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# AOR

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The **AR3000A** has established itself as a high performance base mobile receiver offering an extremely wide frequency coverage of 100 kHz - 2036 MHz and all mode receive. The introduction of the **AR3000A PLUS** provides even greater performance and capabilities. What is the plus? Plus five custom modifications applied as standard: Switchable narrow AM filter for improved shortwave listening, switchable WFM filter for WEFAX reception, 10.7 MHz I.F. output and switch for compatibility with the SDU5000, tape relay with independent contacts and switched audio, discriminator output. Further custom modifications are available and may be applied to existing units. Simply request the descriptive leaflet and price menu for full details.

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***AR8000 UK £449.00***

***PC MANAGER £49 + £3 P&P***

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***AR2700 UK £289***

AOR (UK) LTD, Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbys. DE4 4BG ENGLAND Tel: 01629 825926 Fax: 01629 825927 

# short wave magazine

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## Cover Subject

Pipe-dreams. We review the stunning Wavecom 4100 Data Analyser.

*Cover Photo: Craig Dyball*




# Features



## Win a PRO-2035 base station scanner


Second part of our competition on page 54.


## Regular Columns



Good Listening

## SWM SERVICES

### Subscriptions

Subscriptions are available at £25 per annum to UK addresses, £28 in Europe and £30 overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £42(UK) £47 (Europe) and £51 (rest of world).

### Components for SWM Projects

In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit boards for *SWM* projects are available from the *SWM* PCB Service, Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. Tel: 0121 - 384 2473.

### Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are **£2.30** each, photocopies are also **£2.30** per article, plus **£0.50** for subsequent parts of serial articles.

Binders, each taking one volume are available for £5.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for back numbers, binders and items from our Book Service should be sent to: **PW Publishing Ltd., FREEPOST, Post Sales Department, Arrowsmith Court, Station Approach, Broadstone Dorset BH18 8PW,** with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in Sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Broadstone (01202) 659930. An answering machine will accept your order out of office hours and during busy periods in the office. You can also FAX an order, giving full details to Poole (01202) 659950.

### Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. If you require help with problems relating to topics covered by *SWM*, please write to the Editorial Offices, we will do our best to help and reply by mail.

# editorial

### When is a Camel not a Camel?

Following the publication last year of the very interesting feature on the radio communications used during the '94 Camel Trophy in South America, I received a letter from the BMA pointing out that *SWM* was helping to promote smoking!

Whilst not wanting to get into an argument about the rights and wrongs of smoking - but anyone who knows me personally will be aware that I am very seriously affected by cigarette smoke - I find myself in somewhat of a dilemma. The **only** name by which this intriguing 'off-road' event is known is the Camel Trophy and it is sponsored by a multi-million dollar leisure activities company marketing such items as watches, boots and leisure wear. Yes, I realise that they are part of a group with tobacco connections, but they use a totally different logo with not a commitee designed horse in sight!

So - in this issue you will find another very interesting article on the communications set-up for this year's event. Just remember the health warnings - smoking can seriously damage your health!

### Pipe-dreams

I firmly believe that everyone needs to have the odd pipe-dream. So, I make no apologies for presenting, in this issue only, the ultimate decoder's dream machine - the Wavecomm 4100. However, if past reviews of exotic gear are anything to go by, I fully expect that there will be some of you out there who will be adding this fantastic piece of equipment to your station!

**Dick Ganderton G8VFH**

# letters

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 any other magazines. The views expressed in letters published in this magazine are not necessarily those of *Short Wave Magazine.*

**Dear Sir**

It was very good of your to reply to my letter of February 9 regarding the Realistic DX390 world band portable radio. I would like to know more about it and if you could publish a request in your *Letters* pages for comments from other users, I would be very grateful.

Very many thanks again.

**Joe Maitland**
**Hanslope**
**Milton Keynes**

*We can, we have, let's hope that someone out there has some info.*

**Dear Sir**

I feel I must write and inform you of the most helpful and patient attitude of one of your advertisers, Satellite and Sound 2000 Ltd. I telephoned them as a result of their advert in *Short Wave Magazine* and, after some discussion, agreed to buy an almost new scanner.

After many hours delving in the instructions, I did manage to program some memories, although this did involve some 'phone calls to S&S 2000 Ltd., whose advice was most useful. I guess advancing years don't help with fiddling with hand-held scanner controls!!

The squelch control on a Maruhama RT618 is almost beyond reach of a mildly arthritic digit!! Having 'phoned S&S Ltd. to explain my problem, they (Martin) agreed straight away to change the unit for a PRO43 which has easier controls and is similar to the PRO44, which my better half has 'taken over'!

What super folks they are at St. Neots - only fair to give praise where due. I enjoy *SWM* greatly, having discovered the new airband listening hobby.

I learnt to fly in a Chipmunk in the 1950s and the electronics were partly hand signals from one aircraft to another! It's all very sharp and correct now - super fast speech and only a few off the cuff remarks.

My very best wishes to you.

**E. Ralphs**
**Blythe Bridge**
**Stoke on Trent**

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

**Dear Sir**

In the April edition of *SWM* (which I received yesterday) there is a letter about insurance from M. Gardiner, Hedge End, Southampton. I would like to say that only last week I consulted my insurance agent as regards to my radio equipment, including aerials and he assured me that **all** my equipment was fully covered through my contents insurance, (I pay the first £50 of each claim).

This is a new for old policy and if M. Gardiner is interested, the insurance firm is the Co-Op insurance - I suppose that there will be an office in Southampton.

**N. Carrington**
**Sutton in Ashfield**
**Notts**

*Different companies seem to have differing clauses regarding radio equipment, it's best to check with your broker.*

# letters

**Dear Sir**
I have just picked up the April issue of *SWM* (my third 'cos I'm new to the game) and as I recently purchased an MVT7100 as my introduction to radio listening I have been interested in the letters on short wave use of this set. I have to agree with your comment at the end of Mr. Miller's letter. There's absolutely nothing wrong with a bit of DIY!

My wife won't let me get away with spending too much on this hobby so I have to be careful with the pennies! Therefore I decided on a 'cheap' version of the W&S kit. I must start out by saying that I haven't yet had time to put my 'bits' into operation, but I think they fulfil the W&S conditions for short wave listening and I look forward to trying them soon.

Firstly, £20 for a bit of wire - come off it. I reckon for receiving you don't need this. We aren't desperate for absolute impedance match (the balun and tuner take care of that). I will be using some single strand connecting wire (about £6 for 100m from Cirkit - at that price I don't mind if it is damaged by the wind!).

The balun you have to buy (£20). The a.t.u. is home made from a design in a book called *Practical Wire Aerials* (I think) which I borrowed from the local library. This set up is for receiving so doesn't need wide spaced capacitors.

I expected to have to buy the capacitors for about £20 from Maplin but picked up a pair at Pickets Lock for £7. Switches and knobs and coil formers from the scrap box. Plastics case from Cirkit (about £6) - Total cost about £40.

It would have been nice not to have to have spent this money but I feel a lot better knowing that I've saved £100 - now what can I buy with that?

By the way, I have just made a couple of flexible whip aerials (for 430MHz and 1200MHz) as well. These are made by soldering 0.75mm stainless steel wire into a BNC plug, insulating the inner with a bit of plastics tube (or coaxial inner insulation) and then crimping silicone rubber tube overall (to stop me poking my eye out!).

The end is sealed with epoxy resin filled with talcum powder (any perfume will do!). How much has this saved me?

Thanks for an interesting magazine.

**David Guest**
**Harlow**
**Essex**

*Of course not everyone feels brave enough to indulge in a bit of home construction. Antennas, however, are probably the best way to get started.*

**Dear Sir**
Many radio listeners rightly complain about the poor standard of medium wave and long wave reception available on modern domestic receivers. The popular stereo radio cassette units are, more often than not, particularly bad offenders in this regard.

I myself own one such unit (from a well known manufacturer) which gives a most unsatisfactory reception on medium wave, sensitivity is very poor, especially at the high end of the band. Furthermore, a serious problem of 'breakthrough' from strong short wave broadcasts occurs on the medium wave band (due to poor front end filtering allowing such signals to mix with local oscillator harmonics).

This can result in whistles and other 'phantom' interference, even when tuned to fairly strong medium wave stations. Amateur operators, transmitting on h.f. bands and blameless of any problem, could very easily, cause such image interference on these sets, and be held responsible.

These problems are also unfair to medium/long wave broadcasters, who may lose listeners as a result. The above problems are, to a greater or lesser degree, common place, and most present day receivers compare poorly with the typical transistor radios from 20 or 30 years ago in this regard.

The European Union (EU) has in the past been accused of introducing regulations/directives which were considered unnecessary or frivolous (for various consumer products) by many people. Perhaps the EU should now consider doing something very worthwhile and compel domestic radio manufacturers to produce sets only to acceptable standards of sensitivity, selectivity and rejection of out-of-band signals, on the medium wave, long wave as well as v.h.f./f.m. bands.

**David Baker**
**Eire**

**Dear Sir**
Inmarsat Monitoring.
Inmarsat is the medium which international trans-oceanic aircraft are moving to from h.f. voice communication. The satellite-equipped aircraft (steadily building in numbers) are transmitting a combination of ACARS data, cabin telepathy and flight deck telephony. Some of the messages, including a propagation of the ACARS, are generally automatically.

