejection notch. If you want to achieve an even greater degree of rejection, or need to provide a much sharper response in order to cope with a narrower separation between wanted and unwanted frequencies then you can add additional stubs in the same way. Use another 'tee' connector with a quarter wavelength of cable between it and the previous 'tee' in order to sharpen the notch.

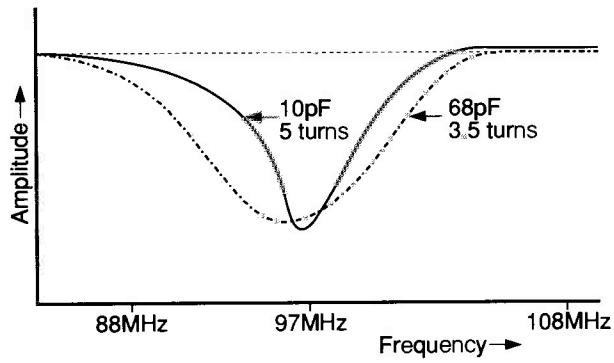
One disadvantage of quarter wavelength stubs is that they also produce rejection notches at odd multiples of the resonant frequency. So in the example I just worked through the filter would also notch out 3 x 90MHz (180MHz), 5 x 90MHz (450MHz), etc. Although this may not be a disadvantage if you are only interested in the airbands for example it can be a nuisance if you monitor a wide range of frequencies.

Parallel Tuned Circuits

An alternative type of filter that can be used is a simple parallel tuned circuit. This is not used to provide a short circuit at the interfering frequency as is the case with the tuned stub, but is connected in series with the signal path and appears as a high impedance



Graph showing the performance of bandpass filters.



Graph showing the performance of a notch filter.

effectively blocking the unwanted signal. This type of filter will not give as sharp a notch as a tuned stub but with a good choice of components and the correct type of construction it will only operate at one frequency. The component values are given by the standard formula $Fr = 1/\{2\pi\sqrt{(LC)}\}$. For the circuit to be effective a reasonable choice of component values has to be made. Too small a value of capacitor will result in a very sharp notch and too large a value will produce a very broad one.

At my location I have problems with interference from the BBC national radio services operating in the band 88-100MHz. After some experimentation I produced a effective notch filter consisting of 3.5 turns of 22s.w.g. wire originally wound on a 5mm former in parallel with a small 68pF ceramic plate capacitor. The components were mounted in free space between the centre pins of two BNC connectors. These were soldered to opposite ends of a small square section tube I had constructed by bending a small length of tin-plate. The filter was tuned by expanding or compressing the coil in order to give maximum rejection at 97MHz. With the component values I have given the filter has sufficient bandwidth to give good rejection to other signals in the broadcast band without affecting the receive performance in the adjoining bands. If you only have problems with one service then you can try 5 turns of wire and 10pF, which will give a narrower but deeper notch. A little experimentation may be called for at other frequencies but if your listening is spoilt by interference then the effort may prove worthwhile.

If you have any questions you would like to ask, or any tips to pass on, do please drop me a line at PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - Good Listening. □

Abbreviations	
BNC	type of coaxial connector
f.m.	frequency modulation
m	metre
mm	millimetre
MHz	megahertz
pF	picofarad
s.w.g.	standard wire gauge
u.h.f.	ultra high frequency
v.h.f.	very high frequency
π	pi (Greek symbol)
√	square root

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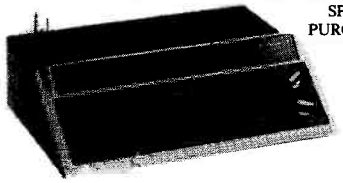

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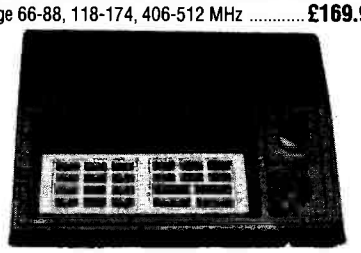

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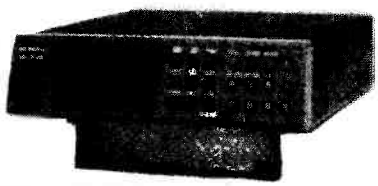

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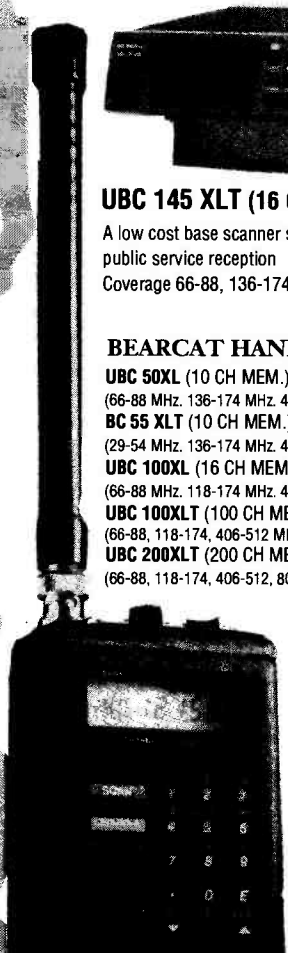

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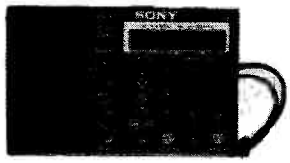

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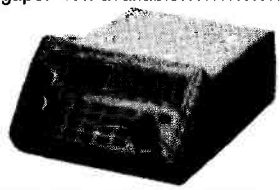

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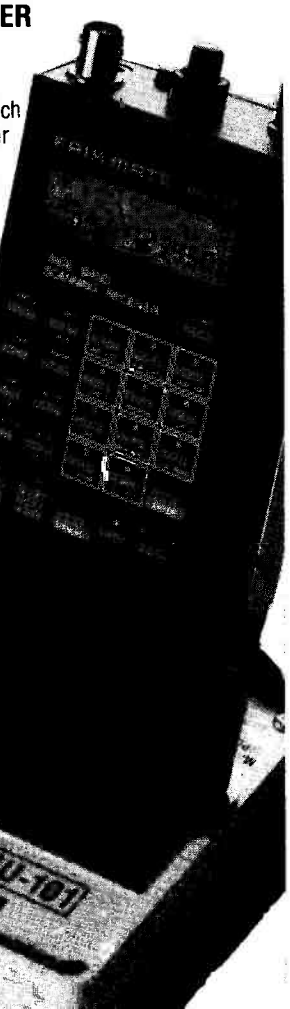

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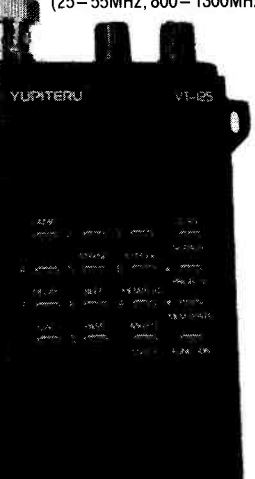
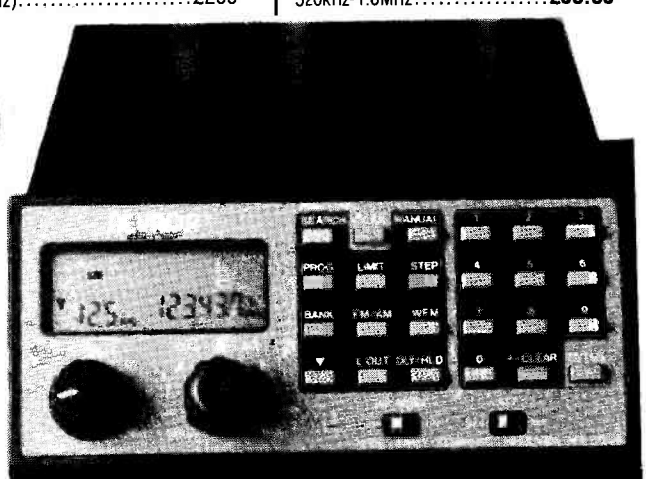




NEW NEVADA MS 1000 BASE/MOBILE SCANNER

A LISTENER'S ATU

Paul Essery GW3KFE

This circuit has been designed to work with an end-fed wire and earth and to cost next to nothing. I'll show you how to set it up, without test gear, to cover a band of frequencies.

Incidentally, notice I said 'end-fed wire' - not long wire. In fact, a long wire is a specific type of antenna - a wire which is long at the frequency in question. Thus, if we have a 22m top, end-fed, it is not a long wire on Top Band, nor on 3.5MHz. On 7MHz, it is a half-wave wire, while on 14, 21 and 28MHz it is correctly described as a long wire. If your own specimen is one of the 'I strung up some wire until it ran out' variety, you are probably safer to call it an 'end-fed random wire'. Each of these needs to be operated against a good earth. So, once you have an a.t.u. and the antenna as high as possible, any further effort must be expended upon improvements in the ground connections. The still popular idea of driving a ground stake into the ground and saying 'I now have a good earth' is a load of old codswallop.

I digress. First let's consider what bands the a.t.u. will work on and make a note of these. In general, the more bands, the more complex it will be, so there's some justification in a single-band job as a first attempt. Let's try the 14MHz amateur band first, although you may, of course, pick any band you fancy.

Needs

First, we need a coil former and some wire. For a coil former, you could do worse than go to your local chemist shop and chat to the pharmacist. He gets many of his supplies of pills and things in nice round plastics boxes with screw or snap-on lids. Be sure to explain what you want them for and he'll no doubt be pleased to drown you in a sea of them in assorted sizes! Alternatively, you can use a toilet roll core, stiffened with masking tape. For the wire, find an old valved radio with a transformer and choke that you can strip down. This should also be the source of a variable capacitor. If the set is a medium and long wave one, the capacitor will be a two-gang 360pF or even a two-gang 500pF. For a 'listening only' a.t.u. you could get away with one out of an old transistor radio.

So, you have wire, coil former and a variable capacitor. You now need another variable capacitor, again from an old radio. This one should ideally be one of the old three-gang 500pF, but a two-gang 360 or 500pF will do. What you still need is a box, a band switch, plus a coaxial connector and something for the antenna and earth connections. A piece of 'chocolate-block connector' will serve nicely. Remember, when cutting them up, you must cut off a pair if you want a fixing hole in between!

The current trend is for everything in the shack to be bought - which is a bit hard on those who can't afford some of the prices being asked!

Circuit

For the single-band a.t.u., look at **Fig. 1**. It's a parallel tuned circuit. Onto the coil we'll tap both the antenna and the receiver connection through the larger of the two variable capacitors.

R & D

Research and Development! Now to wind the coil and be sure it 'hits the band'. Take the coil former and using a hot needle make two small holes 6mm apart and about 12mm or so up from the bottom, then another two a similar distance down from the top. Don't lose the lid. Make things look pretty by lining up the holes. Feed the wire in and out of the bottom pair of holes, wind on about eight turns of wire and feed the end through the top pair of holes so as to lock the wire into place. Cut the wire off to leave a reasonably long 'tail' at each end.

Now take the smaller of the two variable capacitors. The frame and shaft are connected to the moving vanes while the fixed plates are the insulated ones solder tag connected to the fixed vanes. For 14MHz, you only need to use one gang, so use the gang furthest away from the spindle. Now, if you have a test-meter put it on the high ohms range and connect it across this gang's fixed vane terminal and somewhere on the frame. Twiddle the capacitor across its range and check for 'no shorts' anywhere. While you're at it, repeat this test on the other gang, and you might as well check the other capacitors as well. If you find a short, you can usually remedy the defect with a bit of judicious bending.

Once that is cleared, have a look at the antenna connection to the receiver. If it has a separate antenna terminal your luck's in - if not you'll need to make up some way of getting a firm connection to the inner of the coaxial connector. The usual ploy is to jam the wire down the centre hole with a couple of dead matches! The braid can be held under a screw on the chassis nearby.

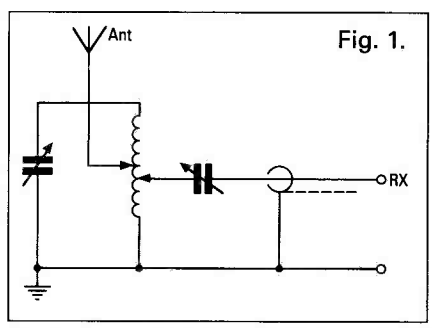


Fig. 1.

Now, wire the variable capacitor between the two ends of the coil, connect the frame of the capacitor to the receiver chassis and the other side to your existing antenna wire. Try to get the lead to the receiver antenna connection as short as you reasonably can. Wait until the band is full of signals and tune the capacitor slowly across the band. With any luck, at some point, you will notice that the 14MHz signals drop markedly in strength as you tune the capacitor. Of course, if you have a grid dip oscillator, you can set it to 14MHz, poke it into your coil and tune the capacitor for a dip on the g.d.o. If there isn't a dip in signal strength on the g.d.o. or the received signals, take one turn off the coil and try again. Once you have, as it were, found the band, take a look at the setting of the capacitor. Roughly you want to the capacitance to be about 30pF for the 14MHz band and 75pF for the 49m band. If it looks somewhere near, fair enough. If you have the gang almost or completely out, take a turn off the coil - if all the vanes are meshed, add a turn or two to the coil.

Now we can make our first attempt at assembling. Don't bother with a chassis. You have already wired the tuning capacitor across the coil, so connect the station earth to the frame of the capacitor. Connect the antenna to the point where the fixed vanes of the capacitor join the coil top end. Sit the lot on a newspaper on the window ledge. Now take a bit of coaxial cable long enough to reach from the receiver's antenna and earth terminal to the embryo a.t.u. One end can have the pvc outer striped off for about 50mm (don't break the braid strands if you can help it). If you now push the braid back towards where the pvc starts, it gets fatter. Bend the inner over at 180° near the pvc and you should now be able, with the help of a pin, to tease aside the braid at this point, such that you can hook your pin under the end of the inner and fish it, in its insulation, through the braid. Thus your piece of coaxial cable has two 'tails', one of braid, one of inner. If your receiver has antenna and earth terminals, repeat the treatment at this end of the coaxial cable. If your receiver has a coaxial connector only then this end of the coaxial cable is fitted with the appropriate connector, usually a PL259. Solder it as necessary.

Connect the braid to the frame of the tuning capacitor and connect the earth lead. The inner of this coaxial cable can go to the frame of the other ('loading') capacitor. Connect the fixed plates together with a short wire link and solder a wire from this to the coil. Initially, try

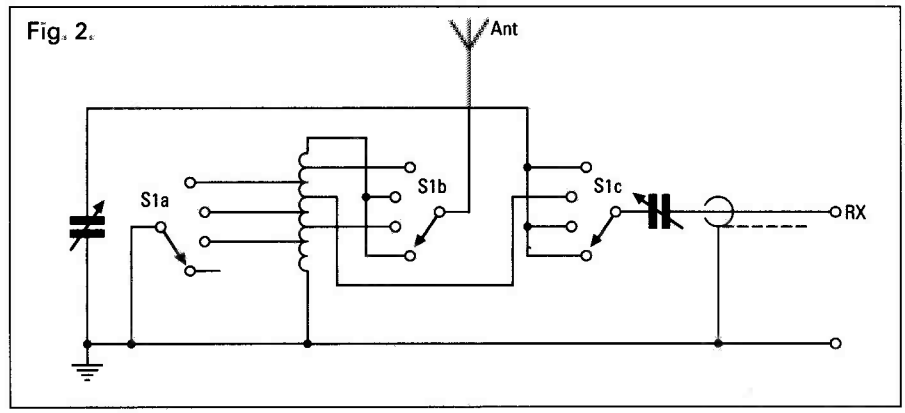


Fig. 2.

connecting it to the same place as the antenna.

Tune up the receiver, minus antenna, for a peak in the 'sharsh' at mid-band, around 14.175MHz. Incidentally, if you can hear the peak in the 'sharsh' your receiver is not deaf. Connect the receiver to the coaxial lead. Now tune the loading capacitor. At each adjustment swing the tuning capacitor across the range, looking for a peak in signals, or, if the band is dead, a peak in the 'sharsh' coming from the speaker.

Don't tweak the receiver control settings at this stage, and stay close to the chosen frequency. It will be found that the two capacitors interact a little with each other and that the 'best' setting feels too sharp on one or other of the capacitors. Then you can try connecting the loading capacitor to a point part-way down the coil. You can also try this with the antenna connection. In general use you will find that as you swing up and down the band there is no need to move the loading capacitor at all, just peak the tuning at the new frequency. When you have the 'best' setting, that's it! You can probably go 50kHz or more without felling any need to tweak the a.t.u. tuning. While this is the case with a low impedance antenna, you will find the half-wave end fed, which has a high impedance, will be keener for you to peak the 'load' control, and relatively flat on the 'tune' knob. Note the best settings for a.t.u. in the log, so you can come straight back to them. Even on 28MHz you should sense no requirement for slow-motion drives. If you do then you aren't quite right with the adjustments given above.

Construction

Many a single-band a.t.u. of mine has remained in this state for months, happily serving its turn every evening. Eventually, the newspaper goes a nasty shade of yellow in the sun. However, it can be put into a box if you like and a wooden one is maybe easiest for a first trial. You can use a couple of segments of the chocolate-block connector to connect antenna and earth, a second pair of segments doing duty to connect the inner and the braid of the coaxial cable into circuit. Wire it back up exactly as before and check that it still works. At the bottom limit you can stick everything down to a piece of plywood with epoxy resin.

For the multi-band version you need to get hold of a 3-pole wafer switch from somewhere, with as many ways as bands, plus one. Constructionally, you might try a metal case this time.

The circuit is shown in **Fig. 2**. Experience dictates that usually it is best to make one to cover the lower bands, say Top Band to 10MHz for one and 14-30MHz for the other. If you look at the circuit, it is exactly the same except for the addition of the band-switching. If you have a switch with enough ways (3-pole 10-way) you can try to make it cover 1.8-30MHz, but you will often find that, one way or another, a stray resonance appears in that section of the coil that is nominally out of circuit.

Some people will say you shouldn't short out the unwanted turns, but instead leave them open circuit for fear of unwanted resonances. Personally, I've hit trouble with both methods at times when I've tried to cover 1.8-30MHz in one unit.

If you used a pill box for the coil former, you can fix its lid to the back of the panel with a single screw and then jam the box onto the lid. For a toilet paper core, what about a bath-plug screwed to the back of the panel and the former jammed onto that? The tuning capacitor can be fixed to a little L-shaped bracket and the assembly then mounted to the front panel with the shaft sticking through a clearance hole in the panel, or you may be able to mount it directly to the front panel by the fixing bush and screw. The loading capacitor is a bit more complex. I made a little L-bracket as before, and then a piece of plastics on the bracket and the capacitor on top of the plastics.

Now for the pre-testing. Before assembly, you must get the coil and tuning capacitor to 'hit' each band. Start with the lowest band, as already described. Now go to the next lowest band. Equip yourself with a short lead with a crocodile clip at each end, use this to short out turns from the earth end of the coil and check for resonance on this band. Note the number of turns shorted. Repeat for each band, working always from lowest to highest bands. Note carefully how many turns you have shorted out for each band.

When this is complete, proceed to assemble it. Jam the coil on to the pillbox lid, fit the capacitors and switch. Check with the test meter, on ohms, that the frame of the tuning capacitor is earthing to the panel and that both the frame of the loading capacitor and its fixed vanes are not shorting to the panel.

For the first trial, wire the antenna and the loading capacitor to the top of the coil, as we did with the one-band version. Wire the taps from earth onto the coil, in accordance with the list you prepared in the previous paragraph. Now try it on each band. You may find it worthwhile to tap the antenna lower down the coil. This is done by wiring the antenna terminal to the rotor of the switch and then from the tap on the coil back to the appropriate stator tag. The same goes for the lead to the loading capacitor - wire it to the rotor tag and the stator tag to the coil.

Since you are tapping the coil up from earth by progressively shorting out turns, the earthy end of the coil is, for our purposes, the top of the section we have shorted out. Therefore, don't try putting your antenna tap, for example lower than this. Not much joy comes from the centre of a shorted chunk of coil!

To make all this adjusting of taps more easy, there are a couple of things one can do. At the last position of the switch, you can fit a short lead terminated in a crocodile clip to the rotor of each wafer. These are used while prodding around to optimise a particular band; when set, all you do is to hard wire to the same places from the appropriate coil tags. If you tie the croc-clips back, you can leave them there for a future exercise!

If you are winding your coil with thin enamelled wire, it is worth while to twist a little loop of wire at each turn as you wind the coil, so that you have a point on each turn to which you can make connections. The enamel may need scraping off before soldering, but much of the transformer wire nowadays is of the type where the enamel dissolves and the solder 'tins' the wire, just by the action of the hot soldering iron. □

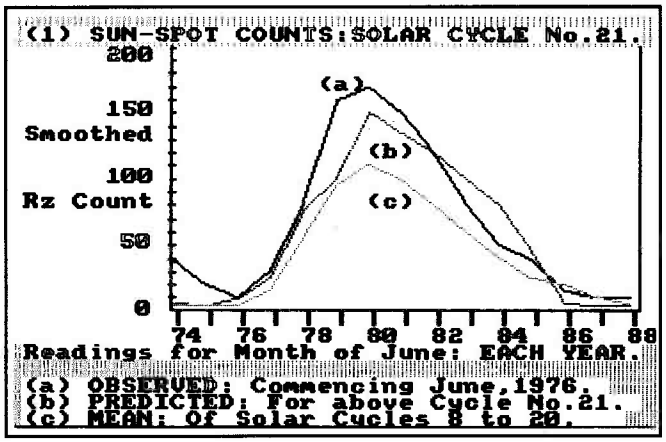
Conclusions

My Mark One version was built some thirty plus years ago. Mark 'Umpty' still serves my end-fed wires in 1990. Essentially it is the same box of components, but the switch has been rearranged to allow me to bring two coaxial-fed antennas into the station and it also now contains a dummy load for when I transmit. It has had a new case and two new front panels over the years - a bit like Grandpa's axe, I suppose!

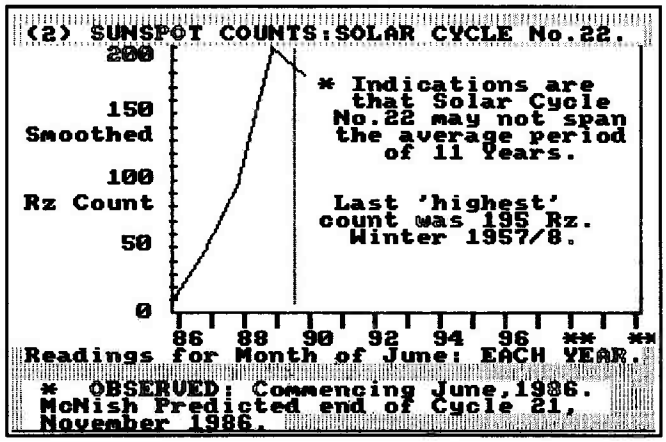
HF RADIO WAVE PROPAGATION

F. C. Judd G2BCX Part 4

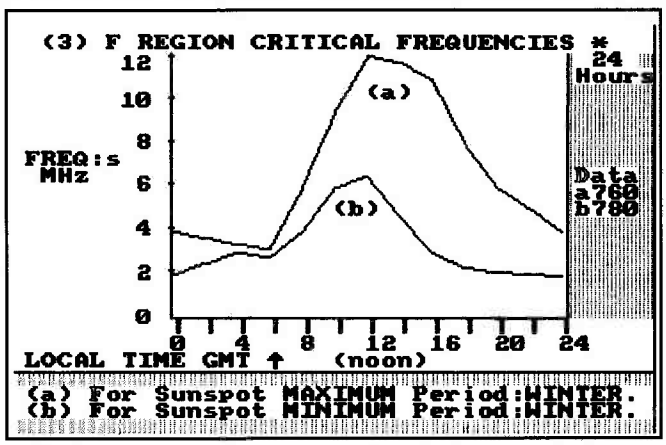
The size and number of sun spots and accordingly the amount of radiation they produce, has a great influence on the behaviour of all the ionospheric regions. There are records of sun spot activity, confirmed by carbon 14 dating, for as early as 300AD. Modern records are obtained by direct observation. Solar cycles can be longer, or shorter, than the average 11 years.



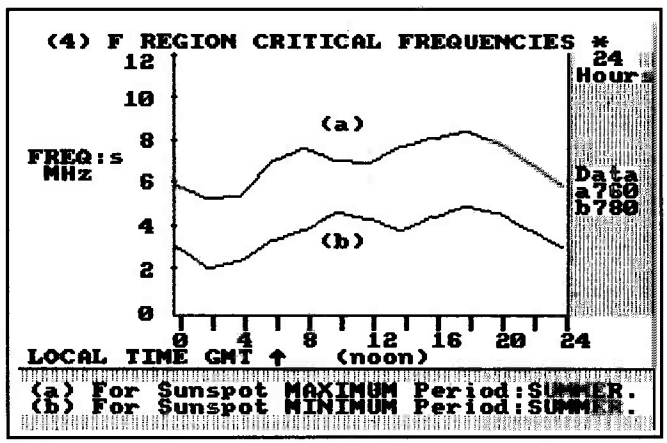
(1) This solar cycle ran for more or less the average 11 years. Curve (a) shows the smoothed (Rz) sunspot numbers for the whole cycle the highest being approximately 170. During the period of 'maximum' (years 78/81) DX conditions were good, especially at the higher frequencies e.g. 21 and 28MHz. During 'summer periods' for the years 84, 85 and 86 there was considerable Sporadic-E activity (see (6)).