If an aircraft is satellite equipped and within range of a v.h.f. ground station, the ACARS will route through either 131.55, 130.25, 129.025 or (in Europe) 131.725MHz. If out of range of a land based v.h.f. station, the equipment will redirect any messages via the satellite.

Following the recent radio communications monitoring convention last October in Atlanta, USA, such transmission via satellite have been available to the airband enthusiast for the first time.

The basic requirements are: a satellite dish of at least 1.8m, a wave guide feedhorn, a microwave r.f. amplifier, an i.f. (intermediate frequency) line amplifier, r.f. connectors, coaxial cable, insulated wire, a weatherproof cover and a receiver capable of f.m. reception from 1530.000 to 1545.000MHz.

Aircraft transmit on 1645.500 - 1646.500MHz, up-converted to Inmarsat from 3619.000 - 3620.00MHz. Receive is 1544.000 - 1545.000MHz, down-converted on Inmarsat from 6439.000 - 6440.000MHz.

Inmarsat reception is possible! The system is about to become a reality to many with a keen interest in aircraft monitoring. The estimated cost should be under £200, plus the dish. The cost of a suitable computer should also be considered.

I am following developments both in the USA and Australia and hope to report in the near future of further information as it comes to hand.

**M. J. Wynn**
**Oxford**

**Dear Sir**
It appears that I have stirred up a hornet's nest with my recent criticism of rally venues! I read with a smile the very eloquent, yet irrelevant letter from T. B. Ellard, March issue.

Being a very interested, yet choosy member of the great, broad-based, hobby like ours surely does not mean that I must accept poor rally/exhibition conditions!

As a hobby, we have seen amazing technical advances, from the early 'crystal tickling' to the highly complex devices now available to us. What a pity, then, that we must be stuck in poorly sited venues to enjoy these 'goodies'.

Unfortunately, my wife and I are limited by circumstances to restricted distance and geography when attending shows/rallies, but our vote goes to the excellent Lincoln show-ground where one can enjoy our hobby in it's country aspect and abundant 'fresh air'.

Is it a sin to expect, and get, better facilities we wonder?!

**E. Billiald**
**Nottingham**

*Perhaps voting with your pocket is the best solution to this problem.*

**Dear Sir**
I am trying to obtain, for a severely handicapped friend, a replacement Van der Molen cassette unit, series 1000. This unit, consisting of cassette deck, associated printed circuit boards, twin VU meters and DIN socket was fitted, with other audio items, into a period furniture cabinet. It was marketed under the 'Havering' name by Mconomy (now Comet) in the 1970s.

Van der Molen of Romford still exist but now make printed circuit boards and have not carried spares for 14 years. Information leading to a perfect complete unit or a working cassette deck with no wear in any of the rotating parts would be greatly appreciated.

**H. Tyson G3IXO**
**Somerset**

**Dear Sir**
First, I would like to give you my thanks for publishing such an interesting and easy to read magazine. I think that many non-native speakers, like me, enjoy it world-wide, without a chronicle use of a dictionary!

Then, I would like to ask you for a favour. I'm French and living in Tokyo and a keen s.w.l. Nevertheless, there are only a very few non-Japanese s.w.l. in Japan. I would be very pleased if you could help me to find other English, French or German speaking s.w.l.s in Japan by publishing this letter.

In advance, thank you very much.
P.S. I can also be contacted by Fax: ++81-3-3927-3709.

**F. Collin**
**Japan**

*Good luck with finding some like-minded listeners.*

# grassroots

**Club Secretaries:**
Send all details of your club's up-and-coming events to: Lorna Mower, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Please tell us your County and keep the details as brief as possible.

* Short Wave Magazine & Practical Wireless in attendance

## rallies

**May 6:** The Dartmoor Radio Rally is being held at Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open at 10.30am. There is enough parking for 600 cars with access for disabled visitors. There is also a playground for children, trade stands, a Bring & Buy and refreshments, etc. Talk-in on S22. For further details contact **Ron** on **(01822) 852586.**

**May 14:** The Dunstable Downs Radio Club are holding their 12th Annual National Amateur Radio Car Boot Sale at Stockwood Country Park, Luton, Nr. Jn. 10 M1. Doors open 10am until 5pm. Talk-in on 144MHz. Attractions include open day, environmental exhibits, side stalls, and free entry to the Mossman Collection of horse-drawn vehicles, craft museum, train and carriage rides, plus much, much more. **Ken Brewer** on **(01582) 451057.**

**May 14:** The Drayton Manor Radio and Computer Rally is to be held at Drayon Manor Park Zoo, Pazbly, Tamworth, Staffs on the A4091. The main traders will be in four marquees. There will be an outside flea market, large Bring & Buy stall, local clubs and special interest stands. Doors open at 10.30am. Make it a day out for all the family. **Norman G8BHE 0121-422 9787** or **Peter G6DRN 0121-443 1189** evenings please.

**May 20:** The Ipswich Computer Show is being held at Willis Corroon Sports & Social Club, The Street, Rushmere St Andrew, Ipswich. Entry fee for adults is £1.50 on the day. Children under 14, DAPs, UB40 and wheelchair users only 50p. Doors open 10am to 4pm. Free parking. **Sharward Promotions** on **(01473) 272002** or **FAX: (01473) 272008.**

**May 21:** The 11th Yeovil QRP & Construction Convention is being held at the Preston School/Centre, Monks Dale, Yeovil, Somerset. Doors open at 9am. Admission is £1.75. There is a free car park and refreshments all day. The convention will be preceded by a Morse Fun-run on each evening from Tuesday 9 to Friday 12 May. Further details can be obtained from **G3CQR, QTHR. (01935) 813054.**

**May 28:** The 19th Annual East Suffolk Wireless Revival will be held at The Maidenhall Sports Centre, Stoke Park High School, Ipswich, Suffolk. Doors open at 10am to 4pm. There will be a Bring & Buy, car boot sale, vintage radio display, Novice stall, rig clinic, antenna test, RAIBC, BYLARA and RAYNET stands plus lots more. Talk-in on S22 GB4SWR. Admission is £1.50 which includes car parking. Further details from **Bob Baal G7HZV** on **(01394) 271257.**

***May 28:** The Great Northern Rally, G-MEX, City Centre, Manchester. All the usual attractions, admission is £1.50. Doors open at 10.30am and close at 5pm. **0161-748 9804.** ***Yes! This is the correct date! This year, the rally has changed from its usual February slot.***

**May 28:** The Maidstone YMCA Radio Rally. Route - M2 junc. 3 or M20 juncs. 4, 5, 6 or 7 then A229 to Loose Village, two miles south of Maidstone. QSX GX8TRF (S22) and GX3YSC (10FM and SU22). Exhibition h.f. station GX3TRY. Doors open at 10.30am (free 10am admission for severely disabled). Entry fee £1.50 per adult. All day videos, free sweets and sickly drinks for juniors. Snack bar also available. Do your own Bring & Buy, outdoor tables for hire. **(01622) 743317.**

**June 11:** The annual Royal Navy Amateur Radio Society Rally will take place between 10am and 5pm on the Sports Field, HMS *Collingwood*, Fareham, Hants. **Clive G3YTQ** on **(01329) 234143.**

**June 17/18:** The Bletchley Park Amateur Radio & Computer Rally is being held at Bletchley Park, Bletchley, Milton Keynes, Bucks. Doors open at 10am to 5pm, both days. This is a new rally in the grounds of the former Second World War top-secret code-breaking, cipher and intelligence centre. There will be special interest groups, Morse tests, numerous interesting displays, talk-in and a Bring & Buy. One price admission to rally and museum. For further details you can ring **(01923) 893929.**

***June 23-25:** Ham Radio '95 Friedrichshafen, Germany. The largest amateur radio show in Europe, and well worth a visit. The Flea Market alone is worth the journey and Friedrichshafen, situated on the Bodensee - Lake Constance to the Engligh - and within easy reach of Austria and Switzerland, is a fantastic area for a holiday.

***June 25:** The 38th Longleat Amateur Radio Rally. Further details from **Gordon Lindsay G0KGL** on **0117-940 2950.**

**July 2:** The 6th York Radio Rally will be held in the Tattersall Building, York Racecourse, York. Doors open at 10.30am. Admission is £1.50. Children accompanied with adult FREE. Ample free parking. Amateur radio, electronics and computers, Morse tests and Repeater Groups. Refreshments and licensed bar. Talk in on S22. **Dave Moreland G7FGA (01904) 790079.**

**If you're travelling a long distance to a rally, it could be worth 'phoning the contact number to check all is well, before setting off. The Editorial staff of *SWM* cannot be held responsible for information on Rallies, as this is supplied by the organisers and is published in good faith as a service to readers. If you have any queries about a particular event, please contact the organisers direct.**

**Editor**

### AVON

**Bristol International RC:** Tuesdays, 8pm. The Fighting Cocks Public House, Hengrove. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

**South Bristol ARC:** Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. May 3 - 20m activity evening/committee meeting, 10th - Building computers - tech. upgrade, 17th - Aircraft video night, 24th - Club annual fox hunt. For more information ring (01275) 834282 on a Wednesday evening.

### BUCKINGHAMSHIRE

**Aylesbury Vale RS:** Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). May 3 - Discussion evening, 17th - Cellular radio technology by M. Knight. Ivan Eamus G3KLT. (01296) 437720.

### DERBYSHIRE

**Derby & DARS.** Wednesdays, 7.30pm. 119 Green Lane, Derby. May 3 - Junk sale, 10th - Weather instruments by Kevin Jones G4FPY, 17th - 'The islands on the air award' by Ken Frankcom G3OCA, 24th - Aerials - the weak link? Mrs Hayley Winfield, 2 Hilts Cottages, Crich, Matlock, Derbyshire DE4 5DD. (01773) 856904.

### DEVON

**Plymouth RC:** Tuesdays, 7.30pm. The Royal Fleet Club, Devonport, Plymouth. May 16 - Selection of rally jobs, 23rd - Selection of Field Day team and helpers. F. P. Russell on (01752) 563222.

**Torbay ARS:** Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. May 19 - Junk and 90/10 sale. Peter G4UTO. (01803) 864528.

### EDINBURGH

**Lothians RS:** 2nd & 4th Wednesdays, 7.30pm. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. May 10 - DF hunt tune-up/club project workshop, 24th - 'Top Band' DF hunt - open to all (Braid Hills Hotel). GM4DIJ, QTHR on 0131-337 7311.

### ESSEX

**Vange ARS:** Thursdays 8pm, Barnstable Community Centre, Long Riding, Basildon, Essex. April 27 - Wartime radio equipment. Doris. (01268) 552606.

### GRAMPIAN REGION

**Aberdeen ARS:** Fridays, 8pm. RC Hall, 70 Cairngorn Crescent, Kincorth. April 28 - Earnest debate: 'This house believes that f.m. should be banned', May 5 - Junk sale, 12th - 2m P.A. project by Steve Gould GM0ULK, 19th - VHF/UHF field day planning. Martin GM0JCN. (01569) 731177.

### GREATER LONDON

**Crystal Palace & DRC:** 3rd Saturdays, 7.30pm. All Saints Church Parish Rooms, Beulah Hill, London SE19. May 20 - Baldock and the Radio Interference Service by Colin Richards G3YCR. Wilf G3DSC on 0181-699 5732 or Bob on (01737) 552170.

**Edgeware & DRS:** Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. April 27 - Morse training evening plus topical discussion, May 11 - EMC discussion, 19th - Straight key evening, 25th - NFD briefing plus Constructors Cup. Rod Bishop. 0181-204 1868.

**Southgate ARC:** 2nd & 3rd Thursdays, 7.30pm. The Pavilion, Winchmore Hill Cricket Club, Firs Lane, Winchmore Hill, London N21 3ER. April 27 - Club radio on the air, May 11 - Talk 'Meanwhile what were the Germans doing?' by Mr Stan Wood, the Marconi historian, 25th - Club radio on the air. M. E. Viney G0ANN. (01707) 850146.

**Wimbledon & DARS:** 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road SW19. April 28 - Come fly with me by G0AWQ, May 12 - Book Bring & Buy. (01737) 351313.

### HAMPSHIRE

**Horndean & DARC:** 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. May 2 - Club night, 23rd - EMC by Nigel Gerdes G7CAW. S. Swain (01705) 472846.

**Winchester ARC:** 3rd Fridays, Red Cross Centre, Durngate House, North Walls, Winchester. 7.30pm. May 19: HF receiver design by Chris Cory G3MEV. P. Simpkins G3MCL. (01962) 865814.

### HEREFORD & WORCESTER

**Bromsgrove ARS:** 2nd & 4th Tuesdays. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. May 9 - AGM. Barry Taylor. (01527) 542266.

### HERTFORDSHIRE

**Hoddesdon RC:** Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. May 3 - Inter-club darts match at Cheshunt Club, 11th - Planning permission talk by G3TZZ, 25th - Visit to Hertfordshire display co. with John Watkins G4VMR. Dave G1CAY on (01992) 460841.

### KENT

**Bromley & DARS:** 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. May 16 - SSTV by A. Messenger G0TLK. A Messenger G0TLK. 0181-777 0420

**Maidstone YMCA ARS:** Fridays, 8pm. YMCA Sports Centre, Melrose Close, Maidstone, Kent, ME15 6BD. April 28 - Rally meeting, May 5 - RAE, Morse tuition and club night, 6th - RSGB Morse test, 12th - Club night, Morse tuition, especially for beginners, 19th - RAE, Morse tuition and club night. (01622) 743317.

**Medway AR & TS:** Fridays, 7.30pm. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. May 8 - VE Day Special Station, 19th - Getting Started in Contests by Dave G4BUO. G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR. (01634) 710023.

### LANCASHIRE

**Bury RS:** Tuesdays, 8pm. The Mosses Centre, Cecil Street, Bury. May 2 - Committee, 9th - Life on the ocean waves by G0PNL, 16th - RSGB video, 23rd - Technical forum and beginners c.w. class. Laurence G4KLT. 0161-762 9308.

### LINCOLNSHIRE

**Lincoln SW Club:** Wednesdays, 8pm. City Engineer's Club, Waterside South, Lincoln. May 10 - AGM, 17th - Visit to RAF Waddington. (01427) 788356.

### MERSEYSIDE

**Wirral ARS:** 1st & 3rd Wednesdays at Ivy Farm, Arrowe Park, Birkenhead, Wirral. Informal natter nights on each Tuesday. May 3 - 'Audio' Part 2 by Cedric Cawthorne, 17th - Visit to A.R.C. Newton le Willows. A. Seed G3FOO on 0151-644 6094.

### NORFOLK

**Norfolk ARC:** Wednesdays, 7.30pm. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. May 3 - GB3NB repeater group AGM, 10th - Night on the air/construction QRP/Morse practice, 17th - Radio navigation by Dr. Philip Lawrence G8MRQ, 24th - Night on the air/construction QRP/Morse practice. Mike G4EOL. (01603) 789792.

### NOTTINGHAMSHIRE

**Mansfield ARS:** 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. May 1 - AGM. Mick G0UYQ, QTHR. (01623) 792243 or Howard G1JGY, QTHR. (01623) 423697.

**South Notts ARC:** Fridays, 7pm. Highbank Community Centre or Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. April 28 - Construction plus on air h.f. and v.h.f. Julie Brown G0SOU. (01509) 672734.

### OXFORD

**Oxford & DARS:** 2nd and 4th Thursdays, 7.30pm. The Grove House Club, Grove Street, off Banbury Road, Summertown, Oxford. D.A. Walker G3BLS on (01865) 247311.

**Vale of White Horse:** 1st Tuesday of each month. 8pm at The Fox, Steventon. Ian White. (01235) 531559.

### SHROPSHIRE

**Salop ARS:** Thursdays, 8pm. Oak Hotel, Shrewsbury. April 27 - RAE tuition and workshop evening, May 4 - Junk sale, 11th - Telford rally group night, 18th - 2nd foxhunt. Ian Davies G7SBD, QTHR. (01743) 463711.

### SOMERSET

**Yeovil ARC:** Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. April 27 - 1st meeting of the new committee and club station on the air. Cedric White, QTHR. (01258) 473845.

### WARWICKSHIRE

**Stratford-upon-Avon & DRS:** 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. May 8 - Digital broadcasting, 22nd - 2m foxhunt. Martin Rhodes G3XZO. (01789) 740073.

### WEST MIDLANDS

**Sandwell ARC:** The Broadway, Warley. RAE class on Monday nights, Morse class on Wednesday nights and RAE Novice class on Thursday nights. Three operating shacks, h.f./v.h.f./u.h.f., Phone, c.w., RTTY, AMTOR, Packet, all bands. Talks, outings, contest and demonstrations. For further information please ring 0121-552 4619/0121-552 4902.

### WEST YORKSHIRE

**Denby Dale ARS:** Wednesdays, 8.30pm. Pie Hall, Wakefield Road, Denby Dale, West Yorkshire. May 3 - Simple ATV 10GHz by John G6GSV, 14th - Drayton Manor Rally coach trip, 17th - Sky Update by Phil G4FSQ, 24th - Fox hunt. Denby Dale ARS also provides RAE, Morse and Novice RAE classes and is a registered City & Guilds examinations centre for both the RAE and Novice RAE exams. Further details from the examinations secretary Brenda G4OTE on (01484) 424776 or secretary Kevin G1FYS on (01484) 547553 for club activities.

**Keighley ARS:** The Ingrow Cricket Club, Ingrow, Keighley. Thursdays, 8pm. April 27 - Junk sale, May 4 - Natter night, 11th - Fox hunt, 18th - Natter night, 25th - Amateur TV demo by G3TQA. Kathy G0RLO. (01274) 496222.

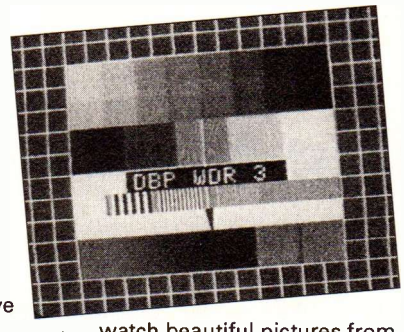
### WILTSHIRE

**Trowbridge & DARC:** 1st & 3rd Wednesday, 8pm. The Southwick Village Hall, Southwick, Trowbridge. May 3 - Visit by G4YNM of Ben Spencer Consultants, who will be displaying and demonstrating his range of kits and modules for the radio amateur. Ian G0GRI. (01225) 864698.

**Elaine Richards**
**PO Box 1863,**
**Ringwood,**
**Hants BH24 3XD.**

# junior listener

## DXTV




**Katy Martin** (15) has written from Margate asking about starting in DXTV. So, if you think you could get interested in searching for both foreign TV signals and ones many miles away, where do you start?