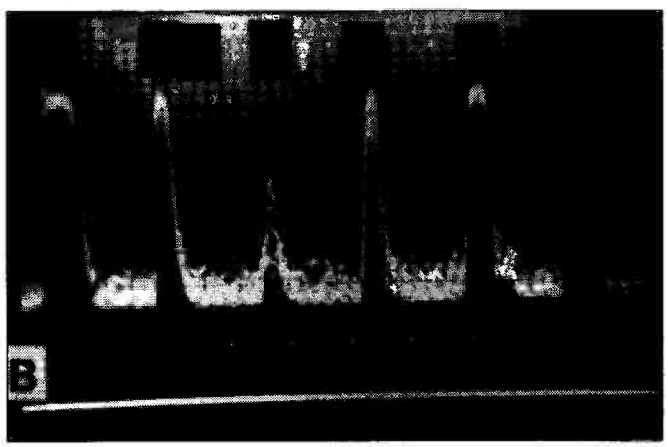
(2) This graph shows the sunspot counts since the end of Solar Cycle No. 21 and up to November 1989. The peak during '89 reached almost 200, the h.f. bands DX yield for the period being extremely good. However, the count falls directly after the peak which suggests that Cycle 22 may be shorter than 11 years.



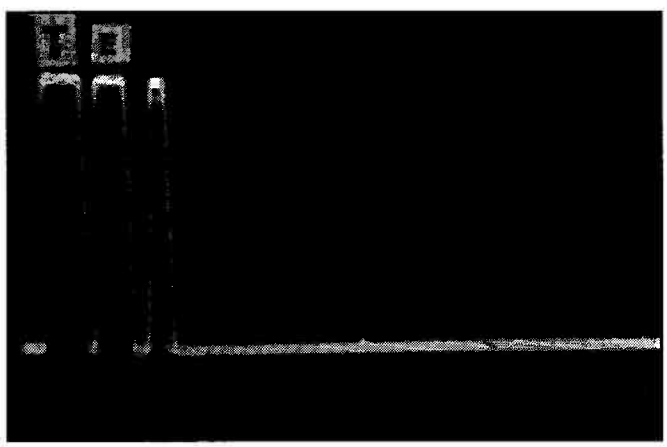
(3) The F region 'critical frequency', explained in Section 1(5), depends on the time of day, or nights, the seasonal period (i.e. winter or summer) and the maximum or minimum of sunspot activity. The critical frequency is always highest during the **winter** and with sunspot **maximum** activity.



(4) The 'Auroral Curtains' that form at the extremes of the Northern and Southern hemispheres can become ionised in the same way as an ionospheric region and can, therefore, reflect radio waves at both h.f. and v.h.f. An actual v.h.f. path is shown here which allowed a two-way radio contact to be carried out between central England (G) and Holland (PA).



(5) Photo from c.r.t. display showing (extreme left) TX pulse, followed by multiple echoes from the F region. Echo 1F indicates a region virtual height approximately 280km. The pulse producing the secondary echo 2F has travelled to the region and back to earth twice i.e. 2 x 280km. The total distance travelled by a pulse to produce 3F, 4F and 5F is approximately 3, 4 and 5 times the virtual height respectively. Echo 5F shows magneto-ionic splitting due to the earth's magnetic field. The Line at B shows the calibration marker intervals, 1ms.



(6) Photo from c.r.t. display showing Sporadic-E (Es) reflections using the pulse transmission technique. Extreme left, TX pulse. First reflection, 1E, from virtual height of Es cloud at 100km. Second reflection 2E produced by transmitted pulse having made the journey to the Es cloud and back to earth twice.

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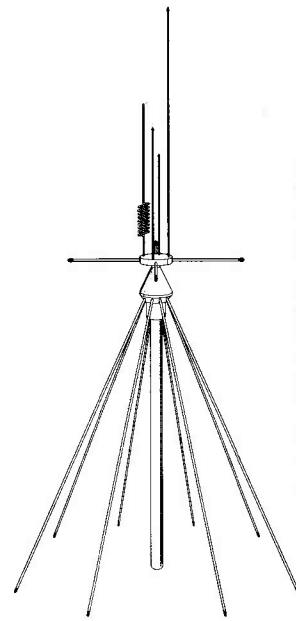

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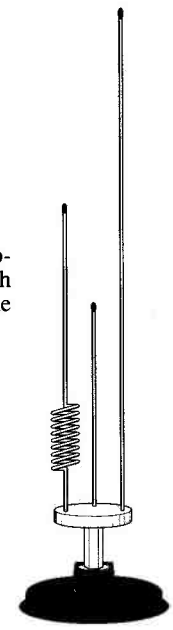

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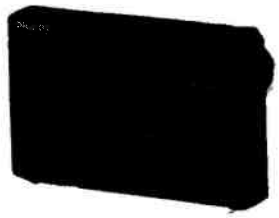

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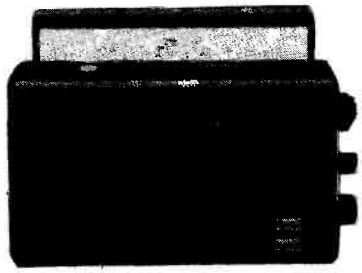

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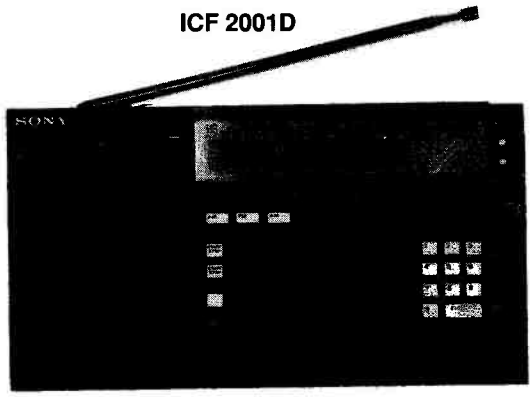

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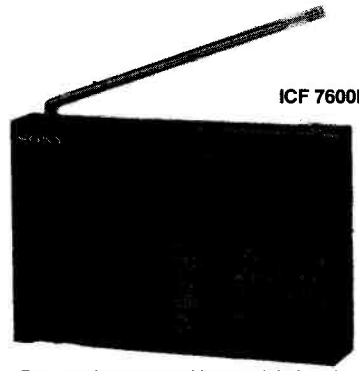

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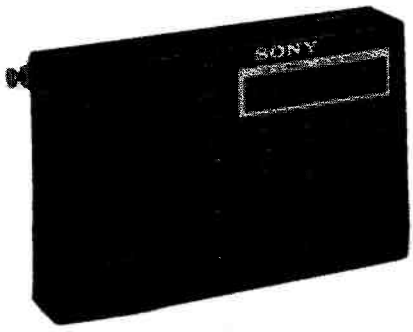

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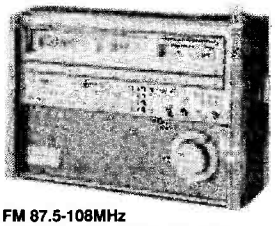

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AMATEUR RADIO SATELLITES

Arthur C. Gee G2UK

Part 3

Having so far described the theoretical background to satellites, we can now turn to the practical side of 'How do we listen to them'?

Having made up your 'Oscalator', you see that the map is calibrated from 0° - which is south at the bottom - round in a clock-wise direction, through west to 180° - which is north - through east at 270° and back to south at 0°. There is also a small 'overlay' which is centred on London, calibrated from north - 0° - through east which is 90° to 180°, south, and back through west, 270° to north. There are circles inscribed on this overlay which give the range of an average ground station working into the particular satellite the cursor is intended for. This overlay also indicates the beam heading to use for accessing the satellite.

Now, say we want to find out when the UoSAT satellites can be heard. I'm going to use an extinct satellite for demonstration purposes, OSCAR 9. It was last heard by ZS6CCD around 1200 on Friday 13 October 1989 (see note 1).

Look up in the Orbital Prediction Calendar the entry for OSCAR 9, which is the number given for UoSAT 1 in the OSCAR satellite series. A reproduction of the page referring to this satellite is shown here. The first column of figures refers to OSCAR 9 for 20 April 1988. The figures 05:55:45; 10:37:55; and 18:28:12 refer to times (UTC) during the day when the satellite passes over the equator at the longitude indicated by the corresponding figures, i.e. 155°, 225° and 343° respectively. With our Oscalator, we can find an orbit to cover the reading of 155°, we see that the orbit just comes within range of the British Isles. The cursor has a time scale on it reading from 0 to 48 minutes. We turn the cursor so that the 0° mark on it is over the 155° mark on the map. From the small overlay we see when the satellite will come within our range. Where the cursor scale crosses the circumference of the overlay, will give us the time the satellite takes to travel from the time it crosses the equator, the EQX as it is called, to coming within range of our location. In the example given it is 29 minutes. We add this to the time (UTC) given in our tables which is 05 hours 55 minutes, we can ignore the seconds, giving us 06 hours 24 minutes. So if we listen around then we should hear the satellite coming within our range about that time. The satellite will be approaching from northwards towards the south. If we had a 144MHz band beam antenna our Oscalator gives us the additional information that we should point it in a north-easterly (about 030°) direction to receive the satellite's signals. It will also tell is that the orbit will last for about 10 minutes.

But, 0624 is not a very 'socially acceptable' time to start our satellite reception experience! Around half past six in the evening, however, is a much more acceptable time. The EQX for an orbit at this time is 343°. If we swing the cursor around to cover this figure we see that the orbit for this time does in fact pass right over the British Isles, a much more convenient orbit. Adding 9 minutes for the time taken for the satellite to cross the equator and reach the point at which it comes within range, gives us 18 hours 24 minutes - a much more convenient time and a far better orbit too. In this case, UoSAT 1 (OSCAR 9) is coming up from the south.

Two further points to notice. The orbit time of UoSAT 1 is approximately 93 minutes. This is known as its 'period'. Every satellite has its own 'period' and this time can be used to calculate orbit times for passes which are not shown in the Orbital Calendar Tables. Similarly, each orbit moves to the west of the previous one by a certain amount, due to the rotation of the earth. In the case of UoSAT 1 this is 23°. Again, this can be used to calculate EQX not shown in the Tables. It is not economic to give every orbit's data when producing the Tables, so 'reference orbits' are given for three orbits in the Tables we are using, spaced over the day so that in-between orbits can be easily calculated.

The second point to note is that our Oscalators are rather 'crude' instruments. They are, after all, constructed of readily-available materials and 'home-made', so we cannot expect them to be as accurate as ones made to

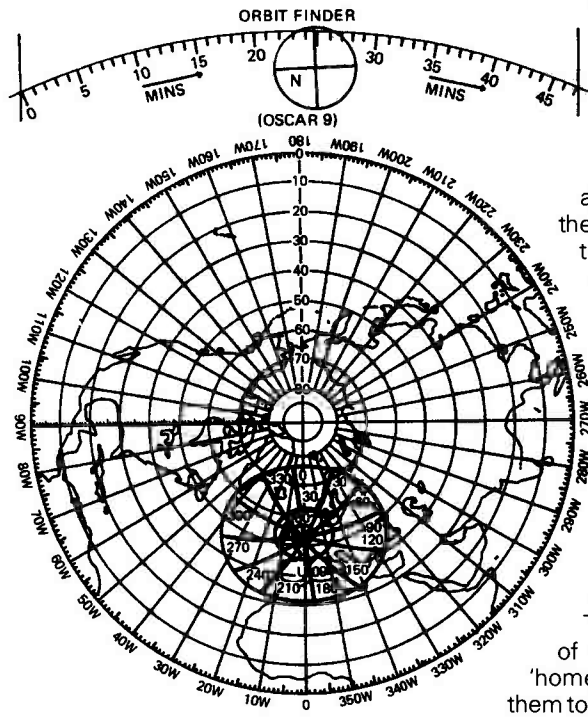

Fig. 3.1: The AMSAT-UK Oscalator. An impression of the map showing the longitudinal graduations, small overlay, etc. The markings on the cursor are shown above.

OSCAR9 20-04-88		OSCAR11 20-04-88		OSCAR12 20-04-88		RS10 20-04-88	
05:55:45	155 ›	07:07:46	140 ›	00:12:52	53 ›	07:42:44	134 ›
10:37:55	225 ‹	12:03:22	214 ‹	05:59:49	140 ›	12:57:48	213 ‹
18:28:12	343 ‹	18:37:31	312 ‹	21:25:03	14 ›	18:12:52	292 ‹
OSCAR9 21-04-88		**OSCAR11 21-04-88**		**OSCAR12 21-04-88**		**RS10 21-04-88**	
07:00:39	171 ›	07:45:49	149 ›	01:16:21	73 ›	08:13:03	143 ›
16:24:59	312 ‹	12:41:26	223 ‹	07:03:19	160 ›	13:28:08	222 ‹
19:33:05	359 ‹	19:15:34	322 ‹	22:28:32	34 ›	18:43:12	302 ‹
OSCAR9 22-04-88		**OSCAR11 22-04-88**		**OSCAR12 22-04-88**		**RS10 22-04-88**	
06:31:28	164 ›	00:11:11	36 ›	00:24:12	64 ›	08:43:23	153 ›
17:29:51	328 ‹	11:40:56	208 ‹	06:11:09	151 ›	13:58:27	232 ‹
20:37:58	15 ›	18:15:05	307 ‹	19:40:43	356 ‹	19:13:32	311 ‹
OSCAR9 23-04-88		**OSCAR11 23-04-88**		**OSCAR12 23-04-88**		**RS10 23-04-88**	
06:02:18	156 ›	07:23:23	144 ›	01:27:41	84 ›	07:28:41	136 ›
10:44:27	227 ‹	12:19:00	218 ‹	07:14:38	171 ›	12:43:46	215 ‹
18:34:44	345 ‹	17:14:36	292 ‹	22:39:52	45 ›	17:58:50	294 ‹
OSCAR9 24-04-88		**OSCAR11 24-04-88**		**OSCAR12 24-04-88**		**RS10 24-04-88**	
07:07:10	173 ›	08:01:26	153 ›	00:35:31	74 ›	07:59:01	145 ›
16:31:29	314 ‹	12:57:03	227 ‹	06:22:29	162 ›	13:14:05	224 ‹
19:39:36	1 ›	19:31:12	326 ‹	21:47:42	36 ›	18:29:10	303 ‹
OSCAR9 25-04-88		**OSCAR11 25-04-88**		**OSCAR12 25-04-88**		**RS10 25-04-88**	
06:37:58	165 ›	08:39:29	163 ›	01:39:00	95 ›	08:29:21	154 ›
17:36:21	330 ‹	13:35:06	237 ‹	07:25:58	182 ‹	13:44:25	233 ‹
20:44:27	17 ›	20:09:15	335 ‹	20:55:32	27 ›	18:59:29	313 ‹

Fig. 3.2: Reproduction of a page from a past copy of the Orbital Predictions Calendar referred to in the text.

AMATEUR RADIO SATELLITES

scientific instrument principles. I mention this because we are often phoned up by folk new to the game, saying the predictions are 'not accurate'. By which they mean that the results from the Oscalator are 'seconds' out from those calculated by other prediction methods using a computer. The Oscalator is, however, quite accurate enough for all practical purposes.

Apart from the limitations of our Oscalator, there are other factors which affect the accuracy of the predictions. The sensitivity of your receiver - and your ears! The height of your antenna and your location, atmospheric and ionospheric conditions as well as the distance of your location from the location the reference orbits were calculated for.

Complicated Orbits

We have so far dealt with predicting the position of a satellite in a circular orbit in space. This is the simplest type and is the one the beginner should 'cut his teeth on'. Once you have got the hang of things as indicated previously, you can try some of the satellites in a more complicated orbit such as for instance OSCAR 13. The circular orbit had the disadvantage that the period is relatively short, giving a very short time when the satellite is in 'radio sight' of any station on the ground. Another type of orbit used for amateur radio satellites is known as the Molniya-type orbit. This is an elliptical orbit and is shown in Fig. 2.1 in Part 2 of this series. It goes right out into space - some thirty or more thousand kilometres from the earth and thus gives a very much longer period of time in 'radio-sight' of a ground station.

Endless Possibilities

These articles have, of necessity, had to deal with only the basics of satellite reception and I trust they will have given enough information to indicate that amateur radio satellite activity is not nearly so expensive or complicated as its often thought to be. Once you have made a start you will find it quite as interesting as any other sort of short wave listening with endless possibilities to go on developing as ones knowledge increases. Like most other aspects of amateur radio, particularly specialised ones, association with others interested in the subject is a great help. AMSAT-UK exists to help those interested in satellites and if you decide to follow this interest, you will find membership of AMSAT-UK invaluable. Literature, Oscalators, Prediction Calendar Tables, technical information and manuals, information nets on the air, a bi-monthly journal and much more of help to the satellite enthusiasts is available to members from AMSAT-UK HQ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Note 1: Since its launch, OSCAR 9 made over 45 000 orbits during its life of eight years. Apart from a bit of a hitch just after launch, which was eventually overcome, it functioned perfectly throughout its eight years in space, during which time many school children, radio amateurs and space enthusists heard its digitalker and recorded its telementry data. Inspite of its loss, UoSAT 2 and numerous other satellites are still carrying out similar activities waiting to be heard by the space orientated s.w.l. □

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Ron Ham

There are many radio enthusiasts who would like to add equipment for long-distance television reception to their stations, but are unable to devote shack and antenna space to costly receivers that will only be used when the atmosphere is disturbed. I can understand this. My own DXTV receivers, fed by a chimney mounted dipole, are only used for about ten minutes each day while I check conditions and possibly half an hour if there is an opening or when I take a set out in the car.

One alternative is to purchase a multi-band, 625-line, monochrome portable which will serve as a monitor for the various television channels, without spending a large sum of money. The u.h.f. band on such a set means that it can be used as a normal second receiver in the home or office as well as being available for v.h.f. DXing when required.

It's a long time since *SWM* did a review on DXTV equipment, so we thought we would change that situation with a double review!

The VHF/UHF Receiver

Although portables with the two v.h.f. bands included in their tuners do sometimes appear in the large stores, they are more likely to be stocked by a specialist dealer, like Aerial Techniques in Poole. They stock sets with the DXer and the international traveller in mind. The additional bands, often referred to as 'low' and 'high' v.h.f., are more commonly known as Bands I and III and the associated dials are usually marked with the channel numbers, 2-4 (47-68MHz) and 5-12 (175-230MHz) respectively, **Fig. 1.**

The TVC-8M

Last January I purchased a YOKO TVC-8M, **Figs. 1**, **2** and **3** (right), mainly because of a switch, fitted on the rear, that enables the user to select between negative and positive vision modulation. In other words, I wanted to see pictures on the French System 'L' the right way round. Furthermore, I liked its compact style, built-in long, medium and v.h.f. radio, the red glow from the 24hr digital alarm clock situated below the tuning dial and its physical dimensions of approximately 150 x 160 x 190mm deep. Other cabinet features are the finger grip at the top, the tilting-bar underneath and a PP3-type battery compartment (clock back-up) on the back. The brightness, contrast and horizontal-hold controls, which require little adjustment once set, protrude through the rear panel.

To my mind the front panel layout is convenient and attractive. It has the selectors for RADIO/TV, HI/LO VHF TV, VHF/UHF TV and the ON/OFF switch on the right and the six setting-buttons for the clock, in line, on the left just below the tube. Everything is clearly marked including the edge-type volume, tuning knobs and the wave-change switch for the radio. These are all positioned on the right-hand side of the cabinet, **Fig. 2.** The 500mm telescopic rod folds down to about 110mm and is secured by a clip just above the dial. There is a miniature 'jack' socket, with an adapter supplied, to take a standard coaxial plug fitted on the back for connection to an external antenna.

Although the set's performance with the rod antenna is generally good on 'local' stations and some 'DX' when the signals are strong enough, it is more satisfactory to use an outside antenna. For instance, v.h.f. operators could use their 70, 144 and 430MHz beams for Bands I, III and V respectively, especially as we are considering this set for use when an opening is in progress.

Beyond The Range

The vertical calibrated area for the radio and TV bands on the TVC-8M is 65mm, **Fig. 1**, but the scale for Band I (hard left) is only about 15mm, thus leaving some 50mm unmarked. Although the set seemed lively in this area, I had to wait for the right opening to see if mine would tune higher than the Ch. E4 (62.25MHz) indicated on the dial. Fortunately, during one intense Sporadic-E, I found strong signals from the USSR on Ch. R2 (59.25MHz), so I immediately tuned into the 'blank' area and received pictures on Chs. R3 (77.25MHz) and R4 (85.25MHz) around 33 and 50mm respectively from the top. This is a DXer's bonus but, please remember, the manufacturers do not say this is possible and because production batches may vary, this cannot be accepted as a feature.

The BW-450

Another mini-receiver from Yoko, with a pleasing look and a 4.5in screen, is the BW-450 Walk Vision, **Figs. 1**, **2** and **3** (left), which can be powered by ten 1.5V 'C' cells fitted under the top cover. These cells are not supplied with the set, but are a popular size and easily available. However, a specifically designed a.c. mains power unit plus a lead for use in a car are included in the package and no other types can be used. It is important that the instructions about battery polarity are checked before using either of these sets in a motor-vehicle. Most user needs have been catered for, a carrying strap on the left side, **Fig. 3**, a tilting-bar underneath, the main edge-type controls, tuning and volume/on/off on the right side, **Fig. 2** and the brightness, contrast and vertical-hold pre-sets are on the rear. The 370mm telescopic rod antenna folds away neatly inside the cabinet and, like the TVC-8M, a 'jack' socket and a coaxial plug adapter are provided for an external antenna.

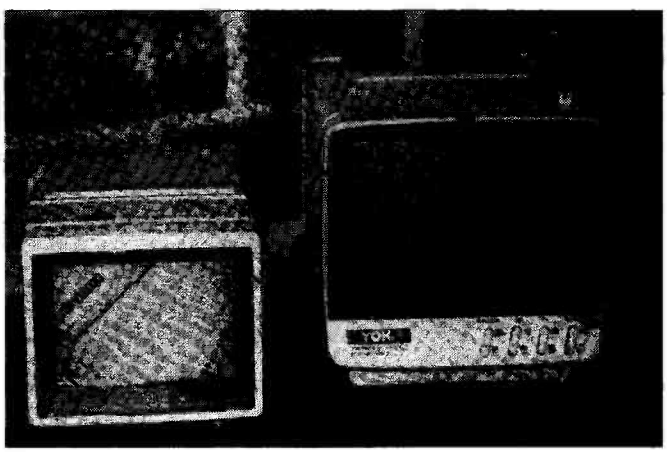

Fig. 1.

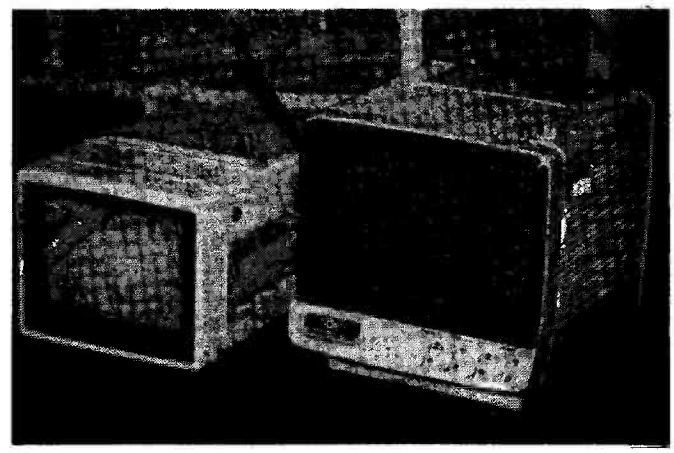

Fig. 2.

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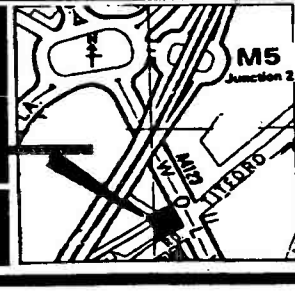

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AERIAL TECHNIQUES

SEE THE REVIEWS IN THIS ISSUE

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The very latest black & white multi-system small screen television combination from YOKO International. Model TVC-8M is a must for every serious TV-DXing enthusiast and it's also ideal for Continental travel and home use. The YOKO 'Euro TV' features full VHF/UHF TV coverage and incorporates **SYSTEM I** (6MHz sound for UK/Eire/South Africa), **SYSTEM B/G** (5.5MHz sound for Eurpe, Middle East, Australasia and other parts) **AND SYSTEM L FRENCH** standard (6.5MHz sound). The 5.5/6MHz sound switching is automatic, the switching for French standard is situated on the back of the TV. This versatile model also has a high quality AM/FM radio section and a digital clock/alarm on the front panel. The alarm can be selected to switch the television or radio on or off at any given time; the clock is equipped with a 24 hour memory alarm, which can be reset instantly to sound at the exact time the following day. AC mains or 12V DC operation.

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THE GALAXY 25. £329.00

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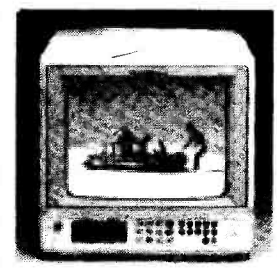

- ★ 10" Picture tube with 78° deflection and smoked screen filter.
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- ★ Extension speaker socket.
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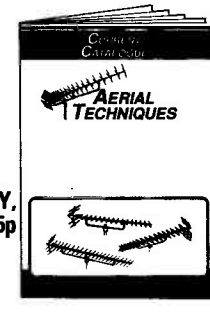
- ★ Compact dimensions of: Height: 25.5cm(10.03in). Width: 26.5cm(10.43in). Depth: 33.0cm (12.99in). Weight: 10kg.