Well, DXing television systems isn't something I've ever been really interested in, but (to use a well-worn phrase) 'I know a man who can' help. I would encourage anyone thinking about this area of the hobby to get yourself the latest catalogues from both Aerial Techniques, 11 Kent Road, Parkstone, Poole, Dorset BH12 2EH. Tel: (01202) 738232 and HS Publications, 7 Epping Close, Derby DE3 4HR. The people involved with these companies are real enthusiasts when it comes to TV DXing and are, therefore, a great source of information.

Unfortunately, even to receive signals from other TV regions in this country you do need specialised equipment. Things like a steerable (often called rotatable) high-gain antenna (and the equipment to turn it through 360° hunting for signals) and probably a pre-amp to boost the signal too.

As for watching foreign channels, then you will probably need a special kind of television receiver too - I don't expect many of you have them in the lounge. Different countries use different formats - what I mean by that is that their TV signals are produced by different methods to ours. Have you ever tried to play a video you bought on a foreign holiday on your own video when you got home? If you did, it probably didn't work unless you have a special kind of video player - we have one, for example, that plays the American NTSC system video tapes as well as our own PAL ones. Books telling you what channels to watch and who the various test-cards you may come across belong to will be an asset - a bit like you use frequency guides on the broadcast bands to help locate stations.

Companies like Aerial Techniques can supply all the equipment you need and HS Publications produce booklets to help you on your way. It doesn't have to be expensive (but like most areas of this hobby it can be!). Don't expect to be able to sit down, tune around the TV channels and watch beautiful pictures from all over the world. It doesn't work like that. You need even more patience for TVDXing than you do for broadcast listening. Pictures fade in and out, the sound is usually transmitted separately and so you need a receiver for that, and sometimes you won't be able to lock onto a picture for days at a time.

The summer months can often be a good time to start looking for TV signals as there are atmospheric anomalies (commonly known as lifts) to help. If the weatherman gives out a warning of unusual atmospherics and apologies for the state of your TV signal, that's a good time to try TV DXing.

If you have some back issues of *Short Wave Magazine*, look for a column called 'DXTV Round-up', Ron Ham gave lots of examples of the kind of picture you can expect to receive.

## New Book

Many of the national and international listening groups produce very good literature that is suitable for beginners and the experienced alike. The British DX Club have published the 13th edition of their *Radio Stations in the United Kingdom*. It's a 43-page, A5 booklet that lists all the British medium wave and f.m. radio stations, both BBC and independent ones in frequency order. You also get the information on their location and transmitter power too. There is also an alphabetical listing giving the station name, address and telephone/fax number.

One thing that is always pleasing is when you see a very reasonable price tag alongside so much useful information. At just £2.50, including postage, you get a lot of information for each penny spent!

If you're interested, send your money to:

British DX Club, 126 Bargery Road, Catford, London SE6 2LR.

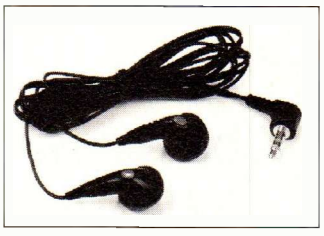
## Silence is Golden!

Listening, whether you are into broadcast station, amateur station or scanners, is a very individual hobby. But, unless you use headphones, you tend to share what you are hearing with all those around you. Not always something to make you popular, especially if you are DXing late at night when everyone else is trying to sleep!

If you are experimenting with some of the 'greyer' areas of listening, then using headphones is a must. Unfortunately, not all radios come with headphones, especially if you are buying second-hand, or you may only get an ear piece provided. The cause of all this - a press release from Maplin Electronics for their new earphones. These are the kind that fit into the outer part of your ear and are very light and comfortable. The new type are stereo earphones with samorium cobalt speakers and cost £6.99. They come with a case to store them in and a 3.5mm gold-plated jack plug. The impedance is 22 to 32Ω and that's for a frequency range of 15Hz to 20kHz.

I've used these types of earphones when using my Philips portable on holiday. I found them to be great to use - small to pack - and they enabled me to listen in peace.

If you've got a Maplin catalogue you'll find then under the code RZ93B.



## Competition

Maplin Electronics have just introduced some new personal earphones featuring cobalt magnet speakers. They are mentioned some where else on this page.

Maplin have very kindly offered six sets as prizes. You can win a pair for listening to short wave, airband or even the hi-fi. All you have to do is answer the three questions below. All the correct answers will be entered in to a draw. Next month I'll pull out six correct answers and announce the winners

Questions:
1. What's the symbol for the chemical element cobalt?
2. What does dB stand for?
3. What's the frequency range and impedance of the Maplin phones?

Don't hang about - get your answers off to me at the address at the top of then page. All entries must reach me by the 26 May. Good luck.

## Change of Address

Many 'junior listeners', when they are first involved in the hobby of listening, try to obtain some of the many awards around. It's a nice way of showing other people that you've achieved something. If you are working towards one of the International Short Wave League Awards, then you should note that their Awards Manager has changed. You should now address everything to:

Herbert Yeldham G-20006/G6XOU, ISWL Awards & Contest Manager, Belle Fleurs, Wade Reach, Walton on the Naze, Essex CO14 8RG.

## Oops!

Both Geoff Chance and Chris Carrington have pointed out that some of the dates mentioned in the list of rallies the ISWL are attending were muddled. I'm sorry and hope that no-one made any fruitless journeys. Here's the correct list.

| | |
|---|---|
| May 28 | Plymouth Amateur Radio Rally |
| June 11 | Elvaston Castle Mobile Radio Rally |
| June 25 | Longleat Amateur Radio Rally |
| July 8 | Cornish Amateur Radio Rally |
| August 19/20 | Staffordshire Hamfest |
| September 3 | TARRG, Telford |

# LISTENING TO

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Built-in compass

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*plus £10.00 P+P*


### New from JPS Communications ANC4

Antenna noise canceller

Effectively reduces power line noise, computer noise,TV timebase noise and many other interference signals.

*See the review in this issue!*

***Just* £189.00**

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orders@lowe.demon.co.uk
info@lowe.demon.co.uk
New check out Lowes new pages on the World Wide Web
http://www. demon.co.u.k/lowe/index. html

**BERKSHIRE**
3 Weavers Walk
Northbrook Street
Newbury
Tel: (01635) 522122

**NORTH EAST**
Mitford House
Newcastle Int. Airport
Newcastle Upon Tyne
Tel: (01661) 860418

**WALES & WEST**
79/81 Gloucester Rd
Patchway
Bristol
Tel: 0117-931 5263

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# THE WORLD

# Lowe Electronics jump start the frog!

***"What a difference! There is no comparison!*** ...The Kiwa filters have turned the Yaesu into a real DX rig." *Elton Byington - DX Ontario*


Tests on the FRG100 have show that the -6dB bandwidths of the AM filters are typically wider than the published specifications. A test sample showed 9.1kHz and 7.5kHz where the specifications read 6 and 4kHz respectively. For many people this has put them off considering the FRG100 as a replacement for older equipment, quite a shame as the basic receiver and the operating facilities represent very good value.

The FRG100 is probably one of these products where a little bit of money spent will make quite a difference to those who do need the extra performance and for those people, we are pleased to announce the FRG100DX. The FRG100DX will already have the new filters fitted by Lowe Electronics and each will be provided with its own test certificate during the course of our modifications and alignment.

Kiwa Electronics in the USA have specialised in filter upgrades for a number of years and as their newly appointed European distributor, we are pleased to be able to offer their highly acclaimed upgrades for the FRG100. Kiwa's IF filter upgrade dramatically improves both wide and narrow band performance of the FRG100 receiver by replacing both AM filters with superior modules offering a tremendous improvement in selectivity.

Each replacement filter uses Filter Module technology for precise filter requirements. Each module is constructed of three cascaded ceramic filters with input and output buffer amplifiers for maximum performance. Other features include zero insertion loss and a guaranteed shape factor (-60dB/6- 6dB BW ratio) of less than 1.8, typically less than 1.65. For the 6kHz filter we've chosen a 6kHz model from Kiwa Electronics.

This gives a performance almost equal to Yaesu's 4kHz (!) This will make quite a difference to selectivity and you'll notice an immediate improvement in performance. This is ideal for general listening right across the short-wave bands and in particular on medium wave.

For the DX chaser, we've chosen to replace Yaesu's 4kHz with Kiwa's 3.5kHz filter offering once again a huge leap in performance. We feel this is a great choice for the avid broadcast band DXer as it offers the best compromise between fidelity and digging the signal out of strong interference.