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ACCESS

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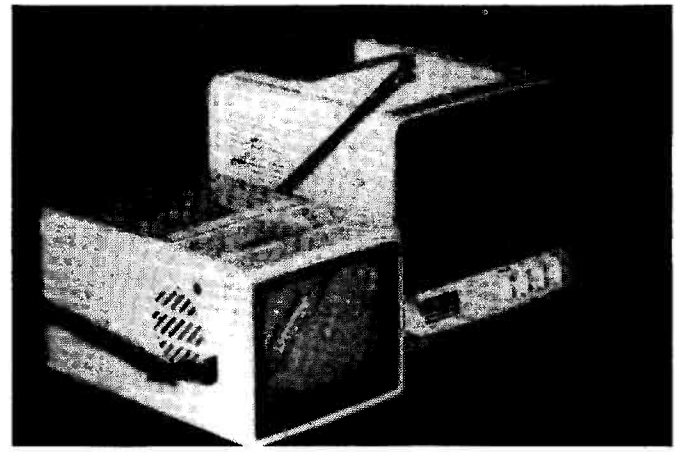
Fig. 3.



One problem I have with the TVC-8M is seeing the pointer in poor light, but not so with the BW-450 because a l.e.d., working as a tuning indicator, sits on the centre of the pointer and travels along the scale. The upper calibration covers Chs. 2-4 and 5-12 and the lower 21-69. System 'L' cannot be selected on this model. Unfortunately, while I had the BW-450 for review the atmosphere was generally settled so I could not judge its performance under DX conditions. I would expect it to be similar to the TVC-8M, but I am sure that David Martin of Aerial Techniques, who kindly loaned me the set, would clarify this point.

DXing

Several years ago, the BBC and IBA ceased transmitting television in Bands I and III respectively thus leaving these frequencies clear in most parts of the UK. Reference to the *World Radio TV Handbook* will show that many countries still use the v.h.f. bands for their domestic television and these are the signals that the DXers look for when atmospheric conditions permit. For example, during a Sporadic-E disturbance and depending on its intensity and direction of influence, pictures may appear sometimes only briefly, in Band I, from stations in Albania, Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Morocco, Nigeria, Norway, Poland, Portugal, Romania, Spain, Switzerland, Sweden, USSR and Yugoslavia. On the other hand, when tropospheric conditions are right, more consistent and steady pictures may be seen for longer periods in Band III from Belgium, Denmark, France, Germany, Holland, Ireland, Norway and Sweden. Do remember, under DX conditions, because of the various sound separation frequencies, sound and vision seldom come together.

The Cost

I often browse around the chain stores to see what's new in the small TV line and note that the models covering the u.h.f. band only are priced between £55 and £90 so I do not consider sets with the added v.h.f. bands, like the BW-450 at £79.95 and the TVC-8M with alarm-clock and radio at £115 to be expensive. These prices include VAT but the post & packing and insurance is around £5 extra. I understand from David Martin that for an extra £20, the BW-450 can be modified for automatic 5.5/6MHz sound switching. My thanks to **Aerial Techniques, 11 Kent Road, Parkstone, Poole, Dorset BH12 2EH. Tel: (0202) 738232** for the loan of the review set. □

US WEATHER STATION ROTA

Andy Thomas

Rota is a major United States Navy base in Spain, located to the north-west of Gibraltar, on the northern shore of the Bay of Cadiz. It is both a sea port and an all-weather air station. Weather information for the Mediterranean area is provided by the Naval Oceanography Command Center, or as they call it, NAVOCEANCOMCENROTA! The Command's emblem shows Don Quixote and Sanchez evidently searching for a windmill.

Weather information is broadcast by Rota using callsign AOK in either c.w. or on FAX and the signal is usually clear here in the UK. Some of the material is generated locally, using a semi-automatic weather station, anemometer (for wind-speed and direction), rain gauge and Barometer and barographs. This material is also contributed to the World Meteorological Organisation, who have assigned the code LERT to Rota.

Other information originates from the various US Naval weather authorities: the National Meteorological Center at Washington DC and the Naval Oceanographic Regional (and Global) Atmospherics Prediction Systems. FAX charts from these sources are marked NMC, NR or NG accordingly.

Satellite Receiver

The most important system is the satellite receiver. This does not use the familiar Meteosat or NOAA birds, although it can receive NOAA, but the Defense Meteorological Satellite Program (DMSP). Currently, Rota has no plans to retransmit satellite images on its FAX service, except for special operations.

The operational DMSP system consists of two satellites, one in south-north orbit and the other in north-south orbit, both with orbital periods of about 101 minutes. For any given point on earth, one satellite passes over at noon and midnight and the other in the early evening and early morning.

Among the utility stations on short wave are the many international weather stations broadcasting to all who are able and authorised to receive them. We talk about the weather out of despair, or disgust, but ships and aircraft depend on accurate descriptions and forecasts for safety and efficiency.

The satellites can store data for retransmission as they pass over the United States or can beam data live to ground stations. At Rota there are two mobile units called SATVANS, which each contain the equipment needed to receive and process the signal. Either SATVAN can be moved to a new location anywhere in the world at 72 hours notice.

Each picture covers 1600 nautical miles in width, and the processing equipment can magnify it X2 and X4. Both visual and infra-red sensors are used, either of them offering a resolution of up to 0.3 nautical miles. This is about 18 minutes of longitude. As a comparison, the harbour entrance at Rota is 0.23 nautical miles wide.

Enhanced Images

The SATVAN can enhance these images to pick out certain information. Low cloud formations or thunderstorms can be identified, or low level winds plotted by cloud movements. A three-dimensional picture of the atmosphere can be made by super-imposing images. Another enhancement emphasises terrain details.

It has been authoritatively reported that one of the uses of the DMSP is to provide weather information for photo-reconnaissance missions and spy satellites, so that pictures of the target would not be obscured by cloud. The photograph of Benina airfield in Libya was taken by a US spy plane the day after the American air strike. The weather at the airfield would have been known at Rota before the spy plane overflew to take its pictures.

Another enhancement, which is done at Rota, finds areas of sea which have strong temperature gradients. Although knowledge of the sea temperature can help fisherman, it can also help submarines, which tend to hide behind these gradients. The information can also be of use to sub-hunters, of course.

Weather information is taken for granted, but it is a vital part of air and sea military operations, and in time of war will probably be coded. Next time you tune to AOK Rota, spare a thought for the other operators who are sharing the service with you. They might be planning a spy mission, or hunting a submarine.

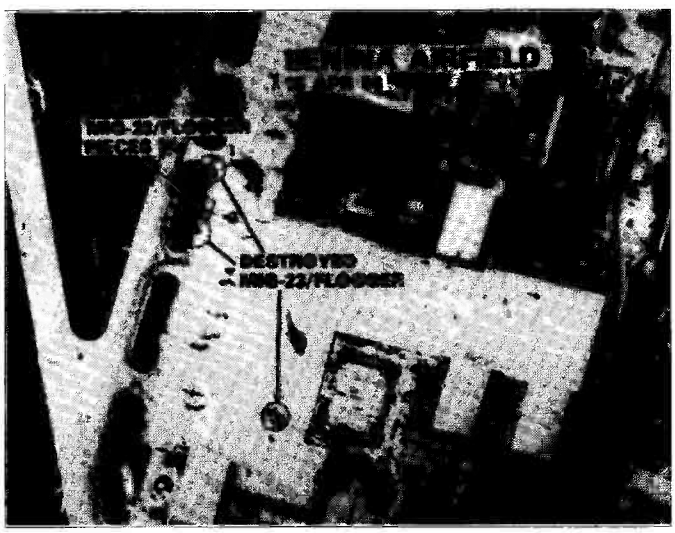
Acknowledgements

US Naval Oceanography Command Center, New York, who provided the FAX schedule and extracts from NAVOCEANCOMCENROTAINST.

References

Jane's Spaceflight Directory 1986 pp291-292.

D. Ball: The Defense Meteorological Satellite Program (DMSP) *Journal of the British Interplanetary Society* 39, pp 43-45, 1986. □



Benina Airfield Libya. DMSP data at Rota would have ensured clear skies for this photo-reconnaissance picture. Photograph courtesy of The Associated Press

Part of Rota's FAX transmission schedule.

Frequencies: 4.704MHz (1800-0600Z); 12.759MHz (0600-1800Z); 7.453MHz (continuous); 4.0535MHz (1800-0600Z); 17.585MHz (0600-1800Z); 5.785MHz (continuous).
8.506, 8.6395, 9.875 and 12.040MHz available on request.
Test chart - 1.516MHz at 0316Z.
Schedule Part 1 at 1530Z.
Schedule Part 2 at 1544Z.

Table 1

Abbreviations	
c.w.	continuous wave (Morse)
FAX	facsimile
GMT	Greenwich Mean Time
MHz	megahertz
UTC	Universal Co-ordinated Time (GMT)
Z	Zulu (UTC)

RECEPTION OF LOW & VERY LOW FREQUENCIES

Ray Howgego G4DTC

The somnolent emissions of the maritime beacons, the increasingly populated long wave broadcast band, the weird murmurings of the *terra incognita* below it and the elusive ionospheric squeaks and whistles at five-figure wavelengths are fascinating.

The extreme limits of the radio frequency spectrum have always held a strange fascination for me. A fascination that is certainly shared with a large number of other enthusiasts. Of particular interest is the low end of the scale, below the medium wave broadcast band.

At one time it was difficult to located the specialised equipment needed to tune these frequencies, but more recently an increasing number of receivers employing up-conversion have appeared with continuous coverage down to 100kHz or below. In addition, several v.l.f. converter designs have been published that up-convert the signals into the 5-30MHz region so that a fairly modest s.w. receiver may be used as a tuneable i.f. Virtually all such receiving equipment feeds the antenna directly to a low pass filter. This removes the powerful m.w. and s.w. signals that would otherwise saturate the amplifying and mixing devices in the early stages of the receiver. These filters are designed to operate into a low or moderately low terminating resistance (50-600Ω) and, as such, give the receiver a low input impedance at the antenna socket. This is fine if one has the space for a nest of dipoles several thousand metres long, but most of us has to make to with a wire of more realistic proportions. What is then required for efficient transfer of signals from the antenna is a receiver of very high, rather than low, input impedance. In addition, even a wire of modest length will possess a high capacitance to ground, effectively shunting the low pass filter and giving it somewhat unpredictable characteristics. To add to the problem, synthesised up-converting receivers are further desensitised by local oscillator and other noise when tuned to their lowest frequencies.

The result is that, unbeknown to the operator who doesn't expect to hear much anyway, the equipment becomes profoundly deaf to signals below 500kHz even though a reasonable antenna has been connected. However, if the equipment is provided with a high-to-low impedance transforming stage, placed between the antenna and receiver, the improvement can be quite spectacular; so much so that most of the long wave broadcast stations will overload all but the best receivers unless attenuation is provided. On the other hand, previously inaudible signals will rise out of the noise to an S9+. This simple solution, in itself, can breathe life into the low frequency coverage of even the most expensive receiver and might well extend their useful limit; however, for guaranteed sensitivity to 10kHz or below, one of the v.l.f. converters mentioned in the references should be considered essential. Two of the converters (reference 2 and 3) apply signals, after filtering, to an active mixing device, while the third (reference 1) uses a passive ring mixer with arguably better dynamic range but presenting only 50Ω input impedance to the antenna. All three, particularly the last, would benefit substantially from the preselector described here.

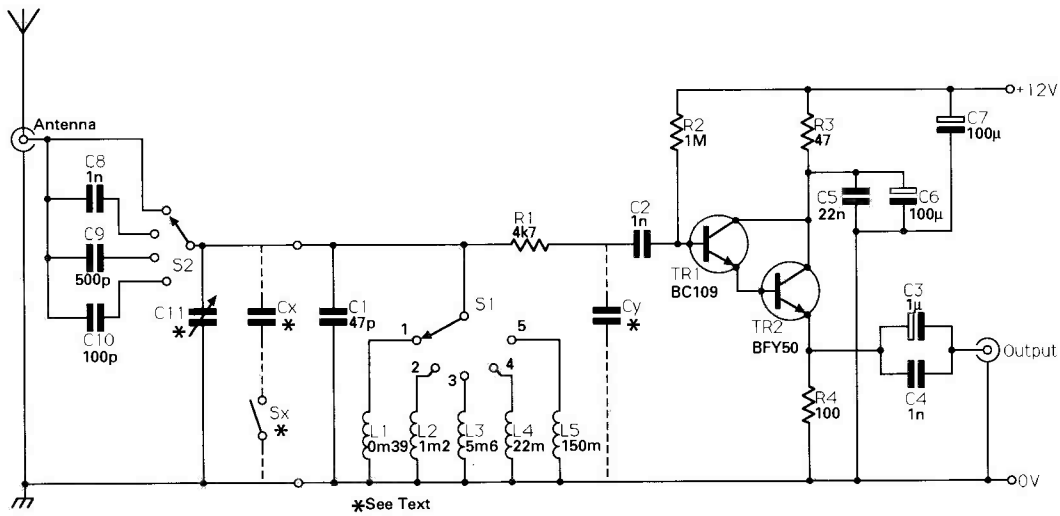
Another point to be borne in mind is that at low frequencies the antenna and receiver must not be regarded as separable entities. In the early days of radio, when low frequencies were the major propagation mode, the length of the antenna was instrumental in deciding the received or transmitted frequency, and the receiver and its antenna were regarded as an inseparable, resonant whole. For v.l.f. reception, this philosophy is as true today as it was then.

The Circuit

The circuit diagram of a preselector suitable for l.f. and v.l.f. is given in **Fig. 1**. The transistors TR1 & 2 are connected as a Darlington pair providing an input impedance of about 1MΩ and an output of 50Ω, while at the same time isolating the receiver from the loading effect of the antenna. Resistor R2 is selected to set TR2 emitter at about +5V, which results in TR2 drawing about 50mA of collector current. Transistor TR2 runs quite warm, but care has been taken not to exceed its maximum ratings. Although the use of a Darlington pair is somewhat unorthodox in this application, the linearity is excellent and is maintained with an input signal of up to 2.5V r.m.s. The voltage gain is slightly less than unity (0.89) and the noise contribution is insignificant. A single power Darlington could be used but suitable types, like the BD411, were discovered to be in short supply.

The input to TR1 is tuned by a parallel circuit consisting of C11 and a number of switched inductors. It was found that in order to tune continuously from 9kHz to 550kHz a minimum of five inductors was required and a variable capacitor with a maximum capacitance of 1400 to 1500pF. If one of the old type, 3-gang, 500pF variable capacitors is available, this would be ideal, with all three sets of fixed plates connected in parallel. Alternatively, a 2-gang 355pF variable

Fig. 1.



RECEPTION OF LOW & VERY LOW FREQUENCIES

(e.g. Cirkit 06-33102) may be used with its two sets of stator plates connected to give 710pF maximum capacitance. A switched, fixed capacitor (Cx) of 680pF should then be wired in parallel with C11 so that each band is tuned in two halves.

The antenna is coupled to the hot end of the tuned circuit via three switched capacitors. It must be appreciated that a large antenna will have considerable capacitance to ground (my W3DZZ with feeders connected together measured in at 700pF) and this will seriously detune the circuit if connected directly. However, a small capacitor in series with the antenna will effectively remove this problem while having little effect on the signal-to-noise ratio. Shorter antennas will tolerate larger coupling capacitors, or direct connection, so provision is made for all eventualities.

Capacitor C1 is included to remove h.f. signals which would otherwise pass through when C11 was set to minimum capacitance, while further h.f. and m.f. filtering is provided by R1 acting with the input capacitance of TR1 to form an *RC* filter. No trace of h.f./m.f. breakthrough, or cross modulation with m.w. stations (the scourge of many v.l.f. circuits) was detected. If by chance further filtering is deemed necessary, small capacitors might be tried at position Cy using the pads provided on the p.c.b.

Construction

The small p.c.b. shown in **Fig. 2** carries all components except the tuning capacitor C11 and the antenna coupling switch S2 and its associated capacitors. The switch specified for S1 is available from several suppliers and, although not intended for p.c.b. mounting, is quite suitable if the wider end-sections of the solder tags are snipped of. The remaining few millimetres of the tags should be carefully bent to fit all fourteen holes. The board will be supported against the front panel by the threaded shaft of the switch and all external connections will therefore need to be made to the copper side of the board. As for the inductors, only those specified in Table 1 should be used, otherwise the performance and tuning range cannot be guaranteed.

Having completed the board, apply 12V power and check that the p.d. across R4 is close to 5V. If it measures higher than this, R2 will need to be increased in value, or vice versa. There can often be a wide variation in current gain of nominally identical transistors and, if not biased correctly, the linearity of the circuit will suffer. The entire unit should be contained in a metal box to prevent reception of h.f. signals into the base circuitry of TR1. The box will need to support the p.c.b., S1, Sx (if used), coaxial input and output sockets, and its size will be largely determined by the choice of tuning capacitor. The capacitors associated with switch S2 may be wired directly between the switch tags and the antenna socket.

Fig. 2.

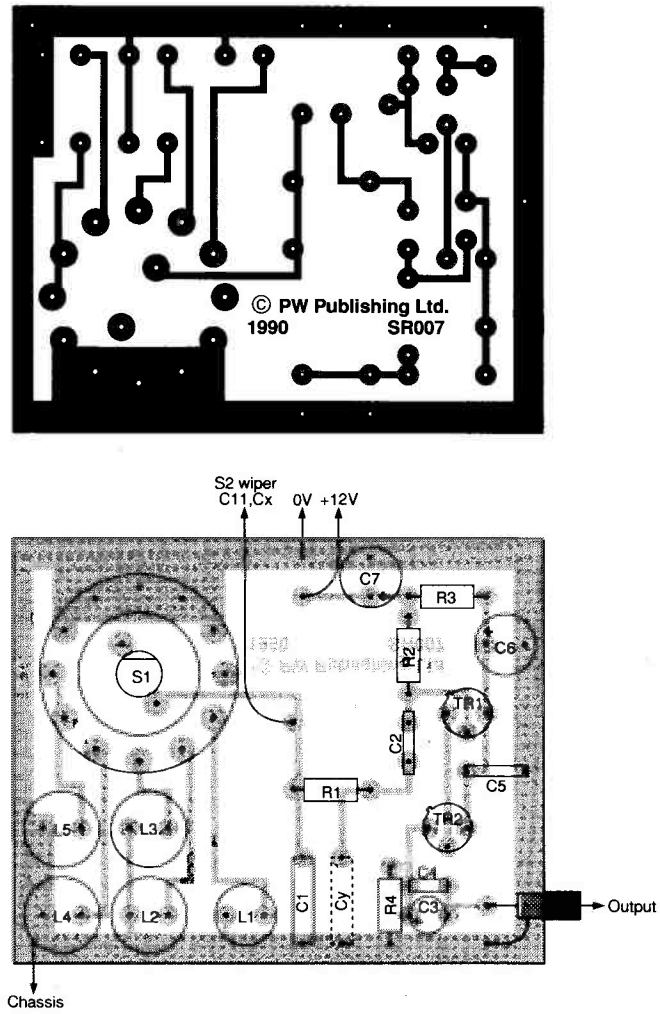


Table 1

Band	Inductance	Cirkit Stock No.	Frequency Range (kHz)
I	0.39mH	34-39111	570-215
II	1.2mH	34-12202	325-120
III	5.6mH	34-56202	145-55
IV	22mH	34-22302	78-28
V	150mH	34-15413	33-9

Practical VLF Reception

The output of the preselector is connected via a length of screened cable to the antenna socket of the receiver, and an antenna connected to the input of the preselector. At these frequencies the antenna should be as long as possible although even a few metres of wire will bring in the more powerful signals down to 15kHz including virtually all that is going on the l.w. broadcast band. Any horizontal dipole, as might be in use for h.f. reception, will work well if both the inner and outer conductors of the coaxial feeder are connected together at the antenna socket, turning the dipole into a top-loaded vertical, or Marconi-T. For serious reception, as little as possible of the antenna should run through the house, and a wholly indoor antenna will be quite useless. If a long wire is used, the section which enters the house should be run through low capacitance screened cable (such as TV coaxial cable), preferably up to a metre or two beyond the outside wall. It was evident that most man-made l.f. interference was radiated by the domestic wiring, but disappeared quite rapidly a short distance beyond the walls of the house. And don't forget that power cable to the garden shed, which should be isolated by a double pole switch.

RECEPTION OF LOW & VERY LOW FREQUENCIES

Table 2

Frequency (kHz)	Allocation
Below 9	Not Allocated
9-14	Radio Navigation
14-19.95	Fixed. Maritime Mobile
19.95-20.05	Standard Frequency & Time Signal
20.05-70	Fixed. Maritime Mobile
60.0	Time Signal: MSF (NPL Teddington)
50.0	Time Signal: OMA (Prague)
70-72	Radio Navigation
72-84	Fixed. Maritime Mobile. Radio Navigation
75.0	Time Signal: HBG (Neuchatel)
77.5	Time Signal: DCF77 (Mainflingen)
84-86	Radio Navigation
86-90	Fixed. Maritime Mobile. Radio Navigation
90-110	Radio Navigation
110-112	Fixed. Maritime Mobile. Radio Navigation
112-117.6	Radio Navigation
117.6-126	Fixed. Maritime Mobile. Radio Navigation
126-129	Radio Navigation
129-130	Fixed. Maritime Mobile. Radio Navigation
130-148.5	Fixed. Maritime Mobile
148.5-255	Broadcasting
255-283.5	Broadcasting. Aeronautical Navigation
283.5-325	Maritime Radiobeacons. Aeronautical Navigation
325-405	Aeronautical Navigation
405-415	Radio Navigation
410	Maritime Radio Direction Finding
415-435	Aeronautical Navigation. Maritime Mobile
435-495	Maritime Mobile
495-505	Mobile (Distress & Calling)
505-526.5	Maritime Mobile. Aeronautical Navigation
Above 526.5	Broadcasting

If a long antenna is used, the 10pF coupling capacitor should be selected and, with the receiver tuned to a l.w. broadcast station. The preselector should be tuned across Band II until the signal peaks. The effect of the other capacitors might require some experimentation, retuning C11 each time. The characteristics of the preselector might then be investigated for weaker signals at other frequencies. If an a.m. receiver is used, the preselector has narrow enough bandwidth to independently select several different signals within the receiver passband. This takes some getting used to but may be used to advantage in this overcrowded region of the spectrum where as many as 40 to 50 signals can be tuned during daylight between 10 and 150kHz. The approximate coverage of the five bands, obtained with a 40-1470pF tuning capacitor, is given in Table 1, the coupling capacitor being 100pF.

For non-broadcast transmissions the narrowest receiver bandwidth should be selected and the b.f.o. switched on. A c.w. filter would be ideal, or an s.s.b. filter followed by a narrow audio filter. If the receiver has a narrow enough bandwidth, the preselector may be tuned to well below 9kHz by placing further 1000pF capacitors across C11. This part of the spectrum is used only experimentally but the patient might listen for the 'squeaks', 'whistles' and the 'dawn chorus' resulting from signals bouncing within the ionosphere (see reference 4).

The allocations of the low frequency names are shown in Table 2. Of particular interest are the reception of maritime radio beacons (a full list of which is give in *Reed's Nautical Almanac* and a partial list in *Short Wave Magazine*), the long wave broadcast band (see *Short Wave Magazine* or the *World Radio TV Handbook*) and the standard time signals (see the *World Radio TV Handbook*).

Above all, do not assume that the band is static. Morse telegraphy signals can appear quite unexpectedly at very low frequencies and, like all Morse on this band, carry interesting information. Those enthusiasts with telemetry decoding equipment will discover an endless challenge.

It must be said, however, that the precise origin or function of many of the signals will remain a matter for speculation (especially as v.l.f. propagation can cover considerable distances). Unless any readers can provide positive identification. □

YOU WILL NEED

Resistors
0.6W metal film 1%

47Ω	1	R3
100Ω	1	R4
4.7kΩ	1	R1
1MΩ	1	R2

Capacitors
Polystyrene 160V

47pF	1	C1
100pF	1	C9
470pF	1	C8
1nF	1	C7

Ceramic Plate 100V

1nF	2	C2, 4

Sub-miniature Electrolytic

1nF (16V)	2	C5, 6
1μF (63V)	1	C3

Semiconductors
Transistors

BC109	1	TR1
BFY50	1	TR2

Miscellaneous
2p, 6w, rotary switch (Maplin FH42W) 2 off; miniature s.p.toggle switch (see text); coaxial sockets, 2 off; p.c.b.; wire; coaxial cable.

Abbreviations

a.m.	amplitude modulation
b.f.o.	beat frequency oscillator
c.w.	continuous wave (Morse)
h.f.	high frequency
i.f.	intermediate frequency
kHz	kilohertz
l.f.	low frequency
l.w.	long wave
m.f.	medium frequency
m.w.	medium wave
mA	milliamp
MHz	megahertz
MΩ	megohm
p.c.b.	printed circuit board
p.d.	potential difference
pF	picofarad
r.m.s.	root mean square
s.w.	short wave
V	volts
v.l.f.	very low frequency
Ω	ohms

References

1: The *PW* Marlborough Converter by Bryan Robertson *Practical Wireless* December 1986.
2: The *PW* Taw VLF Converter by Mike Rowe *Practical Wireless* November 1986.
3: R. Lapthorn. *Radio Communications* June 1961.
4: VLF Phenomena by S.T. Andrews *Practical Electronics* August/September 1968.

AIRBAND

Godfrey Manning G4GLM

All the latest news on the world, from technical terms to the latest plans for air traffic control.

Over the next few years, the central control function (CCF) will be implemented in the London Terminal Manoeuvring Area. As traffic densities increase, a similar system will become necessary in the Manchester control area too. Full details have not yet been released by the Civil Aviation Authority (CAA), partly because final design is still underway and partly because of the way in which CCF will be introduced - in careful stages.

Readers will be watching this development with interest, so let me summarise the general objectives. One of the latest information sources is CAA Document No. 415 *CCF - Handling London's Air Traffic in the Nineties.* Presently, traffic is taken off airways by a controller at the London Air Traffic Control Centre (LATCC), and handed off to an approach radar controller who is situated at the destination airport. A control zone surrounds the airport exclusively for that terminal's use.

Under CCF, control is only handed over to the local tower on final approach. Radar vectoring is done by a centrally placed controller at LATCC - hence the name CCF. Approach routes will be specific to each aerodrome - Gatwick, Heathrow, Luton and Stansted, so the controller can concentrate on a steady stream of unidirectional traffic along one track. Outbound routings will not be altered much, but the initial climb to economic cruising height will be faster without the restriction to remain below a complex net of inbound routes.

Technical Terms

I always wonder just how often readers - especially new ones - are bemused by some of the technicalities that appear in this column. Only rarely do you write in asking for explanations, so I assume that I haven't baffled anybody! Well, how about QFE and QNH for instance? Long ago in the history of telecommunications, Morse operators got fed up with sending certain repetitive items in full, so they invented the 3-letter Q codes. These codes have stuck - in marine, amateur and aviation usage. USA two-way radiotelephone and CB users prefer their 10-codes, but that's up to them! QFE and QNH are the codes applying to altimeters.

The altimeter doesn't measures height, but pressure. Fortunately, atmospheric pressure decreases with altitude in a known (but non-linear) way (it's halved by the time 18000ft is reached), so the altimeter is calibrated in feet. Unfortunately, the atmospheric pressure also changes with the weather so the altimeter can show different 'heights' even if it doesn't leave the ground! It is therefore equipped with a barometric subscale to compensate for this; if the current air pressure is read from a barometer (this is the QFE) and set on the altimeter, a height reading of zero will result.

If, while still on an aerodrome somewhere up a hill, the barometer is now dropped down a hole whose base is at sea level it would, instead, read a higher value. This is QNH. Setting QNH on the altimeter would cause an indication of height above sea level. The hole is rather inconvenient to dig, so instead the QFE is measured and the QNH calculated. For roughly every 30ft of airfield elevation above sea level you add 1mb to the QFE.

In general, if you do not understand any technical point, please don't hesitate to writing in asking for an explanation. It might be possible to deal with one point each month, thereby building up a useful reference guide.

Follow-Ups

That building in Little Budworth, Cheshire, still intrigues some of you. **D. Sandwell** (Huddersfield) sent me a photo: it's a single-storey bungalow-like structure with a rotatable v.h.f. beam on the chimney. An ideal radio society clubhouse!

The *Telephone Directory* lists (0829) 760215 which turns out to be a FAX machine. In the background is breakthrough from the ident keying of the Whitegate (WHI) n.d.b! Would any reader with a FAX machine like to send a message along the lines of, "Hello - what are you?".

Frequency & Operational News

The 9/90 edition of the *General Aviation Safety Information Leaflet* from the CAA lists but one previously unpublished frequency change: the Clacton n.d.b. (CLN, range 30nm) changes to 295kHz. Pilots please be sure to consult your up-to-date NOTAMs; I only mention new changes, the *GASIL* repeats information over three consecutive months.

Dave Rennolds (Oxford) reports on a balloon flight by Don Cameron that communicates on 10.066MHz at a quarter past each hour. I haven't caught up with this one - is it the same Cameron noted for balloon manufacturing? More details, please.

Also to be found on h.f. are aeronautical radio-teleprinter stations such as Santa Maria, Azores (9.994 & 14.497MHz, both 50baud, 850Hz shift) and Nairobi (8.165MHz, 50baud, 170Hz shift). The purpose of these stations is to disseminate NOTAMs, weather reports and aircraft movements. Thanks **C.J. Durkin** (Ormskirk, Lancashire) for bringing this facility to our attention.

Hardware

Some of the newer hand-held scanning receivers will continuously charge their NiCad batteries if operated from an external power source. This has unfortunate consequences if ordinary primary (non-rechargeable) cells are used instead of NiCads. When the external power supply is applied, the set tries to charge the batteries as usual. The non-rechargeable batteries promptly burn out the receiver's internal charging regulator circuit!

As a reminder that primary cells are loaded into the receiver and that external power should not be applied, I suggest a squared-off U shaped piece of aluminium. Cut a strip of thin aluminium about 30mm wide. Make two right-angle bends, such that the three sides of the resulting shape cover the sides and back of the receiver. Just clip the aluminium shape over the back of the set so as to cover up the power input socket. Label the clip in unmistakable lettering. For a neat finish, make the sides too long by about 25%

Six engines must take some coping with! The Antonov AN-225 *Mriya (Dream)* at Farnborough '90.

Photograph by Christine Mlynek.

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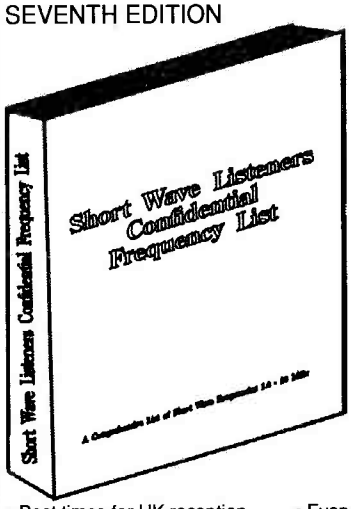

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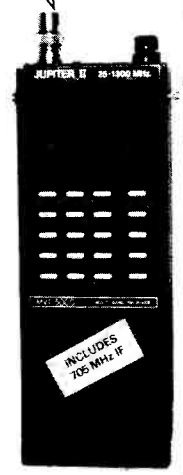
- Telescopic antenna



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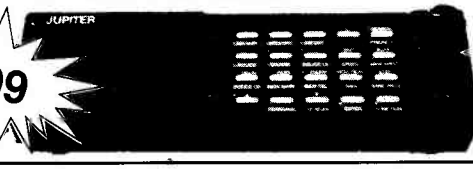

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and fold the excess back through 180° to lie internally within the shape. A simple idea to avoid a costly mistake!

Information Sources

Regular reader **Tim Christian** (North Walsham, Norfolk), has sent me a draft of his proposed booklet. Clearly in an advanced stage of development, the 37 pages list 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 the booklet will find use in professional circles for locating clear frequencies for re-allocation. Readers of this column will have their own ideas as to how to use the information.

This publication stands out for the particular effort Tim has gone to in obtaining verification of the information. This is reflected in the cover price of £6.99, which is, at first sight, high for a booklet but understandable when the quality of the information is taken into account. I hope you'll let us all know when you're ready to start taking orders, Tim, and I'll print the ordering details here. Meantime, now you all know what to ask for at Christmas.

It is good to see that 'Airband' reaches the more distant parts of the globe. **Adam Witkowski** (Ramat-Gan, Israel) wants to order *Emergency - Crisis on the Flight Deck* by Stan Stewart as previously reviewed in this column. The address of the publisher of both this book and Stan's *Flying the Big Jets* is Airlife Publishing Ltd., 7 St. John's Hill, Shrewsbury SY1 1JE, England. Tel: (0743) 235651. Hopefully, good bookshops even in far-flung places should stand a chance of being able to order it for you.

Electronic flight systems can baffle me, as I discovered at Farnborough this year.

Photograph by Christine Mlynek.

Pocket Wind Meter

Weather seems to be of ever increasing interest to radio enthusiasts. For the pilot, it is always of great importance. A cheap alternative to those clever electronic anemometers is the Dwyer Pocket Wind Meter from Stewart Aviation, PO Box 7, Market Harborough LE16 8XL. Tel: (0536) 770962. Increasing windspeed sucks a light ball further up a tube; simple, cheap, little to go wrong. Until next month - watch your crosswind limit!

The next two deadlines, for topical information, are December 7 and January 4. All correspondence to the *SWM* office please. □

Abbreviations	
CAA	Civil Aviation Authority
CB	Citizens' Band
CCF	Central Control Function
cm	centimetre
ft	feet
GASIL	General Aviation Safety Information Leaflet
h.f.	high frequency
kHz	kilohertz
LATCC	London Air Traffic Control Centre
mb	millibars
n.d.b.	non-directional beacon
NiCad	nickel cadmium
nm	nautical miles
NOTAM	NOTice to AirMen
QFE	altimeter barometric setting, reads height above aerodrome
QNH	altimeter barometric setting, reads height above sea level
v.h.f	very high frequency

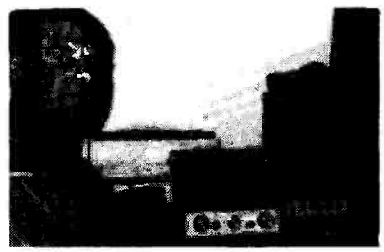
FIRST AID

Noel Carmody is an enthusiastic DXer and would like to make contact with other DXers in Eire or Northern Ireland, with a view to forming a club. **Noel Carmody, Coherhennessy, Ballingarry, Co. Limerick, Eire.**

I have been an avid reader of your magazine for the past two and a half years and I am wondering if you can help me. I have bought a scanner radio called a Mark Scanner, which was made in Japan. On the box it came in there are the letters VR-108FI. It covers 150 to 525MHz and 850 to 905MHz.

I bought it second-hand and I made the biggest mistake of putting 240V through it instead of 12V. The problem is that I can't find out who made the set, who sold it in this country or even if I can still get parts and a circuit diagram for it. Can any reader please help me?

David Tyson. 7 Doran Close, Filey, North Yorks YO14 0AQ.



As a regular reader of your magazine, I followed your articles on the R210 with great interest, having purchased one of these receivers from Birketts some three years ago, using it with excellent results. Alas, the film ribbon dial indicator churned up in its sprockets and broke. I have been trying to obtain a new ribbon, but without success. One wonders if boxes of these ribbons are lying somewhere in a secure store waiting to be rediscovered. Could anyone help me to restore this receiver back to working order?

John Gernert. Electra, 61 Rotten Row, Pinchbeck, Spalding, Lincs PE11 3RQ.

If you have a query you can't find an answer to, why not drop us a line for inclusion in First Aid - we're here to help.

STARTING OUT

Brian Oddy G3FEX

Although a half-wave antenna can be erected in the 'inverted L' configuration with comparative ease, (see last month's article) such an arrangement may prove to be unsatisfactory. This is because the weaker signals are very likely to be masked by radio frequency interference (r.f.i.), radiated by the electrical wiring in the house. The best way to alleviate the problem is to suspend the half-wave antenna horizontally between two supports, so that it is as far away as possible from the house and then use a transmission line to convey the tiny signals to the receiver, without picking up unwanted interference on the way.

Some of the basic properties of non-resonant r.f. transmission lines, usually referred to as feeders, were outlined last month. Due to radiation as well as resistive and dielectric losses, the tiny signals will be attenuated to some extent as they travel along the transmission line to the receiver. Such losses can be minimised by ensuring that the impedance at the antenna feedpoint matches the characteristic impedance of the line and that the antenna input impedance of the receiver terminates the line correctly. An impedance mismatch, at any point along the line, will result in part of the energy of the incoming signals being reflected back along the line towards the antenna. Higher losses will then arise.

Two types of balanced twin feeder are manufactured in the UK, the essential difference being their characteristic impedance - 72Ω and 300Ω. In the 72Ω type, the very small spacing between the two parallel solid conductors is maintained throughout the length of the line by embedding them in a low-loss dielectric, such as polyethylene. Such lines, which are oval in cross section, are mechanically strong and lightweight, but not very flexible. They do not deteriorate with exposure to weather over a lengthy period. In contrast, the multi-strand conductors generally used in the 300Ω type are held about 8mm apart by a web of dielectric material to form a flexible line which resembles a ribbon. The nominal attenuation of this line is only 1.2dB at 70MHz, so a long length can be used to convey h.f. (3-30MHz) signals. Unfortunately, the characteristics of this type of line tend to change if the web of dielectric material becomes coated in moisture or dirt. This problem is largely overcome, in a more expensive version, by embedding the conductors in the walls of a tube of dielectric material.

It is not always convenient or desirable to bring one end of an antenna into the house, so what's the alternative?

Low loss 75Ω coaxial cable is manufactured in large quantities in the UK for domestic v.h.f radio and u.h.f. TV antenna installations. Consequently it is relatively inexpensive. The nominal attenuation of 30m of semi-air-spaced 75Ω coaxial cable is 2dB at 70MHz, so it is capable of conveying h.f. signals with little loss. However, a standard impedance of 50Ω has been adopted for the r.f. input/output connections of professional radio equipment. So, most modern communication receivers are designed to accept a 50Ω coaxial input from the antenna. A variety of 50Ω coaxial cables are manufactured for professional applications, but the most suitable types for s.w.l./amateur use are UR43 and UR67. The nominal attenuation of 30m of UR43 is 1.3dB at 10MHz, but it rises to 4.3dB at 100MHz and 8.7dB at 300MHz, so the use of long lengths of this cable should be avoided for v.h.f. (30-300MHz) applications. The much larger and more expensive UR67 cable is quite capable of carrying the maximum r.f. power permitted under the terms of the UK amateur transmitting licence (400W p.e.p.), but the main advantage for the s.w.l is that the attenuation is so much lower, being 0.6dB at 10MHz, 2.0dB at 100MHz, 3.7dB at 300MHz and 7.5dB at 1000MHz per 30m.

When properly installed, any of these transmission lines can convey h.f. signals over a distance of 30m or more with little attenuation. Such long lines are best avoided at v.h.f because of the much higher attenuation. The length of the low loss coaxial cables used at u.h.f. (300-3000MHz) has to be kept to an absolute minimum.

The Dipole

The impedance at the centre of a half-wave antenna will be about 72Ω at resonance, provided it is erected at λ/2 or a multiple of λ/2 above the ground and well clear of surrounding objects. At other heights, however, the impedance will be modified by reflections from the ground. If the antenna is cut in half, then a 75Ω coaxial cable could be connected to the wires at the open centre point of the antenna to form a **dipole** or **doublet** antenna. Since the two arms of the dipole are symmetrical and coaxial cable is unbalanced, a better plan would be to connect a balanced 72Ω twin feeder to the open centre point wires to form a truly balanced and matched system, see **Fig. 1**.

The overall length of a dipole for a particular band can be calculated by using the formula: L = 142.5/f

where: L is in metres and f is in MHz.

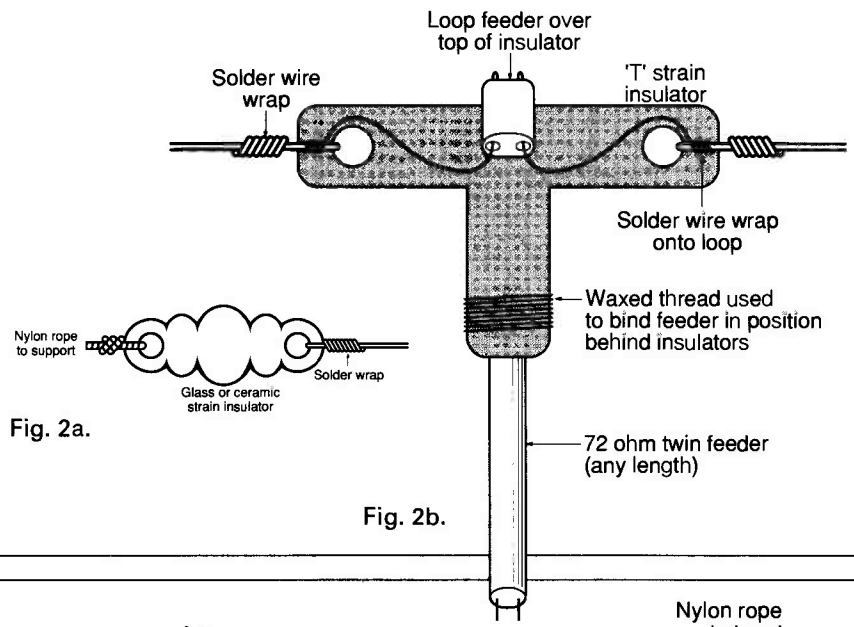


Fig. 2a.

Fig. 2b.

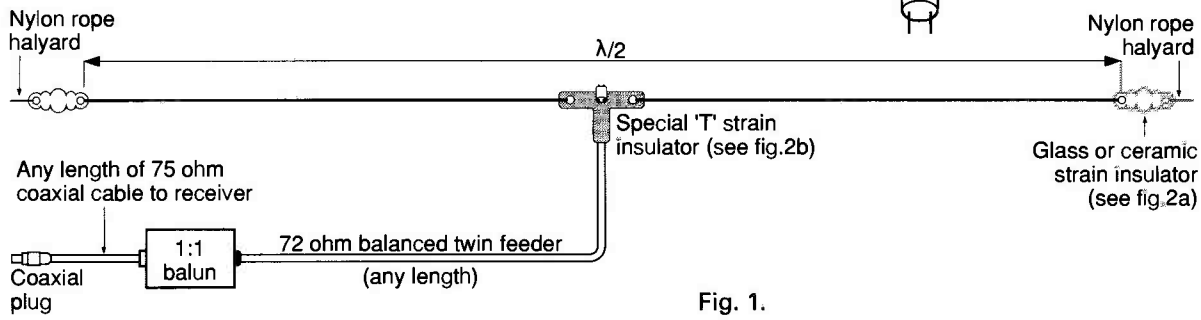


Fig. 1.

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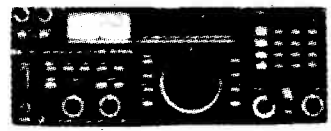

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For those who prefer imperial units the formula is: L = 468/f

where: L is in feet and f is in MHz.

Note: Since the s.w. broadcast and amateur bands are relatively narrow, taking the centre frequency of the band concerned will ensure an acceptable performance. The overall length should be measured from the point where the wires pass through the insulators.

Ideally 16 or 18s.w.g. cadmium copper wire should be used for the dipole, because soft drawn copper wire is liable to stretch. To avoid changes in the characteristics of the antenna in wet weather, glass or ceramic strain insulators which have a long leakage path should be employed at the points of suspension. One of the readily available 'T' shaped strain insulators should be used at the centre of the dipole, so that the weight of the twin feeder can be supported by the antenna without placing an undue strain on the connections at the feedpoint. Before making off the wire to an insulator, clean it for a distance of about 150mm with glass paper. Pass the wire through the hole in the insulator and form a loop by wrapping the end around the cleaned portion of the main wire a few times, see **Fig. 2a**. The four wire wraps should be soldered to ensure that they make good contact with the main wire.

To prevent moisture from entering the feeder, it is advisable to pass it over the upper edge of the 'T' insulator and then allow it to drop down to reach the feedpoint, see **Fig. 2b**. Depending upon the type of 'T' insulator used, the feeder can either be bound in position with waxed thread, or held by the clamping plate provided. Use a sharp knife to split open the end of the feeder and remove about 100mm of the dielectric material. The exposed conductors should then be cleaned with glass paper, make quite sure that all traces of the enamel used to identify one conductor (if applicable) has been removed. Splay the conductors so that they may be wound around the wire loops at the inner ends of the dipole as depicted in **Fig. 2b**. When soldering each connection, it is advisable to grip the feeder conductor with a pair of pliers to prevent the dielectric from melting.

The dipole can be erected between two supports, such as a pole at the far end of the garden and a chimney on the house. If a tree is to be used as a support, there must be some provision for movement in the wind. This can be achieved by passing the halyard over a pulley tied to a large branch and attaching it to a counter-weight e.g. a bucket full of stones. Nylon rope is fairly resistant to the effects of the weather and is suitable for the halyards used to raise the antenna. Ideally the dipole should be erected so that the line of the wire is at right angles to the direction of the incoming signals from a desired area. Some confusion may arise in this connection because Great Circle bearings have to be considered when setting up an s.w. antenna.

The light-weight 72Ω twin feeder, which may be any length, should drop down from the dipole at right angles to the wire to a convenient point in the garden. Here it is attached to a wideband (3-30MHz) balanced-to-unbalanced 1:1 transformer, called a 1:1 balun. The balun enables the balanced feeder to be connected to any length of 75Ω* unbalanced coaxial cable, which may be buried, attached to a fence or wall and passed through a metal window frame with impunity, since the outer screen will be earthed at the coaxial socket on the receiver. (* There will be a mismatch at the balun if 50Ω coaxial cable is used to match the receiver input impedance, but this can be ignored for receiving purposes). Some 1:1 baluns consist of a trifilar winding around a ferrite ring, i.e. three wires of equal length which are wound as one, see **Fig. 3a**. The windings are connected in the manner shown in **Fig. 3b**. The principle of operation is similar that of an auto-transformer, see **Fig. 3c**. Ready-made 1:1 baluns in weather-proof containers are obtainable from some amateur radio equipment retailers, but it is a relatively simple matter to make one. Wind six trifilar turns of 20s.w.g. enamelled wire around a 50mm ferrite ring and connect the wires as shown in **Figs. 3a/3b**.

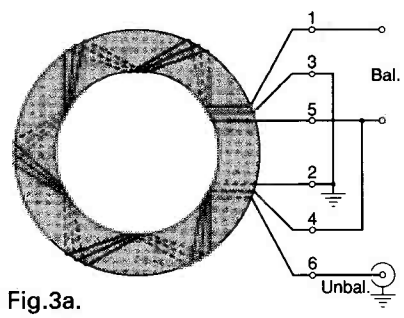


Fig.3a.

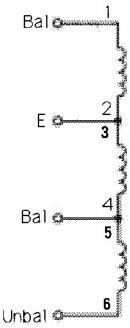


Fig.3c.

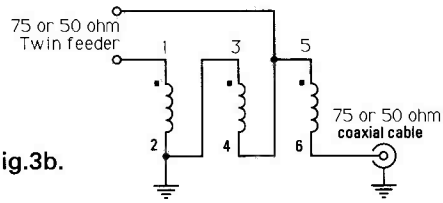


Fig.3b.

Multiband Operation

So far, only single band operation has been mentioned, but it is possible to operate a dipole at certain multiples of the fundamental frequency to which it is cut. The distribution of voltage, current and impedance along antennas one, two and three half-waves long was depicted last month. The diagrams showed that the impedance at the centre of a half wave is low (72Ω), but a very high value (>5000Ω) exists at the centre of an antenna two half-waves long, i.e. a full-wave.

Any attempt, therefore, to operate a dipole at twice its fundamental frequency will result in a total mismatch between the feedpoint and the 72Ω twin feeder. However, the impedance at the centre of an antenna three half-waves long is low (95Ω), so operation at three times the fundamental will be possible, as only a slight mismatch will exist at the feedpoint. This pattern is repeated as the number of half-waves is increased, so there will be a total mismatch at even multiples of the fundamental, but satisfactory operation will be obtained at odd multiples of the fundamental. However, due to the correction for end-effect which was applied when calculating the length of the dipole for operation at the fundamental, it will prove to be slightly too short for resonance at three times the fundamental.

Another effect will occur when operating the dipole at an odd multiple of the fundamental, namely a change in the directivity pattern. Although the maximum response of a dipole to incoming signals is at right angles to the line of the wire, when it is operated at three times the fundamental there will be six areas of maximum response. Four of the lobes will be at 45° to the line of the wire and two at right angles to the wire, see **Fig. 4**. In practice, a three half-wave antenna will be found to be an excellent DX performer as the lobes will cover four continents if the wire is erected either N - S or E - W in the UK. □

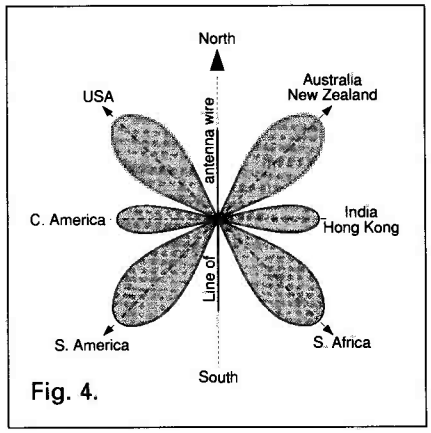


Fig. 4.

SEEN & HEARD

AMATEUR BANDS ROUND-UP

Paul Essery GW3KFE
PO Box 4, Newtown, Powys SY16 1ZZ

I have been asked several times why radio amateurs prefer s.s.b. on the h.f. bands, rather than a.m. or f.m.

In the early years, telephony on the amateur bands was always a.m. By mid-WWI, it had been realised that, mathematically speaking, an a.m. signal had a continuous 'carrier', plus upper and lower sidebands, and an experiment confirming the theory had been carried out. There things lay as far as 'wireless' was concerned, as the practical technology did not then exist. By the early thirties, a small group in USA were using s.s.b., but it languished and died. On the land-lines though, where spectrum space was at a greater premium and traffic rising, some experimental work was done and equipment was actually in service.

By this point, it was realised that fading was ever-present and that, on an a.m. signal, one could have one sideband fading in a different way from the opposite one. In autumn 1947, W6YX, using a transmitter by O.G.Villard W6QYT, worked W6VQD and s.s.b. was away! Norgaard W6VMH then tackled the 'selling s.s.b.' chore so successfully that it swept all before it.