**SOUTH EAST**
Communications Hse.
Chatham Road
Sandling, Maidstone
Tel: (01622) 692773

**YORKSHIRE**
34 New Briggate
Leeds
North Yorkshire
Tel: 0113-245 2657

**SOUTH WEST**
117 Beaumont Road
St. Judes
Plymouth
Tel: (01752) 257224

**EAST ANGLIA**
152 High Street
Chesterton
Cambridge
Tel: (01223) 311230

# we Electronics

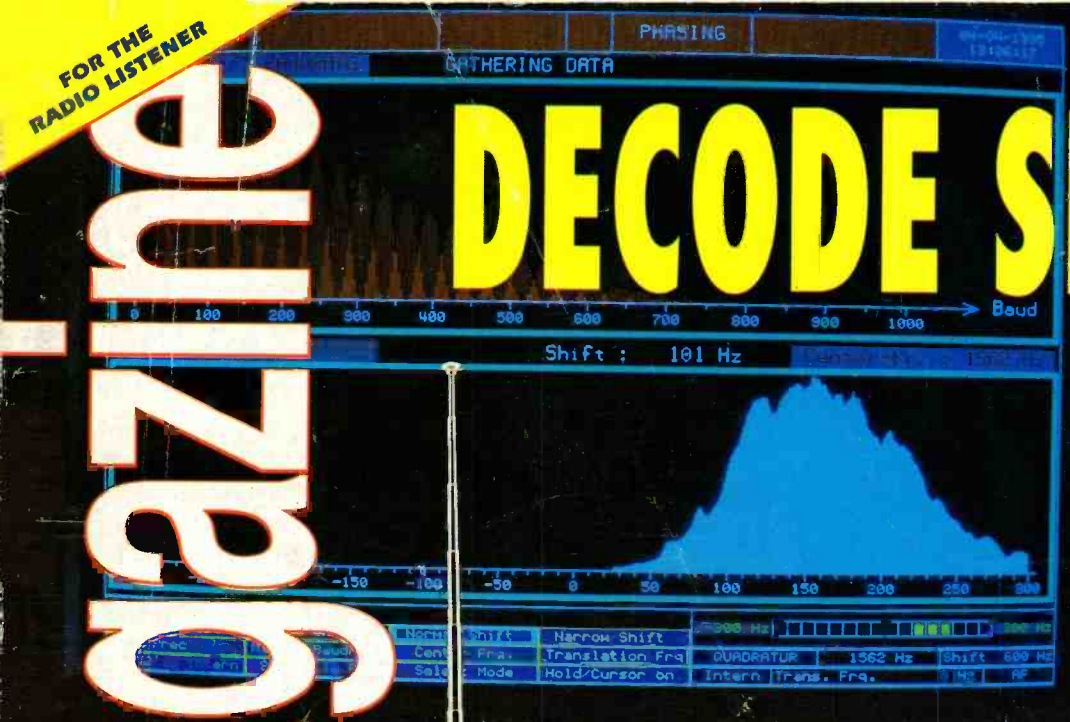
, Matlock, Derbyshire DE4 5LE Tel: (01629) 580800 Fax: (01629) 580020

FOR THE RADIO LISTENER

# short wave magazine

# DECODE SPECIAL

## Data Modes- Getting Started




## Exclusive
## JPS ANC-4 Antenna Noise Reducer
## Reviewed
## Professional Data Analyser
## From Wavecom


## Win a PRO-2035

### Plus Regular Features Covering

Airband, Scanning, Junior Listeners, SSB Utility Listening, Propagation, Amateur Bands, Long, Medium & Short Waves, Satellite TV Reports, Weather Satellites and more.

May 1995 £2.25 ISSN 0037 - 426

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# NEVADA COM

189 London Road, P

# news

**For the latest in the World of Listening**

## The CONET Project

We have been informed of a plan to produce a CD of spy station recordings. The record label - 'Irdial Discs', will release the collection of the infamous numbers stations, which are heard with clockwork regularity on the h.f. bands 24hours a day, around the globe. Signals to be included are MOSSAD stations, the 'British Man', 'Bulgarian Betty', the '3 Note Oddity', the 'German Child's Voice' and many others.

The CD will include signal types from the some 30 year history of these stations, which are used by the world's intelligence organisations to communicate with agents in the field.

It is planned that the signals will be presented both as received and in a noise removed form. The 'Sonic Solutions' profiling system will be used to remove the background noise.

The Sonic Solutions system is claimed to be so powerful, it can take a recording from an answering machine, and resolve the background noise so that it is completely inaudible! When applied to the Numbers stations recordings, Irdial say the results will be spectacular.

Irdial are still looking for sources of recordings, particularly those of stations that are no longer transmitting. All contributions will be fully credited. Submissions can be made on any recording format, and all media will be returned to their owners. Recordings with logs are preferred, since the project will form a historical documentation of the numbers phenomenon. The CD is apparently to be catalogued by the British Library.

Contributions should be sent to

**Irdial Discs,**
**Attention Numbers,**
**PO Box 424,**
**London SW3 5DY.**
**Fax: 0171-351 4858,**
**Internet:**
**irdial@irdialsys.win-uk.net.**

## Sunday Open Day for W&S

Waters & Stanton will once again be holding their annual Open Day at their Hockley premises. The Open Day, which is free to all, will be held on 21 May between 1000 and 1700.

As on previous Open Days there will be a 'vast quantity' of special offer items.

Visitors are advised not to be late, as in previous years there have been queues of bargain hungry customers at dawn. Jeff Stanton tells us that every department is making a special effort to clear stocks.

Refreshments will be provided free of charge to help those weary bargain hunters. For further information contact **Waters & Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, Fax: (01702) 204965.**

## Lowe Caught on the Web

Lowe Electronics now have a home page on the World Wide Web at address **http://www.demon.co.uk/lowe/index.html**

The page has currently just completed the 'genesis' stage and is growing daily. Lowe intend to eventually have their entire catalogue of receivers, scanners, amateur radio equipment and accessories available on line.

They will also upload onto it technical reviews, articles on antennas, decoding, etc. plus in depth third party reviews of their own receiver range.

Comments from users are welcomed as to the type of information that they would like to see on the page as the database slowly builds up.

Non E-mail users can contact **Lowe Electronics** at their Headquarters, **Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800.**

## National Transmitter News

**New BBC FM Transmitters**

**March 7 Keswick Forest**, Cumbria. This new station brings good f.m. radio reception, including stereo, to approximately 6700 people in Keswick, Bassenthwaite and surrounding areas. The station is located some 4km north west of Keswick, it entered service following a period of test transmissions which began on Thursday January 19 1995.

The frequencies used by the station are, Radio 1 99.2MHz, Radio 2 89.6MHz, Radio 3 91.8MHz and Radio 4 94.0MHz. The polarisation for external and loft mounted antennas is **horizontal**.

Further information on f.m. reception in the Cumbria area including advice on fitting an external f.m. antenna, is available from:

Engineering Information
BBC Broadcasting Centre
Barrack Road
Newcastle-upon-Tyne
NE99 2NE
Tel: 0191-232 1313

or

BBC Engineering Information
Villiers House
The Broadway
Ealing
London W5 2PA
Tel: (0345) 0101 313
(local call rate)

## NVCF'95

The forth National Vintage Communications Fair will be held on May 14 at the Pavilions Hall of the NEC. Featured will be thousands of rare and collectable vintage technology items with a special emphasis on early radios, television receivers, gramophones, telephones and classic 1950s Hi-Fi. In attendance there will be over 300 specialist dealers from the UK, Europe and the USA. This is reputed to be the event of the year for the seasoned collector. For the newcomer pondering as to whether to take up collecting, there will be helpful advice and guidance on hand from many leading collectors' clubs, societies and specialist magazines.


The fair is presented annually by the *Sound and Vision Yearbook*, which is a comprehensive reference guidebook in this field. For early arrivals at this year's fair the admission fee of £5 includes - while stocks last - a complimentary copy of the latest edition of the *Yearbook*, which is normally £3.50.

The fair starts at 1030 and the doors close at 1700. Enquiries to the organiser, **Johnathan Hill, NVCF'95, 2-4 Brook Street, Bampton, Devon EX16 9LY. Tel: (01398) 331532.**

**The best of classic British audio - model TL/10 10W monoblock amplifier with Point One control unit, made by H.J. Leak & Company of Acton, London W3 in 1954.**

## Radio and TV DX News

The Maxfield offer to buy the programme and transmission arm of the ailing Gibraltar Broadcasting Corporation is still on the table, including the programme maker 'Strait Vision Productions', according to the Gibraltar Chronicle. In a new twist the GBC are wanting, it is rumoured, to off load the Strait Vision contract though recent press suggests that GBC are still offering programme commissions to Strait. With GBC now relaying the 'BBC Prime' satellite service during the day (with opt outs for GBC own offerings), locals are none too happy with the BBC service of repeats, preferring the earlier BBC World Service.

Ajman is a small state in the United Arab Emirates and a forth government owned TV station will open in 1996. Two programme channels will be on offer, one in Arabic and the other offering foreign language programmes.

It's thought that initially nearly 30 DAB transmitters will be established in the UK with five around the capital city. The London service will radiate from Crystal and Alexandra Palace, Guildford, Bluebell Hill and Reigate. Other DAB outlets will be constructed in the main population areas, Bristol, Cardiff, the North East, North West and Belfast.

Better pictures in the Sudan with the National Television Service buying eight new transmitters to relay the first. programme in Duwaym, Buram, Kassala, Dongola, Fulah, Kadugli, Juba and Malakal.

The close down of the Norwegian Band 1 transmitters will 'take quite a long time' and a time span of two to three years is suggested, the replacement u.h.f. transmitter operating in parallel alongside the terminating Band 1 partner. Gamlesveten already has the parallel u.h.f. transmitter installed and this year will see parallel units sited at Hemnes, Bagn and Melhus. The Norwegian Telecoms Authority state the reason for Band 1 closure is the interference levels experienced during the Sporadic E season and the need to utilise Band 1 frequencies 'for other use'! The first Band 1 closures should therefore not happen until 1997/8.