So, what has s.s.b. got that a.m. hasn't? Well, a.m. consists of a carrier, an upper and a lower sideband. Obviously, since both sidebands are carrying identical information, one is redundant. We can throw it away and make life a bit easier for our output stage. Now, consider the carrier. At the receiver, it provides the continuous signal used by the detector stage to recover the audio. Our detector will decode **everything** against the biggest carrier in the passband. As signals fade, so one can bet long odds the biggest carrier **would** be the wrong one for a proportion of the time! Norgaard likened it to a man carting a hat-rack everywhere he went just so he could hang up his hat!

Why don't we suppress it at the transmitter and use a b.f.o. in the receiver instead, just as we've been doing for years with c.w.? Make it big enough, and you can guarantee it to be bigger than anything off-air, so you've got rid of one problem straight away. There will be three other main benefits: First, if we have a 100W output a.m. transmitter, fully modulated, we have 25W u.s.b., 25W l.s.b. If we look at the voltage vector diagram, we come to a nasty shock when we realise that our transmitter in fact churns out a PEAK power of 400W!

If we assume the p.a. was 80% efficient, our peak input then will be 500W for a total of 50W, or 10% efficiency in terms of talk power. For the same pair of valves - say, a pair of 807s - we can obtain 70% efficiency in practice in s.s.b. service so for 400W of talk power we get 572W peak input, and our talk efficiency has gone up from 10 to 70%.

Secondly, perhaps more important, we don't transmit any carrier wave, and anyone who listened in those far-off days can tell you that you could never expect to hear a DX signal that wasn't totally buried under heterodyne whistles from the carriers of the gang calling him.

Thirdly, the s.s.b. signal is rather less than half the width compared with the equivalent a.m. signal, so one could expect, even without getting shot of heterodynes, to embody twice as many signals in the same area.

Then what about f.m.? Narrow-band f.m. was tried, and used, in the forties and fifties as an anti-TVI thing. Practically, on a clear channel it would reach out to VK or ZL well enough. However, if the channel was less than clear, f.m. came off worse even than a.m. If two f.m. signals happened to be on top of each other, the strongest one captures and effectually suppresses the weaker one into inaudibility - NOT ideal in QSB conditions! Oddly enough, the same 'capture effect' can be helpful on v.h.f. when there is a 'lift' on.

Summing up then, for the 'phone s.w.l., the use of s.s.b. gives a bigger signal, with less selective fading distortion and a background free of heterodynes. On the negative side, there is no doubt that the better the s.s.b. filter in the transmitter and the receiver, the greater the ill effect on the recovered audio. So an s.s.b. signal, tuned perfectly is not as 'hi-fi' as the recovered audio from an f.m. rig on the 144MHz band. This is a small price to pay, though, compared with the ability to make solid telephony contacts in conditions which would have been unbelievable forty years ago.

So - that's why a.m. or f.m is not a preferred mode on the h.f. bands!

Events

At the time this was written, no sign had been noted of the ZA operation. If anyone can bring it off, it is the Hungarian group, so all we can do is carry on in daily diminishing hope.

If you think that you have problems with TVI, how about Ron ZM7AMO on Chatham Island. Everytime he hit the key on Top Band, telephones all over the island started ringing!

Letters

G. Bramwell (Swinton) has a long list of stuff gleaned from a 20m length of wire tacked to a T-match home-brew a.t.u. and a Trio 9R59DS receiver. On Top Band, a couple of ONs, 3.5MHz Europeans plus KA1DWX and W2VP, on 7MHz Europeans plus S. Americans and VK, on 14MHz N America, S. America plus Israel, on 21MHz the Americas plus W4ECZ/MM P1NG and S92LB. Finally on 28MHz, a lovely collection from all over the six continents.

Dennis Sheppard (Earls Shilton) has been somewhat occupied by the problem of a neighbouring TV set which spews out a peculiar noise. So, the antennas have been moved to reduce the pick-up. Nonetheless on 28MHz, s.s.b. yielded KH6LJ, W2/G0GQP, K3JSW, VE5AAS and a load of other Ws and K stations. Turning to 3.5MHz, Dennis mentions VK3DZM, ZL4AP, VE8HL, HP3FL, ZD8Z, W9ZR, K0TT, VE3LAW and K5EJ.

Harold Wood is in the Gorton district of Manchester; Harold notes that he has finished the decorating mentioned recently and has now been allowed back in the shack. On 14MHz, I note ZB2AZ, OM60ARDF (a celebration of 60 years of amateur radio d.f. events), CU2AK, OE6KGJ/6, OH2AQ/P/OJ0, SV1AGK, JN1FMD, 4X6DW and 3B8FU. On 28MHz there were T77C, PT7WX, AA0BU, HC1CMN, YV2KBA, CT1PS, TA2AU and NX8P. Incidentally, Harold has doubts about T77C; but this call is fairly well-known from San Marino.

Andrew Marriott (Bath) has come back to the hobby, specialising in 18MHz c.w., and enjoying every minute of it; and the more so when he reported W7ELH who replied with a letter saying this was his first European in 34 years on the bands! VE7SR, VE6AUV, 4K4QQ, W7KB, K7SP, KC0OU, KC0EI, K0KES, W5NBI, W5NHQ, W4WG, K4ASP, plus the W1, W2 and W3 call areas were all noted.

Next we find **Vince Cutajar** (M'Scala, Malta) who notes, on 18MHz YV5AAX, V29A, 6W1QJ, FG4DM, V47NXX, AL7I, V51P and UD7KWB. As for 24MHz, NO4J/C6A, KP4LY, VK4NJ, VK4MZ, 6W1QJ and UD7KWB, so this band seems to be opening up quite well.

Dudley Taylor lives in Oswestry, but his listening is mainly from the mobile set-up. On 18MHz, Dudley logged in TA7/KU0J, VE2PA, 3C1EA, 9H3IL, EK3DA/MM, FE1JKK/FY, VK6HD, TK/HB9ASZ, UA9MGO, UA9XDU, eleven assorted JAs, and all W call areas, including three W6s and four W7s; not to mention numerous small fry Europeans.

Don McLean (Yeovil) found 28MHz open to JA on the short path 0700-0900Z plus VKs too; and the North Americans appeared from 1100Z to the close of play. Logged were FR5DX, HK3KPC, JAs, K7OWZ (Utah), KB0NL (S. Dakota), KP4GY, PT9ZZ, TI2JJP, UA0FF, ZW0JR, ZC4BOB, 5B4AAL and 8J90XPO. The 21MHz score included such as A61AD, HL2GS, HL9HH, JAs, JY3ZH, P29SC, PJ6/KV4AD, R1SO, R6L, RL7PDB, SV8/I5DCE, T5RR, UZ0QXU, UM8MGO, VKs including VK8TM, VP8CED, VP8CEG, both Falklands stations, VQ9TB, VU2TTC, ZL4TS, ZM2NBK, 4K2BDU, 4K0ADS, 5H0QL, 7K1UBJ/3 (a JA 'special'), 7Q7KG, 9H3NH and 9X5SW.

Finale

That's it for another month. Your letters, lists, comments and whatever should be sent to the address at the top, to reach me by November 30 - tight for you, but blame the Christmas rush that will be in full swing by the time the production phase is under way. More dates next time round!

Practical Wireless have organised a trip to the Dayton Hamvention in 1991. Anyone interested in this trip, which will cost £549 for the five days, should send for further details or ring 071-731 6222. Book early as the number of places is very limited. Bookings will be dealt with on a first come first served basis.

The price is based on two people sharing a twin-bedded room. Not included in the price, but highly recommended, is an optional medical insurance cover at a cost of £30.

SEEN & HEARD

DECODE

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

Beginners - Start Here!

Paul Czembor has written from Luxembourg asking for an outline of just what 'Decode' is all about. As I have received several letters in a similar vein, I think now would be a good time to tackle the issue. Probably the best way to start is with an outline of some of the stations that can be received.

One of the most interesting areas seems to be press broadcasts. These are transmissions by press agencies such as TASS, Associated Press, etc. Rather than being simple news broadcasts for the public, they are intended for reception by newspapers and broadcasting authorities. The transmissions often form the basis of many of the stories you read in the daily paper. It is not really practical to use speech transmissions for this type of information - the printed word being far easier to edit. So what is needed is some form of communication that produces a printed output. One of the systems that I'm sure most readers will have heard of is Telex. This is where messages are sent using a machine rather like an electronic typewriter. The press services use a system very similar to this. You're probably wondering just what these transmissions sound like. This is difficult to describe, but the nearest I can get is a rapid warbling sound. Press stations using this system can be found throughout the short wave bands.

Another area that attracts great interest is FAX transmissions. These are used primarily for the transmission of weather charts, but some press and meteo photographs are also sent. Although broadly similar to the modern office FAX, radio FAX uses the old analogue transmission standards. These transmissions have a cyclic sound that could be likened to the sound of a wheelbarrow with a rusty wheel!

I'm sure you're now all wondering what you have to do to receive these transmissions. Fortunately, the personal computer age has made this quite easy. These modes can be received with most common computers and a careful look through the advertisements in *SWM* will give you a good idea of the range and prices. If you'd rather avoid computers, there are many self-contained decoding systems on the market. The only problem here is that, with one or two exceptions, they tend to be expensive. One particularly successful complete system is the ERA Microreader.

That's as far as I intend to go in this simple introduction. However, I will be running a number of tutorials in the column which, I hope, will help to build readers knowledge of this fascinating aspect of the hobby. If you have any questions you would like answered, please drop me a line and I will do my best to help.

Readers' Letters

Mark Hayward has written from Basildon in Essex with details of his station. Mark runs a Yaesu FRG-7 receiver with an a.t.u. and long wire antenna. For decoding Mark uses a Dragon computer with software for c.w., RTTY, AMTOR and SSTV. He does however, have a real problem with interference from the computer. This is mainly due to his long wire being in the same room as his station. An additional problem is that his parents won't allow him to have an external long wire antenna. So, what can he do? I have a couple of suggestions that might help. The first and cheapest, is to make an 'invisible' antenna. The trick is to make a long wire out of very thin wire, the theory being that it then becomes very difficult to see. Typical wire size for this type of antenna would be about 28s.w.g. or 0.4mm diameter. Another point to remember when making a long wire antenna is that it doesn't have to be in a straight line. The important aspects are; (i) it must be kept clear of sources of interference and (ii) kept well away from other electrical cables, for your safety.

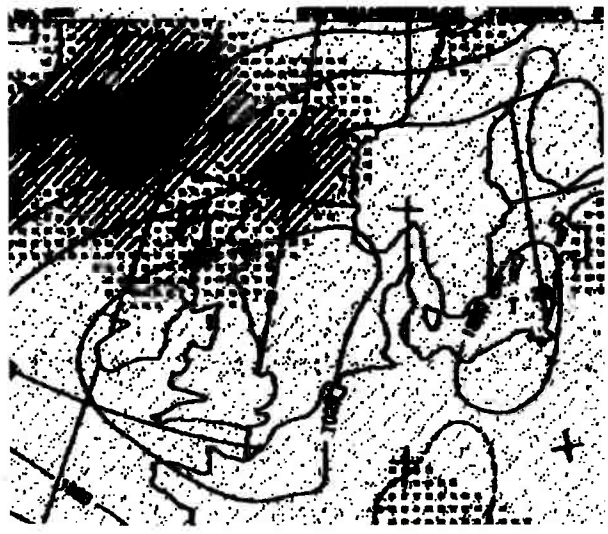
A second alternative for Mark would be to use an active antenna again, mounted away from interference. I know many newcomers are put off by the price of some of these units but, if you are prepared to do some work yourself, the range of active antennas from C.M. Howes are excellent value for money.

Bernard Harratt of Pontifract writes with several points, the first of which concerns the RTTY weather program that was published in the August '90 *SWM*. This was a simple routine that enabled the five figure number groups transmitted by weather stations to be decoded into English. The author suggested that the program could easily be adapted for use on other computers. This is where Bernard has hit a problem as he is not at all conversant with BASIC programming. His question is simple - has anyone re-written this program for the 48K Spectrum? If any readers have done this, perhaps they could send me a copy and I will pass it on to Bernard. Incidentally, Bernard is not the only reader who has written with this question.

A final point raised by Bernard is that of software copying. This is a very contentious issue and one that you need to treat very carefully. If a program is in the public domain, it will generally say so on one of the initialisation screens or in the instructions. If there is nothing to indicate whether or not it is public domain, it should be treated as if it were copyright. You should also be careful just where you obtain public domain software. The best sources are either national user groups or some of the software libraries that advertise in the computer press. At least by using this system you can be sure that you have the latest unmodified version of the software.

Darran Taplin of Brenchley has been a short wave listener for some six years, but has just recently discovered the world of utility stations. Darran's current station comprises a Lowe HF-225 receiver, Global AT-1000 a.t.u. and a 30m long wire antenna. The decoder is the popular ERA Microreader Mk2. The latest project has been to interface the Microreader with his Atari 520ST so that he can have a large screen display. Darran asks just one question - what mode, l.s.b., u.s.b. or c.w., should he use when receiving RTTY. Most decoding systems, including the Microreader, assume that the receiver will be set to u.s.b. for RTTY reception. If this is the case, then l.s.b. need only be used if you need to invert the signal. On some receivers the c.w. mode includes additional filtering designed specifically to improve c.w. reception. In these cases it is normally only possible to use this mode for c.w. partly because of the narrow bandwidth but also because the audio frequencies produced are outside the requirements of the decoders.

Norman Hartford of Telford is a keen utility enthusiast, but has come across a problem with an unidentified station. The station in question operates on 21.794MHz using a shift of 425Hz and a baud rate of 100. There is no mention of this station in the usual frequency lists, though the transmitted text shows that it is the Novosti News Agency. This agency has recently undergone a name change from the old Novosti Press Agency (APN) to the new Novosti News Agency (IAN). However, I still don't have a callsign for this frequency. If anyone can help, please drop me a line. Incidentally Norman has heard the station at around 0700UTC.



The sort of FAX weather picture often received by readers.

Gulf News

I would like to hope that when you read this the crisis may be over. However, I'm sure this information will be of general interest.

Jan Nieuwenhuis has compiled a very useful list of stations currently active in the Gulf. As far as I'm aware all the stations send RTTY at 50 baud with a shift of 425Hz. The format for the list is: frequency, callsign, station.

4.0425MHz, A9M9, GNA Manama
5.055MHz, JYF6, Petra Amman Jordan
5.867MHz, YIL68, INA Baghdad
6.83MHz, -, Petra Amman Jordan
7.565MHz, YIX75, INA Baghdad
7.800MHz, 9BC22, IRNA Tehran
7.959MHz, 9BC23, IRNA Tehran
8.049MHz, 9BC25, IRNA Tehran
8.1375MHz, TCY1, AA Ankara Turkey
9.1975MHz, A9M41, GNA Manama
9.463MHz, JYF4, Petra Amman Jordan
9.965MHz, 70B45, ANA Aden
10.1625MHz, YIL71, INA Baghdad
11.08MHz, YKP28, SANA Damascus Syria
13.524MHz, YIO72, INA Baghdad
14.373MHz, YIL73, INA Baghdad
14.56MHz, JFY2, Petra Amman Jordan
14.764MHz, A9M70, GNA Manama
15.02MHz, YKP33, SANA Damascus Syria
18.040MHz, TCY4, AA Ankara Turkey
18.56MHz, 9BC31, IRNA Tehran
19.2MHz, 9BC32, IRNA Tehran
19.980MHz, 9BC33, IRNA Tehran

I don't have details of transmission times to hand, but a check of the schedule in Klingenfuss *Guide to Utility Stations* should help. Just to get you started, you should find that INA Baghdad has a strong English broadcast at 1600UTC on 13.524MHz.

Another interesting snippet concerns the Kuwait News Agency KUNA. The Iraq news agency INA has declared KUNA cancelled following the annexation of Kuwait. But word has it that the agency is soon to start operating from London. Obviously if anyone has any more detail I would be pleased to hear from you. My advice is to keep an eye on the KUNA frequencies.

What Receiver

Brian Shepherd is the technology co-ordinator at Buttershaw Upper School in Bradford and has written asking what receiver should he choose for the school's station. Brian is new to the world of utility monitoring, but feels it would be a good way to teach students about data processing. He has already built-

SEEN & HEARD

up the basis of a good station, with a BBC Master computer and RX-8 decoding package from Technical Software. He also has the AA2 active antenna from C.M. Howes and the Klingenfuss *Guide to Utility Stations*. The main problem facing Brian is, what receiver to go for. School budgets being what they are, value for money is particularly important. I thought it would be appropriate, in view of Brian's letter, to discuss some of the parameters that are critical to utility listening.

The first area is the basic frequency coverage. For most operators 1.5 to 30MHz is adequate. However, there are a number of very interesting FAX stations on the lower frequencies, between about 90kHz and 150kHz. One of the favourites in this range is Offenbach Meteo on 134.2kHz. This is the station that re-broadcasts Meteosat images. So the FAX enthusiast really requires coverage from about 100kHz at the lower end.

The next point to consider is the tuning steps. Although the tuning knobs of many receivers give the impression of continuous tuning, most actually change frequency in small steps. This is due to the use of digital techniques for the generation of the internal frequencies. The size of these steps is important, because if they are too large it may not be possible to tune some signals accurately. The ideal tuning step size is about 10Hz or 15Hz. However, some receiving systems, such as the RX-8, can cope with larger steps such as 100Hz.

The other vital point is that the receiver must be able to resolve single side band (s.s.b.) transmissions. Ideally it should have both u.s.b. and l.s.b. as reception modes. There some receivers that use a b.f.o. for s.s.b. reception. Although this is often fine for speech transmissions, the stability of the b.f.o. is often poor. This can make the more critical utility modes difficult to receive.

That covers the real basics of receiver selection so let's summarise.

Frequency Range: 1.5MHz to 30MHz (100kHz for FAX enthusiasts).

Tuning Steps: 10Hz/15Hz (up to 100Hz with some decoding systems)

Receive Modes: s.s.b. (preferably u.s.b. and l.s.b.)

There are of course many other features included in modern receivers that make life easier for the operator, but these are not essential.

If anyone has any particular comments on receivers, I will be pleased to hear them.

Frequency List

As usual, I have included here a selection of the loggings I have received this month. My thanks to **Day Wayson**, Jan Neuwenhuis, **Harold Pinkney** and **Eric Sillick** who are amongst those who sent in logs this month. The format used is; frequency, mode, speed, shift, callsign, time, notes.

3.319MHz, CW, -, -, MGJ, 2049UTC, RN Glasgow

6.96MHz, RTTY, 50, 425, LZA2, 2104UTC, PTT Sofia

7.592MHz, RTTY, 50, 425, YZD6, 2100UTC, Tanjug News

7.845MHz, RTTY, 50, 425, SOH284, 2045UTC, PAP Warsaw

8.085MHz, RTTY, 50, 425, RVL21, 1823UTC, Khabarovsk Meteo SYNOP

9.391MHz, RTTY, 50, 425, SOJ239, 1955UTC, PAP Warsaw

9.395MHz, RTTY, 50, 425, HMF84, 1820UTC, Pyongyang

10.6095MHz, RTTY, 50, 425, SUA30, 2030UTC, MENA Cairo

11.123MHz, CW, -, -, RMP, 1227UTC, Kaliningrad

11.453MHz, RTTY, 50, 425, IMB3, 0818UTC, Rome Meteo

13.474MHz, RTTY, 100, ?, ?, 1405UTC, UNID

13.77MHz, RTTY, 75, 425, CNA7, 0822UTC, VoA Tanger English News

14.638MHz, RTTY, 75, 425, WFK54, 2109UTC, New York news

14.7MHz, RTTY, 50, 425, RGL22, 2000UTC, TASS Moscow

19.649MHz, RTTY, 75, 425, RCF, 1445UTC, MFA Moscow

23.37MHz, RTTY, 100, 425, HZN50, 1429UTC, Jeddah Meteo SYNOP

For a copy of the full frequency list, send three first or second class stamps to Mike. If possible include a few of your own loggings or details of your station.

INFO IN ORBIT

Lawrence Harris
5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB

Satellite activity has remained high for many weeks and on the evening of September 29, I heard the unmistakable tones of METEOR slow-scan infra-red transmissions. Running predictions showed that no satellite was expected and so I assumed that I was listening to the first broadcast of a new METEOR. A few days later I had a call from a contact who gave me the elements of the new METEOR 2/20. I am not including them here simply because, like METEOR 2/19, it has not been transmitting a.p.t. since achieving orbit.

Kepler Elements

The elements and frequencies for current satellites can be obtained from me by enclosing an s.a.e. This saves valuable column space!

METEORS

During recent weeks METEOR 2/18 on 137.30MHz and METEOR 3/2 on 137.85MHz have been operational but watching the orbits slowly change suggested to me that 2/18 would be switched off and replaced by 2/17. This happened in mid-October and 3/2 has just gone off as well. Changes are frequent so I have modified the frequency listings accordingly.

I have spent much time studying the various orbits of the METEORS to try to understand how predictable the changes are and I think that I am close to solving this mystery. Expect a METEOR 3/4 launch soon.

COSMOS 1602

This old experimental satellite has continued to transmit a.p.t. on 137.28MHz, which is an unlikely frequency and so has probably drifted down from 137.30MHz. It has been showing a blank picture, but in mid-October it became visible at long last. I will try to publish some of the telemetry sequences for readers to see what is going on. If you can only listen to the sounds, the periodic pitch changes are the numbers along the side of the picture. They can be decoded to indicate what on-board equipment is being used.

FENGYUN 1B

This has proved more reliable than its predecessor FENGYUN 1A and has carried on transmitting continuous a.p.t. data on 137.80MHz. On the evening of September 24, the Chinese satellite controllers switched on its infra-red scanner and we saw the first picture.

As expected it is of the same format as the NOAA satellites having warm areas (deserts, etc) as dark and cold areas (clouds and snow) as white. Also like the NOAAs it is broadcasting h.r.p.t. (see later) in the 1690MHz band.

The orbit of FENGYUN is such that it passes over the same place about a minute or so later each day. The edge markings are unique and **Fig. 1** shows what they look like.

OKEAN 2

This has returned to occasional transmissions and **Fig. 2** is a recent picture of mine showing Spain and the number sequence which is decodable.

NOAAs

The regular transmissions provide reliable data for newcomers to test equipment. Occasionally NOAA 9 is switched off for a few weeks to avoid conflicts with NOAA 11.

METEOSAT

I mentioned some time ago that users of METEOSAT data should inform the Meteorological Office at Bracknell of their monitoring activities. I have received a letter from F. Singleton, the Divisional Director (Observations) who points out that there are many commercial interests wanting to collect this data rather than pay the Met Office for it. Users will be asked to declare that they will not make such data to available to third parties.

GOES

I moved one of my dishes around to the west recently and detected a faint signal from GOES-E. This is the NOAA geostationary satellite that transmits superb imagery from its location over the USA. It is part of the world-wide network of geostationary satellites transmitting a.p.t. as well as h.r.p.t. (see later). If you have a clear horizon and a good pre-amplifier you should be able to get fair pictures. My 1690MHz pre-amp is being 'tuned up' by Dave Cawley of Timestep Weather Systems so I am hoping to get access to GOES-E again soon.

Frequencies

NOAAs 9 &11 are using 137.62MHz.
NOAA 10 is on 137.50MHz.
METEORS use 137.30, 137.40 & 137.85MHz.
OKEAN 2 uses 137.40MHz.
FENGYUN 1B uses 137.80MHz.
COSMOS 1602 is on 137.28MHz

Fig. 1: FENGYUN 1B showing unusual edge code.

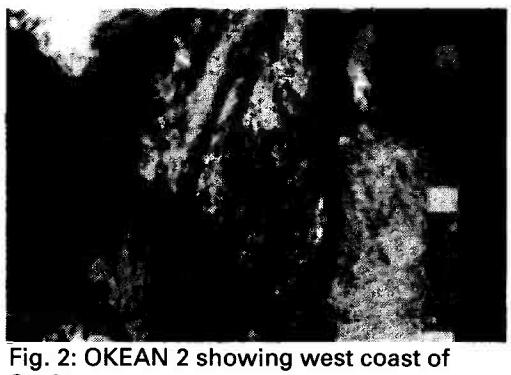


Fig. 2: OKEAN 2 showing west coast of Spain.

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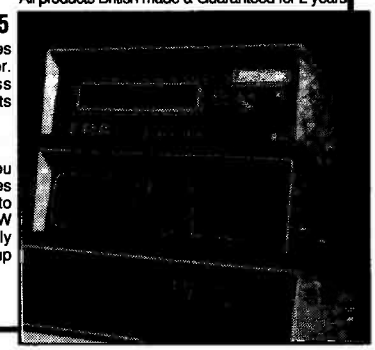

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SEEN & HEARD

Letters

Dave Brown of Port Erin has been monitoring satellite images for several years using a discone antenna feeding a Mapsat v.h.f. receiver and decoder and his Amstrad CPC6128 computer. He produced **Fig. 3** of Sardinia and Corsica and asks about the line rate used by Russian satellites. It is 120 lines per minute, but remember that the satellites are constantly moving so if you synchronise the picture to your own time standard it will slowly drift first one way and then the other as the satellite approaches and recedes - the Doppler effect. I now use Timestep's software to do the synchronisation on both live and recorded data and this produces perfect straight edges.

John Crawshaw wrote from Blackpool to ask several questions to which I replied separately, including Yagis for METEOSAT. I know of some of very uncertain performance so I would like to hear from any manufacturer who can supply a good quality Yagi at an affordable price.

A letter from **Steve Linksted** of Horsham told me of his college which installed a satellite system four years ago and have yet to receive a picture! May I suggest that if they write to me with an s.a.e. I will try to help. Steve requested (and will receive) a tape of NOAA data for checking out his own equipment.

Suppliers

I am regularly asked whether software and hardware is available for one or other of the various computers that *SWM* readers have and so I am collecting this information together.

Technical Software recently sent me details of their FAX and weather satellite decoding products which run on a Spectrum computer. If I can borrow a Spectrum then I will do a review of the unit but meanwhile Richard Wilmot tells me that their software is easy to use and can process both METEOSAT and NOAA satellites. The program costs £42 for the disk version (including the interface adapter), and £59 for the APT-1 decoding module.

The Start

In the 1980s, manufacturers started to use the new small computer systems to produce weather satellite pictures from the v.h.f. band. The first choice was the BBC model B computer which was almost obligatory in schools. Several manufacturers produced interfaces to allow a suitable receiver to be connected to this computer and software could then produce pictures. These systems were working to the limits of the computer's memory and processor speed.

When we tune into the satellites in the v.h.f. band, we are monitoring the a.p.t. (automatic picture transmission) telemetry which, using either a framestore or computer system, we can decode into good quality pictures. This signal is just a part of the complete picture and if you wish to see the total image then you have to build a different system.

High Resolution

NOAA, FENGYUN and METEOSAT/GOES also transmit telemetry in the 1690MHz band and if you build a suitable system you can collect the high resolution picture transmission (h.r.p.t.) data. As its name implies this data has considerably better resolution than the a.p.t. pictures. If you measure the smallest detail that you can see from your a.p.t. imagery you may manage about 4km. Imagery from the h.r.p.t. scanner has about four times the resolution - about 1km!

The latest systems produced for the a.p.t. images for IBM compatible computers probably mark the final stage of image improvement that can be achieved. Systems that convert the incoming analogue signal into 256 different levels mean that the computer can enhance the detail that the eye cannot see. If you use contrast stretching to look at the dark areas of METEOR pictures you will find that the land detail is actually quite good - my own new system can clearly show land that is otherwise invisible.

I have invited companies to keep me informed of their work and I recently received a disk from Timestep Electronics Ltd who are developing an h.r.p.t. system based on collaborative work with John Dubois in America. One picture was of the Alps and the other included the north west coast of Spain, in staggering quality.

To monitor the h.r.p.t. signal you need a dish at least 1.2m diameter fitted with a suitable feed and low noise pre-amplifier. The signal is fed directly into a 4-channel h.r.p.t. data receiver and then to a data card fitted into a suitable computer. I will keep *SWM* readers informed of progress in this field.

Fig. 3.

Other Satellites

'Info in Orbit' has been primarily concerned with weather satellites but most listeners to the bands will hear signals from other satellites as well.

UOSAT-2 and DO-17 can be heard several times each day transmitting on 145.825MHz from polar orbit. Using a dipole you can hear the signal, and its telemetry can be decoded with simple electronics.

For many months now I have been logging a satellite on 136.23MHz. Looking through my records of early satellite transmission frequencies I noticed that SERT 2 and others had used this one but that satellite was launched 20 years ago so I wondered whether it would still be in use.

I contacted Geoffrey Falworth who edits *Satellite News* and provides me with Kepler elements for the less common satellites. He sent me four sets which gave a perfect fit. Geoffrey comments that SERT 2 was re-activated earlier this year to obtain some data from an onboard micrometeroid impact detection experiment.

If you can tune into the 150 or 400MHz bands, try listening out for the numerous COSMOS military and civilian navigation satellites that operate there. The frequencies used are 149.91, 149.94, 149.97 and 150.03MHz plus 399.84, 399.92, 399.96 and 400.08MHz. You will need a suitable antenna, not just the little collapsible rod that comes with most scanners.

I use a discone with pre-amplifier in the loft and I have heard each frequency, so I can assure you that they are there! I recently logged COSMOS 2026 which uses 149.97MHz and is easy to hear.

There are many other satellites worth listening out for but one that you won't hear again is our old friend ARIEL-6 which re-entered on September 23. It was the last all-British science satellite that was operated by three teams of scientists, including mine, and many a night shift was spent recording and analysing its data for the university scientists.

SALYUT 7 is descending towards re-entry expected December 31 ± 10 days depending on solar activity. Geoffrey Falworth tells me several sections will survive re-entry - so keep your head low!

Space Probes

I was recently asked whether amateurs could tune into interplanetary space probes such as MAGELLAN. I'm afraid the answer is no. These craft use very high frequencies and due to their enormous distances from us, amateur equipment is not sufficiently sensitive to hear the signals above the noise level.

Professional systems used by the American deep space network (DSN) not only use giant dishes, but amplifiers cooled in liquid nitrogen to minimise receiver noise.

Remote Imaging Group

I mentioned last month about the delays in printing the RIG magazine. The chairman of RIG is Henry Neale G3REH and he has kindly offered to answer any queries about RIG matters if members ring him on Tel: (0945) 85353.

Sorry there is no space for METEORS part 4 or Predictions this month.

SEEN & HEARD

BAND II DX

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

"We had very warm sultry weather during July and August with no rains. However, September has been having heavy rains and it has become very pleasant," wrote **Lt. Col. Rana Roy** (Meerut, India) on September 17. The weather buffs among you may like to know that the amount of rain I recorded during the months of July, August and September was 0.97, 1.42 and 2.19in respectively. Monthly statistics can sometimes go wrong especially in September when, on the last day I recorded 1.1in during an overnight downpour. This followed the fall in pressure and the tropo-opening on the 28th and 29th. At 1700 on the 30th, my Hygrometer was reading 86%. Incidentally, I have found this a most interesting instrument to have in my office and they are not expensive to buy. Mine is next to a matching thermometer and both are built into the face of a 190mm diameter quartz clock which cost about £18.

Tropospheric Events

As the prevailing high pressure of 30.4in (1029mb) began a gentle decline around 0200 on September 28, a tropospheric opening began. Throughout the rest of that day, and the morning of the 29th, I counted around a dozen, mixed, continental stations in Band II as I did while a similar event was in progress during the morning of October 6. A variety of continental stations, plus BBC Radios Bristol and CWR (Coventry) were putting strong signals into Sussex during the late evening of October 11.

On the 28th, **Simon Hamer** (New Radnor) identified programmes in Band II from BBC Radio's Guernsey and Jersey, Radio Kilkenny (96.4MHz) in Eire and from stations in Belgium, Denmark, France, Holland and Germany.

George Garden (Edinburgh) noticed a programme schedule in his local paper, *The Scotsman*, for East End Radio and being the keen Band II buff he is, he decided to listen out for it. However, he could not receive it from his flat in Edinburgh, so he tried on his car radio and heard its signal while parked on a high spot near the Dollar junction of the M90. "It is a very lively IBA station with pleasant middle of the road music, announcing frequently, 'your community radio on 103.5 FM'", said George and added, "I think this may be transmitted from Falkirk, near Glasgow." Also from this site he heard BBC R. Newcastle at fair strength plus the IBA stations Centre Sound from Stirling and Radios Borders and Forth.

Fig. 1.

Fig. 2.

Fig. 3.

Faces Behind the Reports

During September I had the pleasure of meeting and having a chat with **Russ Burke** (Northampton), Fig. 1, George Garden, Fig. 2 and **John Woodcock** (Basingstoke), Fig. 3, at the Amberley Chalk Pits Museum, (West Sussex). I was then able to show them the museum's Vintage Wireless Collection, which covers 90 years of the subject from the telegraph of 1890, through two World Wars to remote controlled TV of the 1980s.

Info

My thanks to **Francis Hearne** (Bristol) for telling me about two more medium wave/v.h.f. separations on ILR. "Radio 210 and 2CR, are both broadcasting their normal format on v.h.f. and records from the past on 1431 and 828kHz respectively," said Francis and continued, "Both 2CR and Radio 210 are relaying programmes from Brunel Radio and all three stations now broadcast under the title of 'Classic Gold Radio', 2CR and 210 still retain the local format with advertisements and local news."

Thanks also to **Paul Birney** (Co. Dublin) for details of the Local Radio Franchises in Ireland, which includes some of the stations, such as Capital Radio on 104.4MHz, Clare FM (96.4MHz), Classic Hits 98 FM (98.1MHz), Cork 96 FM (96.4MHz), County Sound Radio (103.7/102.6MHz), Horizon Radio 94.9 FM and Radio Kilkenny (96.6MHz) that readers have previously reported to this column. Paul is interested in all aspects of broadcast listening and along with his Grundig 600 receiver he has Realistic PRO-32 and PRO-2004 scanners.

By the time you read this the new Broadcasting Bill should have received the Royal Assent and will come into force in January 1991. On October 17, I learnt from the IBA's ORACLE that, briefly, a new Radio Authority will assign frequencies, issue licences and regulate all independent radio stations in the UK. The present 'shadow' body have plans to offer up to 30 local radio licences during 1991. These changes will be important to DXers so keep an eye on page 697 for the latest gen.

TELEVISION

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

Although the 'E' region of the ionosphere did not turn sporadic as often and as intensely as we would have liked during the summer, most readers took each event as it came and logged what DX could be seen. As far as I can see, the 1990 Sporadic-E season ended early in September and many readers, like **John Woodcock** (Basingstoke), felt that it had been a poor season for Sporadic-E activity.

Judging from the latest letter from **Lt. Col. Rana Roy** (Meerut, India), he wasn't very impressed either. The September log from **Simon Hamer** (New Radnor) contained just three Band I entries. He received test-cards from Denmark (DR) and the Norwegian regional Hemnes on Ch. E3 (55.25MHz) on the 10th; "smeary signals at 1000 ('F2')" on the 25th and pictures from Denmark, Poland (TV2) and Sweden (SVT) on Chs. E3, E2 (48.25MHz) and R1 (49.75MHz) respectively. Simon's entry for the 25th is especially interesting, because John Woodcock was suspicious of an 'F2' opening in Band I on the 9th. If these reports indicate an early start to the winter 'F2' activity, then it's worth making a routine check for 'smeary' images around Chs. E2 and R1 early each morning.

Russ Burke (Northampton) may have seen one of the first of the winter Sporadic-E openings when he received pictures from Italy (RAI) and Spain (TVE1) on October 4 and 5.

News From India

"There hasn't been much of DX this year. The 'Es' were very poor, 'F2/TEP' is now coming in regularly. Yesterday, after a long time, we had Sporadic-E from Russia at 1340 showing a UEIT test-card, but it faded away by 1400. In the evening, at about 1930, we had strong colour pictures from Dubai on Ch. E2, but by 2000 the pictures faded away," wrote Rana on September 17.

During the period June 3 to September 12, Rana received various programmes from the USSR on Ch. R1. These included a film at 1830 on June 3 (**Fig. 1**), aerobic exercises at 0727, a test-card at 0845 and cartoons, **Fig. 2**, at 1815 on the 4th. There was news at 0728 on the 5th; "multiple signals from Russian stations" at 1830 on the 6th, a test-card at 1230 and news at 1745, with various programmes until 2235 on the 7th. He saw a test-card at 0730 on the 12th, songs at 1715, then news mixed up with three other Russian stations at 1915, a clock scribed with 'Olivetti' at 1930, **Fig 3**, followed by their 'BPMER' news logo on the 17th. Then there were aerobics early on the 24th, a mix up with pictures from Dubai (Ch. E2) between 2005 and 2030 on the 25th, with a test-card and a documentary struggling together at

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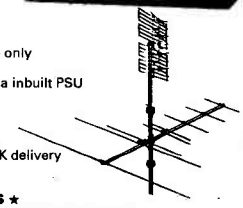

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★ ARQ-Swe: CCIR 518 variant
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★ ARQ-N: ITA 2 Duplex
★ ARQ-E3: CCIR 519 ITA 3
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1350. Finally there was a programme at 1800 on the 26th, a test-card at 1400 on the 27th with weak signals at 0740 and a documentary at 1715 on the 28th.

In July Rana saw a "a foreign movie with Russian subtitles" at 2000 on the 2nd, football at 0730 on the 4th, a digital clock and news at 0725 on the 11th and weak pictures at 0727 on the 17th and 1900 on the 28th. In August, he logged cartoons at 0750, a film at 1005 (**Fig. 4**), a test-card at 1240 and multiple signals on Chs. R1 and R2 at 1630 on the 2nd. This was followed by a test-card from 1315 to 1400 on the 15th.

Slightly lower in frequency, on Ch. E2, Rana received programmes, often in strong colour, from Dubai TV. These included Teletext (**Fig. 5**) at 1645, a clock at 1728 (Dubai time 1558) with prayers till 1800. This was followed by an animated film, an Arabic play and songs and dancing for children, all on June 12. Then he saw Teletext, prayers, songs and dancing and a discussion (**Fig. 6**) between 1650 and 2130 on the 13th. There were more prayers, an announcer and a horse-show from 2040 to 2100 on the 17th. Then football during the evening of the 24th and Teletext around 1650 on the 26th and 28th and 1500 on the 29th. Activity in July was limited to colour-bars and Teletext at 1420 on the 4th; programmes at 1950 on the 22nd and Teletext during the mid-afternoon of the 26th. Rana again watched Dubai TV from 1900 to 2130 on August 7 and an Arabic play followed by prayers and sport between 2000 and 2100 on the 13th.

One special for Rana came on Ch. E2 at 1400 on June 7 when he saw a PM5534 test-card, in colour, with 'JTV' at the top and a digital clock showing 1130. Before this signal finally faded out at 1450 he could make out the word 'SWEILEH' written below the ident.

Picture Archives

David Glenday (Arbroath) sent a couple of super colour prints of the test-cards he received from Denmark (TV2 Hadsten), **Fig. 7**, and Germany (RTL-Plus), **Fig. 8**, on Chs. E26 and E59 respectively while one of those late 1989 tropospheric openings was in progress. Les Jenkins (Godalming, Surrey), looked at his satellite archives and showed me the type and strength of the signals he received, in colour, from Scandinavia, **Fig. 9**, via Eutelsat 1-F4 and Spain, **Fig. 10**, via Eutelsat 1-F2. The antenna elevations and directions are 7° east for 'F2' and 13° east for F4.

Tropospheric

Rana Roy received pictures from Indian and Pakastani stations, via tropo, during a few mornings in June and, on September 17, he reported, "tropo has been very poor with nothing in July, August or September."

Jason Faulkner (Leicestershire) has been TVDXing for about 5 years and can receive u.h.f. pictures, under normal conditions, from the transmitters at Belmont, Emley Moor, Nottingham, Sandy Heath, Sutton Coldfield and The Wrekin. However, his DX to date includes signals from Bilsdale, Crystal Palace, Hannington, Moel-Y-Parc, Oxford, Ridge Hill, Rowridge, Rumster Forest, Stockland Hill, Tacolneston, Wenvoe, Winter Hill and BBC1 Scotland on Ch. 25.

Andrew Jackson (Wirral) received pictures from France, (Canal+) on Ch. L5 on September 7-10, 12, 13, 15, 17-20, 23-26, 30, October 1, 2 and 4. He also logged Canal+ on Chs. L7, L8 and L10 from Troyes,

Fig. 1: USSR.

Fig. 2: USSR.

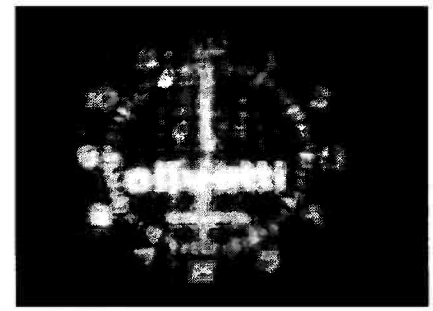

Fig. 3: USSR.

Fig.4: USSR.

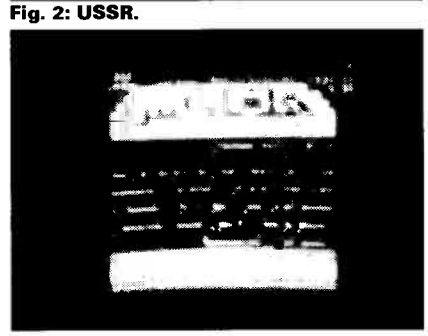

Fig. 5: Dubai.

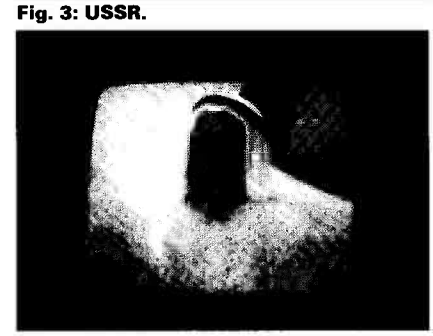

Fig. 6: Dubai.

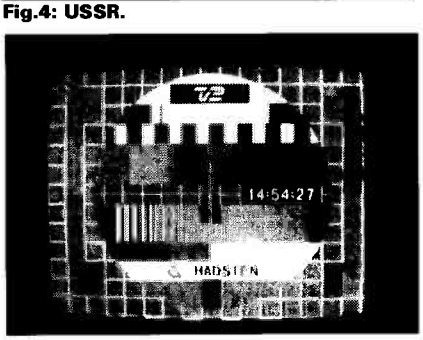

Fig. 7: Denmark.

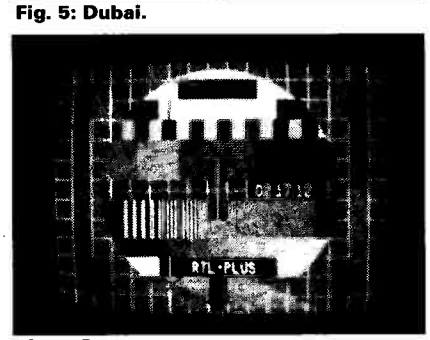

Fig.8: Germany.

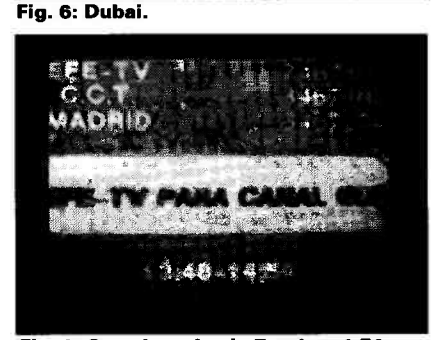

Fig. 9: Scandanavia via Eutelsat 1-F4.

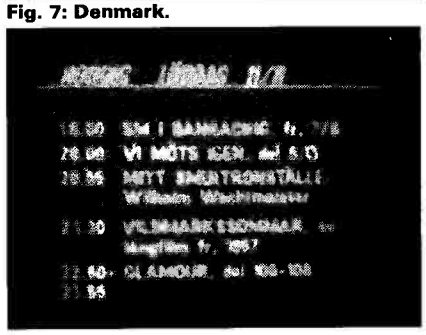

Fig. 10: Spain via Eutelsat 1-F2.

Fig. 11: Slow-scan Austria.

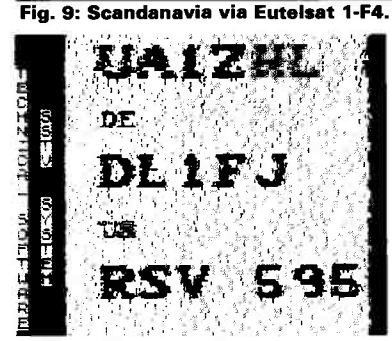

Fig. 12: Slow-scan Germany.

SEEN & HEARD

Nancy and Lyon on the 18th and 19th. In addition, Andrew received Ireland's RTE 1 and 2 on Chs. 40 and 43 respectively from Langford on the 13th and Germany (RTL+) or Holland (PTT NED1) on Ch. E7 on the 15th. Andrew's best DX came on October 1 when he logged, for the first time, strong pictures from Belgium (BRT TV1 and 2) on Chs. 43 and 46 from Egen.

During the evening, he added France (Antene 2), "local quality signals", on Ch. 39 from Dunkerque and Holland (PTT NED3) on Ch. 35 from Goes.

John Woodcock also received pictures from Canal+ on September 23 and 24 and October 1. While the high pressure was falling on September 28, I received weak pictures in Band III from France at midday and mainly Belgium and Ireland (RTE) during the evening. Very strong co-channel interference ebbed and flowed on many u.h.f. channels between 2100 on the 28th and 0200 on the 29th. At 0459, I saw the Anglia TV flag, followed by ITN news, in full colour on Chs. 24 and 41. Not bad for a chimney dipole cut for Band II! At 0830, I received a test-card from Holland (PTT NED 1) which died away around 1000 as rain crossed the south.

Simon Hamer had his usual good haul of DX on September 28. He logged pictures from Denmark (DR Danmark), France (TDF) and Germany (DFF1 and RTL Plus) in Band III and Belgium (BRT1), Denmark (TV2 Danmark), Germany (DFF2 and ARD/WDR1, NDR3, SAT1, West 3 and ZDF), Holland (NED1,2 and 3) and Ireland (RTE1 and Network 2) in the u.h.f. band. "They'll go down in history," said Simon about his "last sightings" reception of the East German DFF-1 and DFF-2 transmissions.

I received a test-card from Belgium (RTBF 1) on Ch. E8 during another fall in pressure from 30.2in (1022mb) during the morning of October 6.

"Sunday the 7th saw a welcome return to the high pressure as forecast by the TV weatherman - a great bonus for us DXers to look forward to," wrote **George Garden** (Edinburgh). He continued, "although this does not always provide the right conditions, in this case it certainly helped."

With DX upper-most in his mind, George took his JVC receiver and amplified loop antenna to a high spot overlooking a valley on the road to Dollar, near Stirling. With the loop on his car-roof, he found that the u.h.f. signal from the transmitter at Darvel was as good as the local ones from Craigkelly. Much to his surprise, he identified the BBC2 signal, on Ch. 34, from Caldbeck, near Carlisle serving the Border area, coming in waves.

A mild tropospheric opening coincided with a pressure fall from 30.2in at 0600 on October 11 to 30.0in (1015mb) at 0700 on the 12th. Among the DX I received during the period was the news and weather from Ireland's RTE in Band III, from 2100 to 2130 on the 11th.

In the u.h.f. band around 0500 on the 12th, I saw Anglia TV's programme schedule, 'flag' logo and the ITN news caption on Ch. 24 and a test-card from Holland (PTT NED 1) on Ch. 27.

SSTV

During the weekend September 22-23, **Steve Charles** (Rustington, Sussex) copied slow scan television pictures around 14.230MHz from stations in Austria (OE5AFW) **Fig. 11**, Germany (DL1FJ, **Fig. 12** and DL6MCR), Poland (SP3AMZ). In addition he saw the captions 'CQ SSTV', 'GOOD DAY', 'HU COPY' and 'MY NAME IS ALOIS'.

LONG MEDIUM & SHORT

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

The many detailed and interesting reports which I have received from listeners during the year have contributed greatly to LM&S and I would like to express my sincere thanks to all those concerned. May I wish all readers a very happy Christmas and good listening in 1991.

Long Wave DX

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

As many UK DXers will know, the potent signal from Donebach on 153kHz renders the reception of the co-channel transmissions from Bechar, Algeria (1000kW) almost impossible during daylight. **George Millmore** was therefore very surprised to hear Bechar for a brief period while checking the band at noon in Wootton, IOW. Their signal rated SIO233 at 1210 and remained audible for about five minutes before it faded out.

The signal from Donebach reaches **Phil Townsend** in London at SIO444 during daylight, but soon after dusk it is buried in the noise. Whilst checking the band before and after dusk, Phil noted the following changes in the SIO ratings: Kaliningrad 171kHz, (inaudible/322); Oranienburg 177 (inaudible/222); Munich 207 (322/333); Roumoules 216 (222/inaudible); Warsaw 225 (433/444); Kalundborg 243 (433/333); Atlantic 252 (444/co-channel interference); Topolna 270 (inaudible/333); Minsk 279 (inaudible/333).

After dark, **Sheila Hughes** (Morden) has been comparing the reception of Atlantic 252 and Tipaza, Algeria on 252kHz. She says, "I found Tipaza to be the stronger signal. Both stations benefited by careful positioning of my receiver in the appropriate direction. Once again I found the excellent map in *Dial Search* useful for this". Sheila made her checks at 2135 and rated the signal from Atlantic 252 as 22222 and from Tipaza as 43343.

MW Transatlantic DX

During a three week period, **Jim Willett** (Grimsby) searched the band most nights and he was surprised by the absence of signals from the Caribbean and S.America. However, the conditions enabled him to listen to quite a number of the broadcasts from Canada and the USA. The earliest to reach him stemmed from CJYQ in St.John's, NF on 930 and CJCH in Halifax, NS on 920, they rated as SIO343 and 333 at 0030. DXers who rise early may be interested in his reception from 0500, which included WOGL Philadelphia, PA 1210 (SIO242 at 0500); KMOX St Louis, MO 1120 (132 at 0520); WCBS New York, NY 880 (222 at 0540); WLW Cincinatti, OH 700 (233 at 0545).

In New Radnor, **Simon Hamer** checked the band between 0000 and 0230 and heard four signals from the USA and six from Canada. He seems to have had better luck than Jim in that he heard the Caribbean Beacon, Anguilla on 1610. **Tim Shirley** checked the band in Bristol from 2300 and he received weak signals from WINS New York, NY 1010 at that time, but they were much stronger by 0300. At 0530 he logged RFO Pointe a Pitre, Guadeloupe on 640kHz.