A letter from Robert Copeman (Australia) stresses that their u.h.f. channels differ slightly from the European channel allocations, for example their ch.31 is 548.25MHz vision where-as ch.E31 Europe is 551.25MHz, a full tabulation appears in the *World Radio TV Handbook*. Channel 31 is used extensively in Australia for community TV such as CTS 31 - Sydney, NSW; MCT 31 - Melbourne; BRIZ 31 - Brisbane, Qld and ACE 31 - Adelaide. Alice Springs is shortly having a commercial station (TEN Network affiliate) and operating on ch. 31 - though not as a community station. In mid-January '95 Robert received via Sporadic E, several 1W tourist information f.m. stations from North Queenslands, the Gold Coast, Qld and Northern NSW, hopefully a pointer of better things for our Sporadic E season in May onwards.

## ISWL Awards Change

We have been informed by Chris Carrington that, as of April, the address for the ISWL Awards Manager will become:

Mr Herbert Yeldham (G-20006/G6XOU)
ISWL Awards and Contests Manager
Belle Fluers
Wade Reach
Walton on the Naze
Essex
CO14 8RG

Anyone wishing to obtain details or apply for any of the ISWL awards should contact Herbert.

## Malta VE Day Station

The AREC club in Malta have organised an event station for the Victory in Europe Day commemorations. The call-sign for the event is 9H50VE, the station will be on air for 24 hours on the May 6, 7, and 8 1995. Proposed frequencies to used are 3.775, 7.044, 14.225, 21.20 and 28.55MHz s.s.b.

Direct QSLs only will be accepted with two dollars accompanying the report. QSL requests should be sent to **9H50VE, PO Box 114, Valletta CMR01, Malta.**

## Summer DX Guide

The annual Summer edition of *Transmissions in English* 1995 is now available from the World DX Club. Compiled by Alan Roe, this is a 24 page A5 size, listing of English language programmes broadcast on short wave stations world-wide. The listing is organised in time sequence. Details of time, station, country, target and frequencies used, are given. Where relays are used the transmitter locations are also supplied.

The guide is ideal for packing together with a portable radio when travelling abroad.

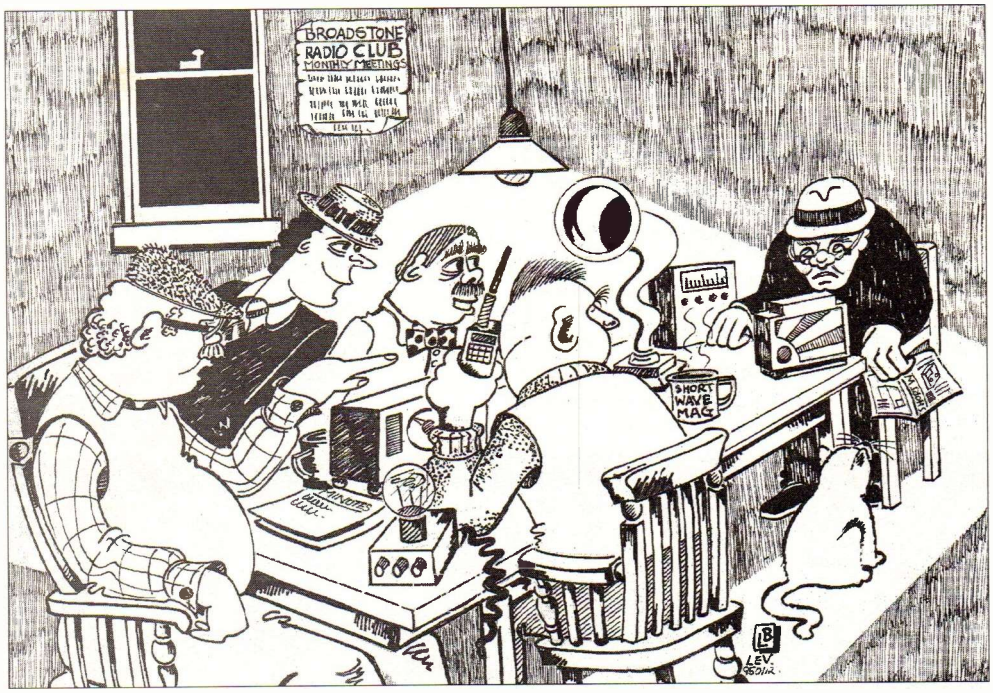
*Transmissions in English* 1995 is available from the **World DX Club, 17 Motspur Drive, Northampton NN2 6LY.** Price £1.00, $2.00 or three IRCs.

## Wrong Price

Last month we inadvertently misprinted the price for the Barton Communications Magnetic Balun. The correct price is £21.45. The complete antenna kit costs £27.95. Barton Communications can be contacted on **Tel: (01325) 377086** for further information.

*Your news and product details can reach thousands of listeners, drop a line to Kevin. Post, Fax or E-mail accepted.*

## *Listen With Grandad* by Leon Balen & David Leverett




*The only thing poor old Fred gets on his receiver these days is dust.*

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### OPT-3300

The latest mini freq. finder from Optoelectronics (smaller than a packet of cigarettes.) Inc. NiCads/Charger/Ant. (1MHz–2.8GHz) ~~£169.95~~

**£139.95** P&P £6

### OPTO-SCOUT

New – top of the range mini counter 400 memory system. Filters Pc Compat. 10MHz–2.8GHz.

~~£399.95~~

**£349.95** Includes: Nicads/Charger/Antenna

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Double nest of dipoles. The ultimate base antenna! Receives 10–1300MHz. Supplied with 10m coaxial lead and BNC plug fitted. 34" high, loft or outdoor mounting use a flat wall or pole mount.

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Do you really want SSB. If not, then this is the one for you. Still the UK's best selling mid priced h/held scanner on the market. It will pick up everything from 8MHz to 1300MHz without any gaps. Complete with Nicad's and Charger. ~~£289~~

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Listen to Aircraft, Ham, Marine and much more with this superb scanner. Covers 66-88/108-174/380-512MHz

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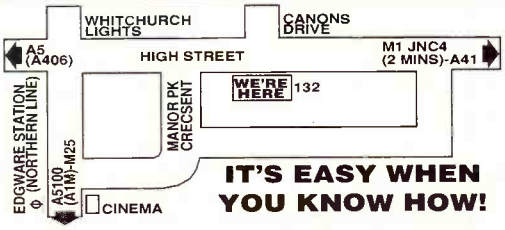


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# Interfaces - Getting Started with the PC

*If you're considering using your computer and shareware programs to eavesdrop on the wealth of data modes on the h.f. bands, you will have to decide which interface to use to make the vital connection between your computer and receiver.*

As you may well expect, there are a number of options on the market, all of which offer attractive solutions. Before I cover some of the products in detail, let's just quickly run over the purpose of the interface. Whilst there are many self-contained decoding systems on the market, many listeners new to the data modes start by using shareware systems such as JVFAX 7.0 by Eberhard Backeshoff and HAMCOMM 3.0 by Wilhelm Schroeder. Both of these programs require a simple interface circuit to tidy-up the audio signal from the receiver ready for processing by the computer. The audio connection to the receiver can either be taken from the line-out jack or the external speaker jack. If you have the choice, I would strongly recommend using the line-out connection. This is because the line-out jack provides a relatively constant output level that's not effected by the volume control setting. This means you can turn the volume down without affecting your data decoding.

At the computer end of the link the interface has to be connected to one of the serial ports. At this point I ought to offer a word of caution regarding some of the conflicts that can occur when using IBM PC type serial ports. The problem relates to the way in which PCs utilise the limited supply of interrupts. Without getting too complicated, these interrupts are special signals within the computer that are used to call for processor time. Within any computer, the central processor unit is the powerhouse that has to direct the operation of all the computer's component parts, e.g. keyboard, display, printer and serial ports. The problem with the PC is that it has a very limited supply of interrupts so they often have to be shared. This can result in all sorts of conflicts if you use lots of serial and printer ports.

One of the best ways to check the set-up on your computer is to run the Microsoft diagnostic program MSD. You will find this program supplied with virtually all modern computers and is usually to be found in the \DOS directory. This handy program displays the hardware and software set-up of your system, including an analysis of the serial port configuration. If you need to connect lots of serial devices to your computer you can avoid all these problems by using a serial data switch (around £20-30). These are available from most computer suppliers and comprise a single input socket with up to four outputs mounted in a smart case. The required output is normally selected using a rotary switch on the front panel.

## Simple Interface

Both JVFAX and HAMCOMM can operate with what's become known as a simple interface. The interface is described in the disk based manuals included with both JVFAX and HAMCOMM. You will also find very similar interfaces in use with many commercial decoding packages. This simple interface comprises a common operational amplifier integrated circuit, configured to give very high amplification. This has the effect of turning a wide range of audio signals into square waves - essential for the computer software to process the signal successfully. Because the circuit is so simple, it has very modest power requirements that can usually be met from the serial port itself.

The other advantage of this interface is that it's ideal for home construction. However, I would only recommend this if you've had some experience, because the combination of trying to use new software and home built hardware is asking for trouble! If you're good at home construction, you should be able to fit the completed receive interface inside a standard 25-way D connector. This saves the bother and expense of using a separate case.

For amateur radio operation the basic interface needs to be supplemented with transmit switching and audio filtering. The audio filtering is required to convert the coarse output from the computer into a form suitable for connection to the microphone input of a transmitter.

## Interface Kits

If you would like to try building your own

interface, but need some help, you could try one of the kits that are currently available on the market. An example of this is the HAMFAX interface produced by G0LOV/G4LUE Amateur Software. The kit is supplied with all components and copies of the HAMCOMM and JVFAX software. The kit supplied for review did not include a case, but there are a wide range of suitable boxes available from your local component shop. The build instructions were very comprehensive taking you right from component identification through to final testing. There was also some advice for installing and configuring the software.

The JVFAXR kit from Badger Boards is also a simple, receive only, interface. Again, no case is supplied, just the p.c.b., components, instructions and JVFAX software.

## Ready-Built

If you'd rather go straight for a ready-assembled interface there are a number to choose from. If you're only interested in reception, the interface produced by Pervisell Ltd is very popular. The electronics are housed in the 25-way D connector and the standard of construction is very high due to the use of surface mount technology. The connection to the receiver is by a flying lead that's ready terminated with a 3.5mm jack plug. Ideal for the new listener.

A second alternative is the complete transceive package that's available from Venus Electronics. As well as providing a very neat interface, their Datapack includes the JVFAX and HAMCOMM software plus some sample images. An extra advantage of this system is the use of a standard DIN plug and socket arrangement that aligns with the standard used for Packet radio TNCs. This is very convenient for those that already have a Packet TNC incorporated in their station.

The latest interface to arrive on the market is the RSD 116 low noise unit from CommSLab Ltd. This new unit uses surface mount technology to fit all the electronics inside the 25-way D connector. The RSD 116 also includes full transmit facilities with separate leads for the transmit switching and audio signals. All three leads are without connectors so you can select the right plugs for your system.

One particularly attractive feature of this system is the inclusion of a detailed question and answer paper that covers many aspects of the software installation and configuration. Particularly attractive to the new users is the provision of a phone-in help-line where your questions will be answered.

## Complex Interface

If you are particularly interested in receiving FAX images from satellites using JVFAX, you will need a more sophisticated interface. This is required to process the amplitude modulated signals that are used by the weather satellites. Although you can build your own interface using the circuits supplied with JVFAX, you really need to be a very competent home constructor for this particular project. For most people, the best option is to choose a ready built unit such as the JVF1 from Martelec Communications. This unit was reviewed back in the December '94 *Short Wave Magazine* and I'm sure the Editorial Office will supply a copy (£2.30 per copy) if you want to check out the full details. Once the initial configuration adjustments have been completed, the unit is very easy to use. The JVF1 features automatic triggering to the satellite signal with just the external gain needing to be set by the operator.

## Support Shareware

Now for a plea on behalf of the authors of JVFAX and HAMCOMM! These excellent programs provide a first rate starting point for many listeners new to the data modes, but often users fail to register their programs or make a contribution to the author. If these programs (and others) are to continue to be developed, you really need to register your software. Not only does this help to guarantee the future of the programs, but it also eases your conscience! Full details of the registration requirements are included with each program.

## Suppliers

**Badger Boards,**
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**Venus Electronics,**
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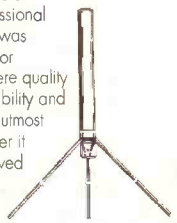

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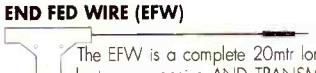

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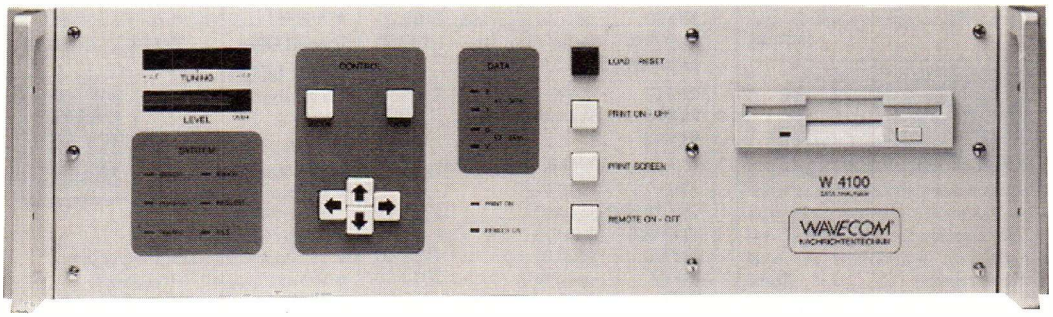
# Wavecom 4100




*If you need help spending your Lottery winnings, the Wavecom 4100 reviewed here by Mike Richards could help!*

Whilst few of us can afford to buy a top flight decoding system, we all need dreams and the Wavecom 4100 certainly falls into the right category! Having said that, when you consider what people pay for other hobbies, such as boating or maybe golfing, the Wavecom's substantial price tag starts to seem much more affordable. Perhaps the more important point is whether or not it represents good value for money. In this review I'll guide you through the 4100 in detail so you can form your own view on this.

## Overview

Before I get into the detail of the 4100's performance, an overview of how it operates and interfaces to the outside world may be helpful. The 4100 is essentially a stand-alone decoding system. This means that it accepts an audio signal from the receiver, decodes it, and then displays the result on a video monitor. The range of signal types covered by this type of decoder tends to run hand-in-hand with the cost, and the Wavecom 4100 features over 54 modes. These spread from simple c.w. through to complex multi-tone systems like Piccolo.

One of the main advantages of this type of decoder over a computer based system is simpler operation with far fewer set-up problems. For example, the 4100 includes a fully automatic analysis mode, so you can just tune-in the signal and let the decoder do the rest. Another spin-off comes in the form of a much reduced level of r.f. interference, simply because the decoder has been designed to operate in an r.f. sensitive environment.

## Setting-up

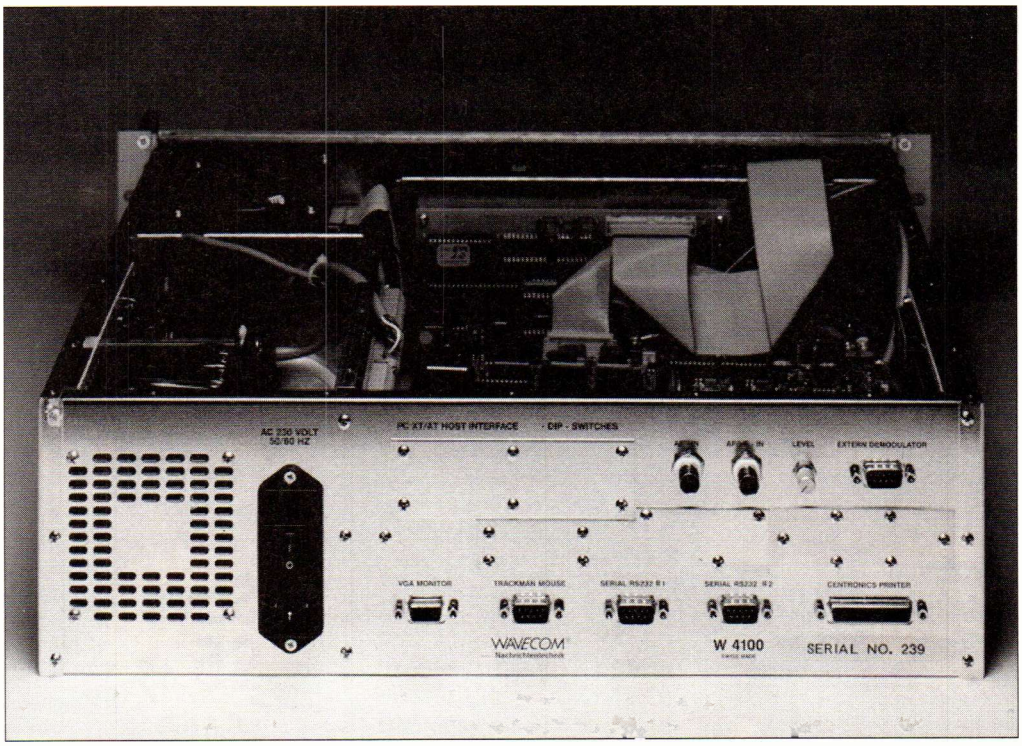
The first point to note about the 4100 is that it's designed primarily for the professional market. As a result, the whole build standard is aimed at extended operational periods (like 24hr) whilst located in high density equipment racks. Hence the 19in rack mount constructional style with a built-in fan to keep the internal temperature under control. The 4100 is also very heavy, weighing in at some 8.5kg. Although the review model was supplied without an outer sleeve, these are readily available from many outlets.

Moving on to the connections, the 4100 has a comprehensive range of standard interfaces assembled on the rear panel. Let's tackle the essential connections first. There are two audio input connections both of which unusually employ BNC connectors. It's not until you realise that the 4100 can accept direct r.f. inputs that you appreciate the reasons for the use of such high quality connectors. If you're using a conventional audio output from your receiver, the AF socket is the one to use. This input has an automatic gain control feature, so as long as the input level is somewhere between 500mV and 2V, the 4100 will automatically adjust the input circuitry for optimum performance.

If you've really won the Lottery and you have a professional class receiver that uses standard digital signal processing (d.s.p.) techniques, the 4100 can accept a direct digital output. The only condition is that the d.s.p. signal must align with the Racal industry standard and you need to use the optional Wavecom d.s.p. demodulator. For displaying the decoded signals, the 4100 uses a standard VGA computer monitor (not supplied) and the rear panel connector is fully compatible with the video system used by IBM PCs and clones. This means you can take advantage of the good prices that come from high volume sales of PC monitors. The printer connection also follows IBM standards, providing a good match to a wide range of printer systems. One point to note here is that the internal software is optimised for use with Hewlett Packard DeskJet 560 colour printers. Although there are drivers included for standard 9 and 24-pin dot matrix printers, by using the recommended Hewlett Packard printer you can produce full colour screen prints.