There was no lack of signals from the Caribbean or S.America in the log from **Derek Taylor** in Preston. Each night he set up his time switch controlled receiver and tape recorder to monitor a particular frequency and then used the recordings to prepare his list for the chart. Quite a number of the entries have not been mentioned in this series before and are subject to confirmation by QSL.

Other MW DX

Having completed the construction of a 6 turn hexagon loop measuring 2.46m by 1.23m, **Mike Evans** put it to the test in Buckhurst Hill. Much to his delight, it enabled him to receive after dark the broadcasts from Sebha, Libya 828 (300kW); Sebaa-Aioun, Morocco 1044 (300kW); Qurayyat, Saudi Arabia 900 (1000kW); Al-Hassake, Syria 918 (200kW; Istanbul, Turkey 1017 (1200kW); also a large number of stations in Europe.

The broadcasts from Istanbul, Turkey on 1017 were also heard for the first time by George Millmore. He rated their signal as SIO233 at 2030. While searching the band in Co.Down, **Eddie McKeown** picked up the 1500kW transmission from Al Arish, Quatar on 954, which he rated as 12311 at 1945.

Some of the broadcasts from Algeria have been reaching the UK via sky wave paths after dark. In Swanwick, **Jim Cash** rated the 600/300kW transmission from Alger on 891 as 32443 at 2058. Sheila Hughes logged Ain Beida 531 as 33333 at 2220 and Alger 981 as 43333 at 2250.

MW Local Radio DX

The broadcasts on 1413kHz from Sunrise Radio, the incremental station in West London, are intended for listeners in Acton and Hounslow, but they seem to be reaching distant places too! In his latest report from Cambridge, **David Wratten** quoted their signal as SIO333 at 0848. No doubt they will be interested in reception reports from listeners near and far.

Although the aim of Spectrum Radio is to serve the many foreign residents in London, the reports reaching me indicate that their broadcasts on 558kHz are being received in many areas of the UK

Long Wave DX Chart

Freq (kHz)	Station	Location	Power (W)	DXer
153	Bechar	Algeria	1000	L
153	Donebach	Germany	500	B,C,D,H,J,K*,L,M,N,P
153	Brasov	Romania	1200	H
162	Allouis	France	2000	B,C,D,J,K*,L,M,N,P
171	Kaliningrad	USSR	1000	C,D*,K*,L*,N*,P*
171	Moscow	USSR	500	M
177	Oranienburg	Germany	750	C,J,K*,L,M,P*
183	Saarlouis	Germany	2000	C,D*,J,K*,L,M,P,Q*
189	Motala	Sweden	300	C,D*,I
189	Tbilisi	USSR	500	D*
198	BBC Droitwich	UK	500	B,J,K*,L,M,P,Q
198	BBC Westerglen.	UK	50	C,I
207	Munich	Germany	500	C,D*,J*,K*,L,M,P
216	Roumoules	Monaco	1400	B,C,J*,K*,L,M,P
216	Oslo	Norway	200	C,D,I,J*,K*,N
225	Konstantinow	Poland	2000	C,J*,K*,L*,M,P*
234	Junglinster	Luxembourg	2000	B,C,D,J*,K*,L,M,P
243	Kalundborg	Denmark	300	C,D,I,J*,K*,L,M,P
252	Tipaza	Algeria	1500	A*,D*,J*,L*
252	Lahti	Finland	200	D*
252	Atlantic 252	S.Ireland	500	A,B,C,D,E,F,G,J*,K*,L,M,O,P,Q
261	Burg	Germany	200	D*,I,K*,P
261	Moscow	USSR	2000	C,L*,M,N*
270	Topolna	Czechoslovakia	1500	B,C,D*,J*,K*,M*,P*
279	Minsk	USSR	500	I,J*,K*,L*,M*,N*,P*

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

DXers:
A: Ted Agombar, Norwich.
B: Thomas Barnett, Slough.
C: Kenneth Buck, Edinburgh.
D: Scott Caldwell, Warrington.
E: Robin Clark, Plymouth.
F: Mike Evans, Ryde, IOW.
G: Paul Gibson, Edinburgh
H: Roy Hill, West Kilbride.
I: Simon Holland, Douglas, IOM.
J: Sheila Hughes, Morden.
K: Eddie McKeown, Co.Down.
L: George Millmore, Wootton, IOW.
M: Fred Pallant, Storrington.
N: Tim Shirley, Bristol.
O: John Stevens, Largs.
P: Phil Townsend, London.
Q: Paul Weston, Kettering.

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during daylight! While checking the band in Gt.Yarmouth, **Ted Walden-Vincent** picked them up for the first time. Even more surprising is that **Simon Holland** can receive them in Douglas, IOM.

My thanks to **K. Mumby** in Leeds for informing me that ILR Radio Aire have now split their m.w. and v.h.f. services. The name 'Magic 828' has been adopted for their m.w. outlet (828kHz), which now concentrates on musical hits of the last 30 years. The latest hits from the charts are now broadcast via their v.h.f. outlet (96.3MHz) renamed 'Aire FM'. Also to **Jason Faulkner** (Leicester) for advising me that Tendring Radio (1557kHz) has been renamed 'Mellow 1557'. The new names adopted by some ILR stations are creating a good deal of confusion - Eddie McKeown asks, "why don't those 'locals' settle on a definite name, instead of 'Super', 'Classic', 'Gold', etc?"

Short Wave DX

Although the solar activity is continuing at a very high level it now seems likely that the peak of the present cycle (No.22.) may have been reached last year. Considerable variations in the reception conditions prevailing in the h.f. bands have been noted recently and these are likely to continue.

Good reception of the **25MHz (11m)** upper sideband broadcasts from Radio HCJB in Quito, Ecuador on 25.790 has been noted in the UK during much of the day. Listening in Largs, **John Stevens** rated their transmission as SIO444 at 1030. He says, "It was amazing to hear the quality of speech and music - I can safely say perfect". However, such results can only be achieved with an s.s.b. receiver, because their transmission consists of only the upper sideband and a low level pilot carrier. Ideally the receiver should contain a synchronous detector.

Their transmissions have also been reaching other areas. In Quebec, **Alan Roberts** rated them as 45555 at 1610. He noted the propagation conditions as good during 18 days and average during 12 days and rated the transmissions from SRI 25.680 as 45555 at 1425; Radio Moscow 25.680 as 25433 at 1155; Radio Norway Int, 25.730 as 45555 at 1705; Radio DW 25.740 as 35444 at 1350; Radio Yugoslavia 25.795 as 35444 at 1230; RFI 25.820 as 45555 at 1620; BBC 25.870 as 35444 at 1230.

Freq Hz	Station	ILR BBC	Power kW	DXer
558	Spectrum R	I	7.50	H,K,L,O,Q,R*,S*,T,V
585	R.Solway	B	2.00	G,N,R
603	Invicta Snd(Coast)	I	0.10	H,L,V
603	R.Gloucester	B	0.10	G,H,O,V
630	R.Bedfordshire	B	0.20	A*,G,H,L,O,U,V
630	R.Cornwall	B	2.00	K,O,P
657	R.Clwyd	B	2.00	D*,G,H,L,O,V
666	DevonAir R	I	0.34	O,P,V
666	R.York	B	0.80	G,H,V
729	BBC Essex	B	0.20	A,G,H,O,V
738	Hereford/Worcester	B	0.037	G,H,P,V
756	R.Cumbria	B	1.00	G,N*
756	R.Shropshire	B	0.63	G,H,O,P,V
765	BBC Essex	B	0.50	G,H,O,P,V
774	R.Kent	B	0.70	A,H,L,O,V
774	R.Leeds	B	0.50	G,R
774	Severn Sound	I	0.14	H,O,P
792	Chiltern R	I	0.27	G,H,L,O,U,V
801	R.Devon	B	2.00	G,H,N,O,P,R,V
819	Hereford/Worcester	B	0.037	G,H,P,V
828	Chiltern Radio	I	0.20	L,U,V
828	R.Aire(Magic 828)	I	0.12	G
828	R.WM	B	0.20	G,H,P
828	2CR	I	0.27	J,O
837	R.Cumbria	B	1.50	G,M,P
837	R.Furness	B	1.00	N
837	R.Leicester	B	0.45	A,G,H,O,P,U,V
855	R.Devon	B	1.00	O,P
855	R.Lancashire	B	1.50	D*,G,H,M,N*,P
855	R.Norfolk	B	1.50	A,H,L,V
873	R.Norfolk	B	0.30	G,H,L,N*,O,U,V
936	GWR (Brunel R.)	I	0.18	H,L,O
945	R.Trent (GEM-AM)	I	0.20	G,H,P,V
954	DevonAir R	I	0.32	O,P
954	R.Wyvern	I	0.16	G,H,P,V
990	Beacon(Nice & Easy)	I	0.09	G,H
990	R.Devon	B	1.00	J,N*,O
990	Hallam R.(C.Gold)	I	0.25	G,H
990	Spectrum	I	?	L,V
999	R.Solent	B	1.00	F,L,N*,O,V
999	R.Trent (GEM-AM)	I	0.25	G,H,U,V
999	Red Rose R	I	0.80	D*,G,M,N*,P
1026	Downtown R	I	1.70	K
1026	R.Cambridgeshire	B	0.50	A,G,H,L,U,V
1026	R.Jersey	B	1.00	L,O
1035	Northsound Radio	I	0.78	H*
1035	R.Kent	B	0.50	L,O,V
1035	R.Sheffield	B	1.00	G,H
1107	Moray Firth R	I	1.50	N
1107	R.Northampton	B	0.50	H,L,N*,O,U,V
1116	R.Derby	B	1.20	G,H,P,V
1116	R.Guernsey	B	0.50	L,O,P,V
1152	BRMB (Xtra-AM)	I	3.00	H
1152	LBC (L.Talkback R)	I	23.50	K,L*,O
1152	Piccadilly R	I	1.50	D*,G
1152	Plymouth Sound	I	0.32	P
1152	R.Broadland	I	0.83	A,H*,V
1152	R.Clyde (Clyde 2)	I	3.60	I
1161	GWR (Brunel R.)	I	0.16	H,O,P
1161	R.Bedfordshire	B	0.10	H,U,V
1161	R.Sussex	B	1.00	L
1161	R.Tay	I	1.40	G*,I
1161	Viking R.(C.Gold)	I	0.35	G,H
1170	Ocean Sd.(C.Gold)	I	0.12	F,L,D
1170	R.Orwell	I	0.28	V
1170	Signal R	I	0.20	D*,G,H
1170	Swansea Sound	I	0.58	P
1242	Invicta Snd(Coast)	I	0.32	L,V
1242	Isle of Wight R	I	0.50	E,F,K,N*,O,R,V
1251	Saxon R	I	0.76	A*,G,V
1260	GWR (Brunel R.)	I	1.60	N*,O,P,V
1260	Leicester (GEM-AM)	I	0.29	D,G,H,V
1260	Marcher Sound	I	0.64	D,G
1278	Pennine R.(C.Gold)	I	0.43	G
1305	R.Hallam (C.Gold)	I	0.15	G,H,V
1305	Red Dragon (Touch)	I	0.20	O,P
1323	R.Bristol	B	0.63	F,G,N*,O,P,V
1323	Southern Sound	I	0.50	O,V
1332	Hereward R	I	0.60	G,H,L,U,V
1332	Wiltshire Sound	B	0.30	L,O,P*
1359	Essex R.(Breeze)	I	0.28	L,V
1359	Mercia Snd(Xtra-AM)	I	0.27	G,H,V
1359	R.Solent	B	0.85	O
1368	R.Lincolnshire	B	2.00	G,H,V
1368	R.Sussex	B	0.50	L,O
1368	Wiltshire Sound	B	0.10	D,O
1413	Sunrise R	I	?	L,V
1431	Essex R.(Breeze)	I	0.35	B*,H,L,V
1431	Radio 210	I	0.14	L,O
1449	R.Cambridgeshire	B	0.15	H,Q,U,V
1458	GLR	B	50.00	H,O,V
1458	GMR	B	5.00	D,G,P
1458	R.Cumbria	B	0.50	N,P
1458	R.Devon	B	2.00	O,P
1458	R.Newcastle	B	2.00	I,N
1458	Radio WM	B	5.00	H,V
1475	C'ty Snd(1st Gold)	I	0.50	G,H,L,N,O,Q,V
1485	R.Humberside	B	1.00	G,H
1485	R.Merseyside	B	1.20	D,G,M,P
1485	R.Oxford	B	0.50	H,O,V
1485	R.Sussex	B	1.00	F,L,O
1503	R.Stoke-on-Trent	B	1.00	B*,D,G,H,N*,O,P,V
1521	R.Mercury	I	0.64	G,O,V
1521	R.Nottingham	B	0.50	G,H,N*,V
1530	KCBC Kettering	I	0.025	U,V
1530	Pennine R.(C.Gold)	I	0.74	G,N*
1530	R.Wyvern	I	0.52	H,P
1548	Capital R. (Gold)	I	97.50	O,P*
1548	R.Bristol	B	5.00	C,N*,O,P
1548	R.City (City Talk)	I	4.40	D,G,M,P
1548	R.Cleveland	B	1.00	P*
1548	R.Hallam (C.Gold)	I	0.74	G
1557	Chiltern R	I	0.76	F,H,P*,V
1557	Ocean Sound(C.Gold)	I	0.50	G,L,N*,O
1557	R.Lancashire	B	0.25	G,N*,P
1584	Gatwick	I	?	O
1584	Heathrow	I	?	L*,V
1584	R.Nottingham	B	1.00	G,V
1602	R.Kent	B	0.25	G,L,O

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

Local Radio DX Chart

DXers:
A: Ted Agombar, Norwich.
B: Leo Barr, Sunderland.
C: Denis Bosher, Dolgellau.
D: Scott Caldwell, Warrington.
E: Robin Clark, Plymouth.
F: Mike Evans, Ryde, IOW.
G: Bill Eyre, Stockport.
H: Jason Faulkner, Leicester.
I: Paul Gibson, Edinburgh.
J: Francis Hearne, Bristol.
K: Simon Holland, Douglas IOM.
L: Sheila Hughes, Morden.
M: Martin Leonard, Dublin.
N: Eddie McKeown, Co.Down.
O: George Millmore, Wootton, IOW.
P: Bart O'Brien, Co.Wexford.
Q: Roy Patrick, Derby.
R: Tim Shirley, Bristol.
S: Darran Taplin, Brenchley.
T: Ted Walden-Vincent, Gt.Yarmouth.
U: Paul Weston, Kettering.
V: David Wratten, Cambridge.

In Thumrait, Oman **Rhoderick Illman** noted the BBC via Daventry, UK 25.870 (Fr to W.Africa 1200-1245) as 34232 at 1214; SRI 25.680 as 34333 at 1306; Radio Moscow 25.680 as 44433 at 1221; RNI 25.730 as 44433 at 1220; Radio DW 25.740 as 43443 at 1219; Radio Yugoslavia 25.795 as 44333 at 1218; RFI 25.820 as 44333 at 1217.

Although the **21MHz (13m)** broadcasts from Radio Australia are intended for other areas, some of them have been reaching the UK. Their transmission via Darwin 21.525 (Eng to C.Asia 0100-0900) was rated 34553 at 0655 by **John Parry** in Northwich; via Carnarvon 21.775 (Eng to S.Asia 0100-1300, Gulf Area 1300-1500) as 54333 at 1328 by **Alan Smith** in Northampton; via Darwin 21.825 (Eng to E.Asia 1100-1230) as SIO 433 at 1227 by **Ron Pearce** in Bungay; via Shepparton 21.740 (Eng to C.Pacific

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2200-0730) as 23333 at 2240 by Sheila Hughes.

There are many broadcasts to Europe. Those noted stemmed from Radio Japan via Yamata 21.500 (Russ, Sw, It, Ger, Fr, Eng, Jap 0530-0830), rated 44334 at 0700 by **Ted Agombar** in Norwich; Radio Pakistan, Islamabad 21.520 (Eng 1100-1120) SIO333 at 1109 by **Philip Rambaut** in Macclesfield; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 34433 at 1522 by **Darran Taplin** in Brenchley; UAE Radio Dubai 21.605 (Ar, Eng 0600-1640) 45554 at 1620 by **David Edwardson** in Wallsend, also on 21.675 SIO544 at 1330 by **Kenneth Buck** in Edinburgh; RCI via Sackville, E.Canada 21.545 (Russ, Uk, Fr, Eng, Pol, Ger 1430-1800) 45433 at 1626 by **Andy Cadier** in Folkestone; Radio HCJB Quito, Ecuador 21.480 (Eng 1900-2130) 43434 at 1920 by **Cliff Stapleton** in Torquay.

Also noted were some of the broadcasts to other areas: SRI via Schwarzenburg, Switzerland 21.770 (Ger, Fr, Eng, It to W.Africa 0545-0730), logged as 33343 at 0645 by **Chris Shorten** in Norwich; BBC via Rampisham, UK 21.710 (Eng to N/W.Africa 0700-1715) 43333 at 0910 by Rhoderick Illman (Oman); BFBS via BBC Daventry, UK? 21.735 (Eng to Gulf Area 0930-1000) SIO333 at 0930 by **Cyril Kellam** in Sheffield; BBC via Limassol 21.470 (Eng to E.Africa 0430-1615) 54555 at 1100 by **Bill Griffith** while in Balatonfured, Hungary; Radio Portugal via San Gabriel 21.530 (Port, Eng to S.Asia, Middle East 1500-1630) 54434 at 1500 by Jim Cash; WCSN Scotts Corner, MN 21.640 (Eng, to E/N.Africa 1600-1955) 44555 at 1827 by **Robin Clark** in Plymouth.

Particularly good reception over long distances has been noted in the **17MHz (16m)** band. During some mornings the broadcasts to Pacific areas from Radio New Zealand Int., Wellington have been clearly received in the UK. Their transmission on 17.675 (Eng 2205-0710 Mon-Fri; 0000-0645 Sat; 0200-0800 Sun) was rated as 24532 at 0245 by David Edwardson and as SIO333 at 0730 by Cyril Kellam. They have also been reaching S.Africa **Dick Moon** heard them at 0600 in George.

Potent signals have reached the UK from Radio Australia via Darwin 17.715 (Eng, Chin to C.Asia 0100-1400). Ron Pearce rated them as SIO444 at 1245 while testing a one transistor receiver! Their special broadcasts to the Gulf area via Carnarvon? 17.630 (Eng 1300-1500) appear to be reaching their target well. In Oman, Rhoderick Illman logged them as 44433 at 1458. In contrast, **Ron Damp** (Worthing) quoted 23322 at 1335. Their transmission to C.Asia via Shepparton 17.630 (Chin, Eng 2200-0000) was noted as 32232 at 2300 by **Robin Harvey** in Bourne.

Surprisingly few of the many 16m broadcasts to Europe were mentioned in the reports: Radio Pakistan, Islamabad 17.555 (Eng 1600-1630), rated 45434 at 1624 by Darran Taplin; BBC via Daventry, UK 17.640 (Eng to E.Europe 0900-1830) 54555 at 0900 by Bill Griffith in Hungary; RCI via Sackville, Canada 17.875 (Fr, Eng 2030-2200) 44434 at 2105 by Robin Clark; Radio HCJB Quito, Ecuador 17.790 (Cz, Ger, Eng, Sw, Norw, Da, Fr, Sp 1800-2230) SIO 444 at 2130 by **Alf Gray** in Birmingham.

Quite a number of the broadcasts to areas outside Europe were logged: Radio Romania Int, Bucharest 17.720 (Eng to S.E.Asia 0645-0715), noted as SIO322 at 0645 by **Francis Hearne** in Bristol; SRI via Schwarzenburg, Switzerland 17.670 (It, Eng, Ger, Fr to Australia, Pacific areas 0745-1030) 55455 at 0830 by Eddie McKeown; BFBS via BBC Limassol, Cyprus 17.695 (Eng to Gulf area 0930-1000) 35553 at 0940 by John Parry; Voice of the UAE in Abu Dhabi 17.645 (Ar to Middle East, N.Africa 1300-1600) SIO444 at 1520 by Kenneth Buck; Radio RSA Johannesburg, S.Africa 17.790 (Eng to Africa 1700-1800) 54444 at 1730 by Chris Shorten; Radio Moscow, USSR 17.655 (Port, Eng, Zu 1700-2000) 55555 at 1759 by **Roy Spencer** in Coventry; VOA via Greenville, USA 17.785 (Eng to W.Africa 1600-2200) 44433 at 1914 by Andy Cadier; KHBI Saipan, N.Mariana Islands 17.555 (Eng to E.Asia 1800-1955) 43343 at 1918 by Alan Smith; Voice of Israel, Jerusalem 17.630 (Eng, Fr to Africa 2000-2055) 43434 at 2015 by Cliff Stapleton; RCI via Sackville, Canada 17.820 (Eng, Fr to Africa 1800-2200) 55455 at 2019 by **Scott Caldwell** in Warrington; BBC via Ascension Island 17.880 (Eng to C/E.Africa 1400-2115) SIO333 at 2105 by **Thomas Barnett** in Slough; BBC via Greenville, USA 17.715 (Eng to C.America 2100-2130) SIO333 at 2112 by Philip Rambaut; VOA via Bethany, USA 17.800 (Eng to W.Africa 1600-2200) 44444 at 2145 by **Martin Leonard** in Dublin; WYFR via Okeechobee, FL 17.612 (Ar, Fr, Port, Eng to W.Africa 1600-2245) 44444 at 2200 by **Darren Beasley** in Bridgwater.

During most days, good reception over long distances has also been noted in the **15MHz (19m)** band. Radio Australia's transmission to C.Pacific area via Shepparton 15.560 (Eng 0200-0600) was rated 25544 at 0600 by Andy Cadier; to S.Pacific areas via Shepparton 15.240 (Eng 2200-0830) as SIO444 at 0830 by **John Coulter** in Winchester; to SE.Asia via Shepparton 15.465 (Eng 2100-0730) as SIO444 at 2205 by Ron Pearce.

Many broadcasters use this band to reach listeners in Europe at some time during the day. They include Radio Sophia, Bulgaria 15.160 (Ger, Fr, Eng 0530-0700), rated 54434 at 0630 by **Harold Wood** in Manchester; RTL Luxembourg 15.350 (Eng 1000-1400, Fr 1400-1000; also to E.USA) 43435 by **John Hepburn** in Ashington; LJB via Sabrata, Libya 15.415 (Ar 1100-0330) 43343 at 1235 by Ron Damp; UAE Radio Dubai

DXers:
A: Ted Agombar, Norwich.
B: Darren Beasley, Bridgwater.
C: Denis Bosher, Dolgellau.
D: Andy Cadier, Folkestone.
E: Robin Clark, Plymouth.
F: David Edwardson, Wallsend.
G: Bill Griffith, Balatonfured, Hungary.
H: Sheila Hughes, Morden.
I: Rhoderick Illman, Thumrait, Oman.
J: Eddie McKeown, Co.Down.
K: Dick Moon, George, S.Africa.
L: Fred Pallant, Storrington.
M: Tim Shirley, Bristol.
N: Chris Shorten, Norwich.
O: Alan Smith, Northampton.
P: Darran Taplin, Brenchley.
Q: Neil Wheatley, Lytham St. Annes.
R: Jim Willett, Grimsby.

Tropical Bands Chart

Freq MHz	Station	Country	UTC	DXer
2.420	R.Sao Carlos	Brazil	0229	K
2.560	Xinjiang	China	2315	F
3.200	TWR	Swaziland	0320	R
3.210	R.Mozambique	Mozambique	0440	R
3.215	R.Orange	S.Africa	1843	C,L,R
3.220	R.Togo, Lome	Togo	2100	M,R
3.230	ELWA Monrovia	Liberia	0300	R
3.255	BBC via Maseru	Lesotho	0230	I,R
3.260	Voix du Sahel	Niger	2130	R
3.265	R.Mozambique, Maputo	Mozambique	1848	L
3.270	SWABC 1, Namibia	S.W.Africa	1845	L,R
3.300	V of Rev. Bujumb	Burundi	2040	R
3.300	R.Cultural	Guatemala	0515	R
3.315	SLBS Freetown	Sierra Leone	2200	M,R
3.320	R.Suid Afrika	S.Africa	0150	R
3.325	FRCN Lagos	Nigeria	1810	I
3.330	R.Kigali	Rwanda	1905	R
3.355	R.Botswana	Gabarone	1900	R
3.365	GBC Radio 2	Ghana	1835	L,R
3.370	R.Tezulutlan	Guatemala	0230	R
3.380	R.Malawi	Malawi	2000	R
3.395	R.Zaracay	Ecuador	0400	R
3.395	RRI Tanjungkarang	Indonesia	1555	K
3.905	AIR Delhi	India	1514	I
3.915	BBC Kranji	Singapore	1952	L,P
3.935	RRI Semarang	Indonesia	1630	K
3.955	BBC Daventry	England	2210	A,E,G,H,J,P
3.960	RFE/RL Munich	W.Germany	2230	J
3.965	RFI Paris	France	1838	H,J,L,N
3.970	R.Buca	Cameroon	2100	R
3.975	BBC Skelton	England	0450	D,H
3.980	VOA Munich	W.Germany	1838	H,J,L,P
3.985	R.Beijing, China	via SRI Berne	2100	E,F,H,J,N,O
3.985	SRI Berne	Switzerland	1730	A,J,P
3.995	DW Cologne (Julich)	W.Germany	1856	H,J,L,P
4.000	Bofoussam	Cameroon	1856	L,R
4.220	PBS Xinjiang	China	2309	F
4.500	Xinjiang	China	2304	F
4.545	Alma Ata	USSR	0704	A
4.650	R.Santa Ana	Bolivia	0020	R
4.735	Xinjiang	China	2310	F
4.740	R.Afghanistan	via USSR	1850	L
4.750	R.Bertoura	Cameroon	2010	R
4.755	Caracol Neiva	Columbia	0500	R
4.760	Yunnan Kumming	China	2306	F
4.760	ELWA Monrovia	Liberia	1930	R
4.760	TWR	Swaziland	1824	A,R
4.760	R.Moscow (Dushanbe)	USSR	1850	L
4.765	R.Rural, Santarem	Brazil	2150	R
4.765	Brazzaville	Pep.Rep.Congo	2031	L,M,P,R
4.765	R.Moscow	via Cuba	0415	H
4.770	FRCN Kaduna	Nigeria	1832	L,R
4.775	R.Gabon, Libreville	Gabon	2030	R
4.775	RRI Jakarta	Indonesia	2000	M
4.780	RTD	Djibouti	2215	R
4.785	R.Tanzania	Tanzania	2300	R
4.790	R.Atlantida	Peru	0050	R
4.790	TWR Manzini	Swaziland	1811	L
4.795	R.Douala	Cameroon	2032	L,R
4.800	LNBS Lesotho	Maseru	1814	L,R
4.810	R.Orion, Jo'burg	S.Africa	0310	I,R
4.810	R.Yerevan 2	USSR	1852	L
4.815	R.Nac.Tabatinga	Brazil	0240	K
4.815	R.diff TV Burkina	Ouagadougou	0530	R
4.820	La Voz Evangelica	Honduras	0315	R
4.820	R.Moskva 4 (Khanty-M).	USSR	1855	L,P
4.825	R.Moscow	USSR	2046	P
4.830	Gaborone	Botswana	2005	R
4.832	R.Reloj	Costa Rica	0300	R
4.835	RTM Bamako	Mali	1825	F,H,J,L,P
4.845	ORTM Nouakchott	Mauritania	1941	B,L,R
4.850	R.Yaounde	Cameroon	2035	F,J,L,P,R
4.850	R.Capital, Caracus	Venezuela	0315	R
4.865	PBS Lanzhou	China	2310	F
4.865	V of Cinaruco	Colombia	0610	F
4.865	R.Mozambique	Mozambique	0220	R
4.870	R.Cotonou	Benin	1830	B,J,L,R
4.880	SABC Radio 5	S.Africa	1850	R
4.885	Voice of Kenya	Kenya	1831	L,R
4.890	RFI Paris	via Gabon	0400	R
4.890	ORTS Dakar	Senegal	0120	R
4.895	Voz del Rio Arauca	Colombia	0335	R
4.895	R.Moscow (Kalinin)	USSR	2048	P
4.905	R.Nat.N'djamena	Chad	1844	H,L,R
4.910	R.Zambia, Lusaka	Zambia	1815	L,R
4.915	R.Ghana, Accra	Ghana	2015	L,R
4.915	Voice of Kenya	Kenya	1844	D,L
4.920	AIR Madras	India	1451	I
4.925	R.Nacional, Bata	Eq.Guinea	2036	L,R
4.930	R.Moscow	USSR	2035	H,J,L,P
4.935	Voice of Kenya	Kenya	1800	L,P,R
4.940	R.Kiev 2	USSR	1936	B,H,J,L
4.950	R.Nac.Luanda	Angola	2000	R
4.958	R.Baku	USSR	1940	M
4.960	R.Baku 2	USSR	1936	L
4.975	R.Uganda, Kampala	Uganda	1846	L,R
4.980	Ecos del Torbes	Venezuela	0330	R
4.990	FRCN Lagos	Nigeria	2000	F,P,Q,R
5.005	R.Nacional, Bata	Eq.Guinea	2200	R
5.010	R.Garoua	Cameroon	2100	R
5.010	R.Malagasy	Madagascar	1900	R
5.020	La Voix du Sahel	Niger	2140	F,R
5.025	R.Rebelde, Habana	Cuba	0335	R
5.035	R.Bangui	C.Africa	1920	R
5.035	R.Alma Ata	USSR	2205	B,J
5.040	Em.Reg.Bengue	Angola	0250	R
5.047	R.Togo, Lome	Togo	2037	B,L,R
5.050	R.Tanzania	Tanzania	2320	R
5.065	R.Candip, Bunia	Zaire	1900	B,R
5.075	Caracol Bogata	Colombia	0447	F
5.260	R.Alma Ata 2	USSR	2305	O

15.435 (Ar, Eng 0600-2050) SIO444 at 1330 by Kenneth Buck; WWCR Nashville, USA 15.690 (Eng 1200-0100) 55555 at 1621 by **Donald Blashill** in Cheltenham; Radio Korea, Seoul 15.575 (Ar, It, Eng, Sp, Port, Ger 1645-2300) SIO444 at 1700 by Thomas Barnett; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) 42333 at 1820 by Alan Smith; Radio Yugoslavia, Belgrade 15.105 (Eng 2100-2145; also to USA) SIO333 at 2135 by Alf Gray; WINB Red Lion PA, USA 15.185 (Eng 2003-2245) 34343 at 2200 by Cliff Stapleton; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Fr, Sp 1600-2130) 33222 at 1918 by **Leo Barr** in Sunderland; RCI via Sackville, Canada 15.325 (Ger, Hung, Cz, Uk, Russ, Pol, Eng, Fr 1630-2200) 33344 at 2107 by Robin Clark; RAE Buenos Aires, Argentina 15.345 (Ar, Eng, Ger, Fr, It 1800-2300; also to N.Africa) 45344 at 2205 by Darren Beasley.

There are numerous broadcasts to other areas too. They include Radio Japan via Montsinery, Fr.Guiana 15.320 (Jap, Eng, Sp to W/C.America 0200-0400), noted 34343 at 0325 by Chris Shorten; RCI Montreal via Austria 15.275 (Eng to Middle East 0400-0500) 44444 at 0429 by Rhoderick Illman (Oman); WYFR via Okeechobee, FL 15.566 (Eng to W.Africa 0500-0800) 44444 at 0510 by Sheila Hughes; BBC via Ascension Island 15.400 (Eng to W.Africa 0430-0700) SIO434 at 0630 by **Neil Wheatley** in Lytham St.Annes; Radio Nederlands via Bonaire, Ned Antilles 15.560 (Eng to New Zealand 0730-0825) 44544 at 0734 by Scott Caldwell; TWR Agana, Guam 15.485 (Chin, Eng to C.Asia 0900-1157) SIO323 at 1115 by Philip Rambaut; Voice of Greece, Athens 15.630 (Gr, Eng to USA 1200-1250) 34243 at 1244 by Eddie McKeown; Radio RSA Johannesburg, S.Africa 15.270 (Eng to E.Africa, Middle East 1700-1800) 22222 at 1740 by Martin Leonard; Africa No.1, Gabon 15.475 (Fr, Eng to W.Africa 1600-2110) 53333 at 1925 by Jim Cash; SRI via Swarzenburg 15.525 (Ger, Fr, It, Port, Eng, Sp to W.Africa 1900-2200) SIO333 at 2100 by Cyril Kellam; AWR Agat Guam 15.310 (Kor, Jap to E.Asia 2000-2200) 44444 at 2200 by Darran Taplin; Radio Nacional, Santiago 15.140 (Sp to S.America 0930-0500) SIO333 at 2210 by Jim Willett; VOA via Tinang, Singapore 15.290 (Eng to E.Asia 2200-0100) 43433 at 2231 by Robin Harvey; UAE Radio Dubai 15.400 (Ar, Eng to USA 0230-0400) 45554 at 0315 by David Edwardson.

The occupants of the **13MHz (22m)** band have now been joined by UAE Radio Dubai, their transmission on 13.675 (Ar, Eng 1605-2055) was rated SIO555 at 1630 by Kenneth Buck. Radio Australia are now making more extensive use of this band. Potent signals have been reaching the UK via Carnarvon on 13.745 (Eng to S.Asia 1430-1700) Jim Cash rated them as 53333 at 1530. Their transmission to C.Pacific areas via Shepparton 13.705 (Eng 0600-0830) was rated 34454 at 0709 by Andy Cadier; to E.Asia via Darwin 13.605 (Eng 2200-0100) as SIO434 at 2200 by Neil Wheatley.

Transatlantic DX Chart

Freq	Station	Location	Time	DXer
		USA		
700	WLW	Cincinatti, OH	0545	D
880	WCBS	New York, NY	0130	B,D
890	WLS	Chicago, IL	0500	B
910	WABI	Bangor, ME	0005	C
1010	WINS	New York, NY	2300	A,B,D
1020	KDKA	Pittsburg, PA	0030	B
1090	WBAL	Baltimore, MD	0230	D
1120	KMOX	St.Louis, MO	0520	D
1130	WNEW	New York, NY	?	A
1210	WOGL	Philadelphia, PA	0002	C,D
1300	WFBR	Baltimore, MD	2345	C
1390	WFBL	Syracuse, NY	?	C
1500	WTOP	Washington, D.C.	?	A
1510	WKKU	Boston, MA	?	A
1580	WEAM	Colombus, GA	0310	C
1580	WPGC	Morningside, MD	0009	C
		Canada		
550	CFNB	Fredericton, NB	?	B
580	CFRA	Ottawa, ON	0530	B
590	VOCM	St.John's, NF	0040	A,D
610	CKYQ	Grand Bank, NF	0050	D
620	CKCM	Grand Falls, NF	0430	D
640	CBN	St.John's, NF	0050	D
710	CKVO	Clarenceville, NF	0050	D
820	CHAM	Hamilton, ON	0430	B
920	CJCH	Halifax, NS	0030	A,D
930	CFBC	St.John, NB	?	A
930	CJYQ	St.John's, NF	0030	A,D
940	CBM	Montreal, PQ	?	A
1010	CFRB	Toronto, ON	0315	D
1050	CHUM	Toronto, ON	0130	A,D
1060	CJRP	Quebec, PQ	0040	D
1070	CBA	Moncton, NB	?	A
1200	CFGO	Ottawa, DN	0140	D
1220	CKCW	Moncton, NB	0300	D
1510	CJRS	Sherbrooke, PQ	0300	B
1570	CKLM	Lavel, PQ	0310	D
		C.America & Caribbean		
640	RFO Pointe a Pitre	Guadeloupe	0530	B
940	XEQ La Tropi Q	Mexico	0300	C
950	HIG R.Popular	Sto.Domingo, Dom.Rep.	0349	C
1230	HIMB R.Ideal	Moca, Dom. Rep.	0148	C
1230	YSNB San Salvador.	El Salvador	0135	C
1290	YSMA R.Chal'ango	El Salvador	0209	C
1390	XERUY R.Univers'd.	Merida, Mexico	0400	C
1470	XESM R.Canon	Mexico	0303	C
1580	XEDM	Hermosillo, Mexico	0317	C
1610	Caribbean Beacon	The Valley,Anguilla	?	A
		South America		
910	LR5 R.Excelsior	Bue.Aires, Argentina.	0130	C
910	OAX2H R.Hua'chuco.	Peru	0126	C
1060	OCY4D R.Exito	Lima, Peru	0119	C
1380	HCCVI R.Cristal	Quito, Ecuador	0110	C

DXers:
A: Simon Hamer, New Radnor. B: Tim Shirley, Bristol. C: Derek Taylor, Preston. D: Jim Willett, Grimsby.

EQUIPMENT USED:
[illegible]

Some of the broadcasts to Europe in this band stem from Radio Jordan, Al Karanah 13.655 (Eng 0500-1315), rated SIO444 at 1106 by John Coulter; Radio Austria Int, Vienna 13.730 (Ger, Fr, Eng, Sp, Ar 0400-1700) 55545 at 1430 by Harold Wood; WHRI Noblesville, USA 13.760 (Eng, Sp, Port, Yu 1700-0000) 44334 at 1700 by John Hepburn; BRT via Wavre, Belgium 13.675 (Du, Eng, Ger 1700-1825) 44344 at 1740 by Chris Shorten; WSHB Cypress Creek, USA 13.770 (Eng 2000-2155) SIO544 at 2005 by Alf Gray; Radio Baghdad, Iraq 13.660 (Fr, Ger, Eng 1800-2100) 43434 at 2040 by Cliff Stapleton; also as 33333 by Dick Moon (S.Africa).

Those to other areas include AWR Agat, Guam 13.720 (Eng, Ind, Tag 1000-1300) SIO121 at 1050 by Philip Rambaut; RCI via Sackville, Canada 13.670 (Eng, Fr to Africa 1800-2000) 43443 at 1830 by Darren Beasley; Radio Nederlands via Flevo 13.700 (Eng to W.Africa 2030-2125) 35433 at 2042 by Darran Taplin.

There are many broadcasts to Europe in the **11MHz (25m)** band. Those noted were Radio HCJB Quito, Ecuador 11.835 (Eng 0700-0830), rated SIO444 at 0815 by John Coulter; Radio Moscow, USSR 12.030 (Eng 0600-1500) 43454 at 0928 by Robin Clark; Voice of the UAE in Abu Dhabi 11.965 (Ar 1600-2135) SIO555 at 1650 by Kenneth Buck; Radio Romania Int., Bucharest 11.940 (Ger, Eng, Fr 1900-2126) 43433 at 1940 by Andy Cadier; AIR via Aligarh, India 11.620 (Eng, Hi 1845-2230) 34343 at 2040 by Cliff Stapleton; Voice of Israel, Jerusalem 12.077 (Fr, Russ, Eng 1900-2300) 33443 at 2026 by David Edwardson; also 11.585 (Heb, Eng ?-2300) 55444 at 2100 by **Roy Patrick** in Derby; Radio Damascus, Syria 12.085 (Ger, Fr, Eng 1805-2105) 54555 at 2045 by Bill Griffith (Hungary), also heard at 2012 by Dick Moon (S.Africa); Radio Free Europe via Gloria, Portugal 11.770 (Rom, Bul 0800-2155) - 54455 at 2108 by Robin Harvey; Radio Beijing, China 11.500 (Russ, Ger, Eng 1700-2155) 55444 at 2131 by Roy Spencer; Radio Station Peace and Progress, USSR 11.980 (Eng 2100-2159) 44444 at 2156 by Leo Barr; Radio Sophia, Bulgaria 11.660 (Eng 2230-2330) SIO444 at 2230 by Alf Gray; Radio Japan via Moyabi, Gabon 11.835 (Jap, Eng 2200-0000) SIO444 at 2315 by Francis Hearne.

Also noted were some of the broadcasts to other areas: RHC Havana, Cuba 11.820 (Eng to USA 0000-0600), noted as 54343 at 0500 by Chris Shorten; BBC via Masirah Island, Oman 11.760 (Eng to Middle East 0300-0815) SIO333 at 0605 by Jim Willett; Radio Korea via Sackville, Canada 11.715 (Eng to USA 1030-1100) SIO312 at 1035 by Philip Rambaut; AWR Agat, Guam 11.980 (Chin, Jap to C.Asia 0900-1600) 32332 at 1105 by Alan Smith; BBC via Kranji, Singapore 11.750 (Eng to S.Asia 0900-1615) SIO222 at 1400 by Rhoderick Illman (Oman); Radio Australia via Shepparton 11.910 (Eng to S.E.Asia 1100-?) 21221 at 1429 by Jim Cash; Radio Austria Int., Vienna 11.780 (Ger,

SEEN & HEARD

Eng, Fr to S.E.Asia 1400-1700) 55444 at 1620 by Ted Agombar; Radio Moscow, USSR 11.775 (Eng, Ha, Russ to W.Africa 1700-0000) 34344 at 1755 by Donald Blashill; VOIRI Tehran, Iran 11.895 (Tur, Ger, Fr, Eng, Sp to N.Africa, S.Europe 1700-2130) 42443 at 1940 by Darren Beasley; Radio Polonia, Warsaw 11.840 (Eng, Fr, Ar to W.Africa 1830-2025) 44444 at 2008 by Darran Taplin; Voice of Israel, Jerusalem 11.605 (Eng, Heb to USA 2300-?) 34444 at 2300 by Martin Leonard; Radio Vilnius, Lithuania 11.790 (Lith, Eng to USA 2200-?) 43333 at 2300 by Sheila Hughes.

Good reception of the **9MHz (31m)** broadcasts from Radio New Zealand Int., Wellington has been noted in the UK. Their transmission to Pacific areas on 9.855 (Eng 0710-0830 Mon-Fri, 0645-1100 Sat) was rated 43333 at 0728 by Ted Agombar. Some of the broadcasts in this band reach Europe from distant places: Radio HCJB Quito, Ecuador 9.610 (Eng 0700-0800), rated 54444 at 0720 by Ron Damp; Radio Beijing, China 9.945 (Russ, Hung, Bul, Rom, Yu 1600-2125) 34333 at 1935 by Leo Barr; Radio Pyongyang, N.Korea 9.345 (Sp, Ger, Eng, Fr 1800-2150) 34343 at 2030 by Cliff Stapleton; Voice of Vietnam, Hanoi 9.840 (Eng, Russ, Viet, Fr, Sp, 1600-2130) 34333 at 2044 by Robin Clark; AIR via Delhi, India 9.910 (Hi, Eng 2000-2230) SIO454 at 2200 by Kenneth Buck.

In the **7MHz (41m)** band there are numerous broadcasts to Europe from places near and far. Among those noted were WWCR Nashville, USA 7.520 (Eng 0100-0530), rated as SIO444 at 0530 by Jim Willett; BBC via Skelton, UK 7.325 (Eng 0700-2300, also to N.Africa) 55555 at 0750 by Ted Agombar; Red Cross BS, Geneva 7.210 (Eng, Fr, Ger, Sp 1100-?) 55555 at 1110 by Darren Beasley; Radio Budapest, Hungary 7.220 (Eng 1515-1530) 54344 at 1515 by Chris Shorten; Radio Tirana via Lushnje, Albania 7.155 (Eng 1830-1900) 44444 at 1840 by Donald Blashill; RAI Rome, Italy 7.275 (Eng, Da, Sw, Esp 1935-2020) 43233 at 1945 by Eddie McKeown; AIR via Aligarh, India 7.412 (Eng, Hi 1845-2230) 33333 at 2100 by Martin Leonard; Vatican Radio, Rome 7.250 (Eng) 44444 at 2050 by Sheila Hughes; Radio Romania Int., Bucharest 7.195 (Russ, Rom, Ger, Fr, Eng 1700-2126) 45544 at 2106 by Andy Cadier; Radio Polonia, Warsaw 7.270 (Ger, Esp, Fr, Eng 1900-2355, also to N.Africa) SIO333 at 2315 by Francis Hearne.

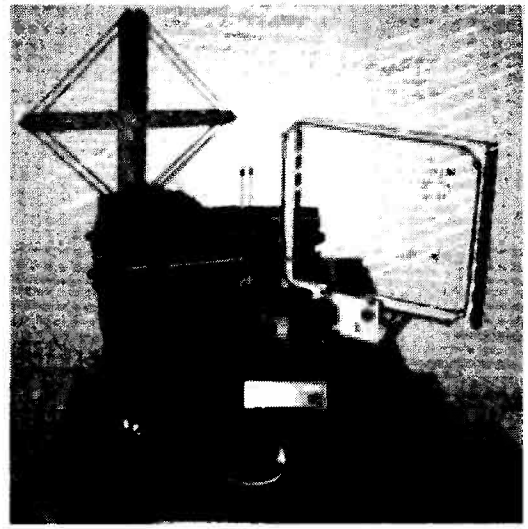

Fig. 1: The equipment used by Leo Barr.

Many of the broadcasts in the **6MHz (49m)** band originate from stations in Europe: Radio Polonia, Warsaw 6.135 (Fr, Ger, Pol, Eng, Da, Esp 1130-1800) 44444 at 1600 by Darran Taplin; RFI via Allouis, France 6.175 (Fr, Eng 0500-2200) 34434 at 1632 by Leo Barr; VOA via Woofferton, UK 6.040 (Eng 1700-2200) 54444 at 1919 by Andy Cadier; Radio Budapest, Hungary 6.110 (Ger, Eng 1900-2030) 43333 at 1950 by Donald Blashill; Radio Tallin, Estonia 5.925 (Sw, Est, Eng 2000-2100) 33333 at 2034 by David Edwardson; Radio Prague, Czechoslovakia 5.930 (Sp, Fr, Eng 1900-2130) 44444 at 2100 by Sheila Hughes; Radio Finland via Pori 6.120 (Sw, Fr, Eng 2000-2230) 54544 at 2210 by Roy Spencer.

Station Addresses

BBC Radio Leicester, Epic House, Charles Street, Leicester LE1 3SH.

ILR Radio Clyde, South Argyle Clydebank Business Park, Clydebank, Glasgow G81 2RX.

Radio WWCR High Adventure [illegible]

[illegible], Box 92307, Los Angeles, CA 90009, USA.

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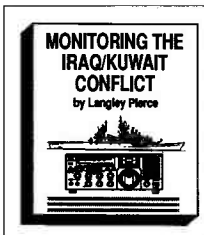

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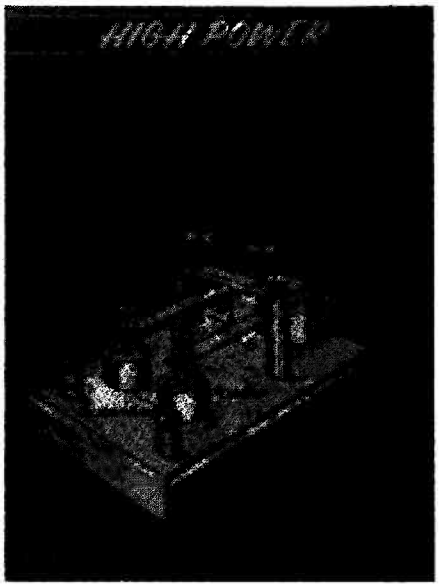

These article originally appeared in the magazine *Popular Electricity* between 1910 and 1911. If you are interested in the historical side of radio, then this book makes interesting reading. Topics covered include antennas, coils, ammeters, detectors, condensers as well as a Hints and Tips section for 'practical electrical workers'. Ideal for the nostalgic read.

PASSPORT TO WORLD BAND RADIO 1991
Editor-in-Chief: Lawrence Magne
Published by International Broadcasting Services Ltd
Available from SWM Book Service
178 x 253mm, 283 pages. Price £13.95 plus 85p P&P

Unlike many handbooks, this one is very readable. In fact, this book seems to be the ideal reference book to have for 'armchair' listening as it contains a great deal of information ranging from the programme, times and frequency details to a truly excellent buyer's guide.

Although 'Passport' is well known for its buying guide, it also contains a good 'how to use your receiver' section and very comprehensive frequency listings. An unusual, but very helpful, guide for the newcomer and 'old hand' alike is the 'When and Where to Listen' type of feature which guides you through the bands, hour by hour. This section alone would make the book a good buy for the keen listener as it helps you to find where and when to listen and who you should be able to hear.

AN INTRODUCTION TO SATELLITE TELEVISION BP195
F.A. Wilson
Published by Bernard Babani (publishing) Ltd
Available from the SWM Book Service
262 x 192mm, 104 pages. Price £5.95 plus 85p P&P

This book is presented on two levels. For the absolute beginner or anyone thinking about puchasing or hiring a satellite TV system, the story is told as simply as such a complex one can be in the main text.

For the professional engineer, electronics enthuusiast, student or others with technical background, there are numerous appendices backing up the main text with additional technical and scientific detail, formulae, calculations, tables, etc.

There is also plenty for the d.i.y. enthusiast with practical advice on choosing and installing the most problematical part of the system - the dish antenna.

THE ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL
Published by the ARRL
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THE ARRL SATELLITE ANTHOLOGY
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AMATEUR SATELLITES: The first 25 years
by Arthur C. Gee G2UK
published by AMSAT-UK
Available from the SWM Book Service
210 x146mm, 34 pages. Price £2.95 plus 85p P&P

It seems quite incredible that 25 years have passed since amateur radio satellites became part of the radio amateur scene. Things have moved so fast in this field that the years have simply flown by unnoticed. Development has progressed at such a pace that it has been difficult to keep up with it. New satellites have been launched at such a rate that one seems to have hardly got used to the characteristics of one, before another has appeared with its new technology.

The material in this souvenir publications is drawn from records in the author's possession. The photos are those collected together over the years in the course of correspondence and much article writing in the radio press. He has deliberately endeavoured to make this somewhat of a pictorial account, as the photos convey so much better than the written word, the pattern of development that has occured over these twenty five years.

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PUBLISHED on the fourth Thursday of each month by PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. Printed in England by KSC Printers Ltd, Tunbridge Wells, Kent. Distributed by Seymour, Windsor House, 1270 London Road, Norbury, London SW16 4OH, Tel: 081-679 1899, Fax: 081-679 8907, Telex: 8812945. Sole Agents for Australia and New Zealand - Gordon and Gotch (Asia) Ltd. ; South Africa - Central News Agency Ltd. Subscriptions INLAND £19.00, EUROPE £21, OVERSEAS (by ASP) £22, payable to SHORT WAVE MAGAZINE, Subscription Department, PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. SHORT WAVE MAGAZINE is sold subject to the following conditions, namely that it shall not, without the written consent of the publishers first having been given, be lent, re-sold, hired out or otherwise disposed of by way of trade at more than the recommended selling price shown on the cover, and that it shall not be lent, re-sold, hired out or otherwise disposed of in a mutilated condition or in any unauthorised cover by way of Trade, or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

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