You will note from the photographs that the front panel features four arrow keys. These are used to select the appropriate operating mode. A more convenient alternative is to use a Trackman Mouse system as supplied with the review model. This connects via a standard 9-pin D connector on the rear panel and give a much friendlier feel to the overall operation. To enable easy updating of the main decoding software, the 4100 includs a built-in 3.5in floppy disk drive. At switch-on this drive is always used to load the decoding software. As this disk was formatted to normal

IBM standards you could make safety back-ups on any IBM PC with a 1.44Mb drive.




## Advanced Inputs

In addition to the basic inputs covered so far, the 4100 includes some advanced options. When attempting to receive v.h.f. and u.h.f. digital modes such as POCSAG, GOLAY and INFOCALL, it's necessary to access the receiver's i.f. signal to ensure minimal errors in the decoding process. To facilitate this, the 4100 has three separate i.f. inputs for 455kHz, 10.7 and 21.4MHz signals. This should cover the requirements of most high quality receivers. If you're very seriously into decoding software, there's also a PC/AT Host interface connection. When used with a dedicated Wavecom card in your PC, you can directly download software from a PC to the 4100. This interface is provided essentially for development work. This feature is supplemented with an external demodulator socket for use with specialist transmission systems.

The two serial ports, also mounted on the rear panel, are used to provide yet more interesting features. The first port is used to carry decoded data from the 4100. This could be connected to a PC for storage or further processing of the received data. The second serial port is also designed for use with a computer but, in this case, gives access to the remote control of the 4100's main features. Although mainly of interest to professional users the ability to both control the 4100 and monitor the decoded output on a PC opens-up lots of opportunities for processing the more difficult and complex signals.

## Documentation

To make good use of a sophisticated unit like the 4100 a good user manual is essential. The review 4100 was supplied with two manuals, one covering all the operational details whilst the other was a comprehensive technical manual with all the circuit diagrams. I understand that the technical manual is not normally supplied, but is available as an extra.

The main user manual was very well presented in a substantial ring binder with plastics section dividers. The installation section was very thorough and described all the inter-connections in great detail. The next section was very well set-out and guided the operator through the use of the main interface to the 4100's facilities. Once you've mastered the basic operation, the MODES section provided descriptions of each operating mode and all the associated decoding features. Although the manual covered the 4100's operation in plenty of detail, some sections suffered a loss of intelligibility through the translation process

## Navigation

With the 4100 set-up and ready to go, the next step is to understand the operation of the various controls. To keep the user interface as simple as possible, Wavecom have adopted a well structured menu system. The standard menus are displayed at the bottom of the main receive screen.

Although movement of the highlighted cursor can be controlled by the arrow keys on the front panel, the mouse option is to be preferred. This uses a Trackman mouse system to navigate your way around the system. If you've not used one of these systems before, you will find it does take some getting used to but, once mastered, it's very fast and convenient. Having selected the required option, you just press the enter key on the mouse to activate it. That sounds simple enough, but there are some other tricks to make life easy. Once you've entered an option, pressing the escape key on the mouse or keypad takes you back one menu. Just using these two keys you can quickly whip through several layers of menus and pop back out again. The third button on the mouse is used to activate the full-screen menu. This menu provides very quick access to all the 4100's features and, in some cases, can be quicker than burrowing through the multi-layer menu system.

Now there are times during operation of the 4100 when you need to enter a numeric value. A typical example being when you want to set the 4100 to a specific baud rate. Wavecom have this very neatly buttoned-up. When an option is selected that requires this type of input, the default value appears with one of the digits highlighted. The value of the highlighted digit can then be changed by moving the mouse forward to increase the value or backwards to reduce it. If you move the mouse to the side you can move the highlight from one digit to

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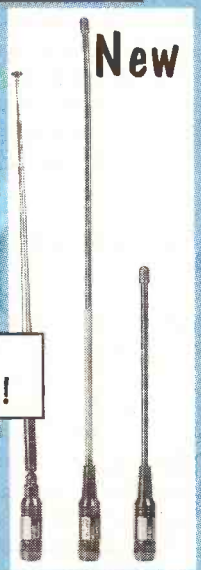


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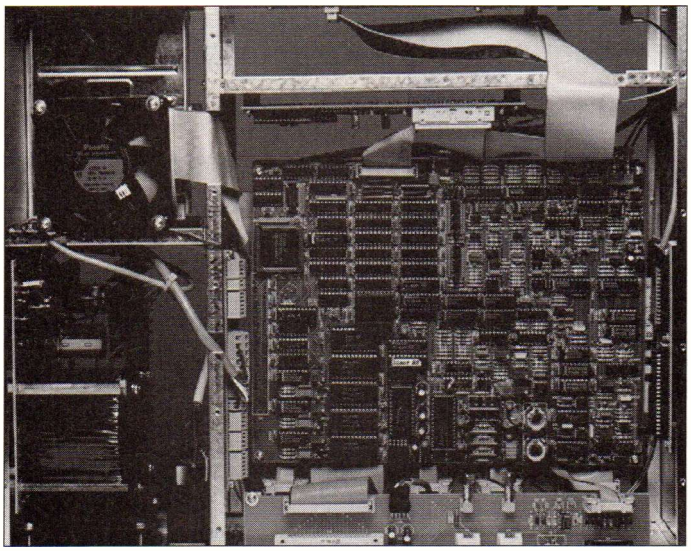

**The 4100 is just packed with powerful electronics. The main board assembly is in fact two boards deep. The p.c.b. that is hidden from view is just as densely populated as the one above.**

the next. This is a wonderfully simple and quick way of including numeric input without having to add a keypad.

The mouse comes into its own when using the analysis modes as it can be set-up to scroll the data blocks. This is essential to explore the effects of the different decoding options. One of the great benefits of the very well thought-out use of the mouse is that you can access all the 4100's features just using this compact mouse. Because of its relatively small footprint you can leave it conveniently placed by the side of the receiver ready for instant action.

## *Front-End*

The secret of any good decoding system is the initial processing of the incoming signal. Whilst the simplest systems just limit the signal and then apply it to a computer. Successful decoding of difficult or noisy signals requires a more subtle approach. The input stages of the Wavecom are extremely comprehensive and give the operator the choice of several types of demodulator.

To give you an idea of the complexity, the demodulator circuit diagrams alone take up fourteen A4 pages in the technical manual! As this is the heart of any decoder, I think it's worth taking some time to cover the facilities in some detail (sorry if it's a bit technical). The input signal is passed to the 3.6kHz bandwidth limiting filter via a balanced modulator. This stage is required when handling signals direct from the receiver's i.f. stages. The carrier frequency supplied to this modulator is crystal controlled and fully adjustable to align precisely with your receiver's i.f. In addition to adjustment of this translation frequency, you can also adjust the effective centre frequency of the bandpass input filter. This first bandpass filter is an essential component as it minimises the risk of out-of-band signals degrading the demodulator performance.

Next come the demodulator stages. These have the job of converting the filtered audio signal into a digital format for final decoding. In order to provide maximum flexibility the 4100 includes three main demodulator systems. The direct demodulator processes the signal by accurately measuring its period. Whilst this is similar to the system used by the simpler computer based systems, it suffers from poor performance with noisy signals. Although this mode is unlikely to be used for mainstream decoding its prime function in the Wavecom is to support the automatic frequency control system.

Probably the most versatile demodulator is the quadrature system. This is able to handle all signal types except the a.m. satellite based weather services. The main advantages of the quadrature system are excellent performance with the higher speed signals and very good performance with noisy signals.

For basic RTTY and the slower speed ARQ signals, the Mark-Space demodulator is by far the best. This operates by processing each of the two RTTY tones through separate 8th order filters. This produces excellent resistance to noise and minimises errors. The final, a.m. demodulator is automatically selected for the reception of images from weather satellites. Like all the other demodulators, the a.m. demodulator was configurable to suit the input signal. With the a.m. system you could set the frequency to ±500Hz and set the gain in 50 discrete steps.

## Operating Modes

To cater for such a wide range of operating modes the Wavecom uses a series of sub-menus to make access simpler. These are divided-up as follows: Standard, Duplex, Simplex, FEC, MFSK, v.h.f./u.h.f. and FAX-SSTV. Each of these modes also features access to the signal analysis mode. This provides a comprehensive analysis of the speed and shift of the signals under investigation. In addition to the signal analysis, each of these sub-menus includes demodulator selection, speed settings and any other specific parameters required for that mode.

However, one of the big plus points is the provision of a full auto mode. This gives completely automatic analysis and configuration to suit the incoming signal. This was an excellent option that worked well under most operating conditions. One of the advantages of the very fast decoding processors is the 4100's ability to adjust parameters such as shift without losing sync. with the received signal. The decoded output from the decoder is normally displayed on the screen but a single button press also activates the printer output.

## Comprehensive Analysis

One of the key differences between amateur and professional decoding systems is the quality and scope of the analysis tools. In addition to the Signal Analysis described earlier, the 4100 includes three types of bit analysis, auto-correlation and code analysis. Of these, the code analysis is likely to be the most used. This comprehensive mode attempts to automate the complete analysis process. When activated, the 4100 first establishes the shift and baud rate. This information is then used

along with the incoming data to evaluate the precise transmission mode. Whilst processing the signal, the 4100 displays the options being considered in the status display. If a successful conclusion is reached, it automatically switches to the appropriate receive mode and starts decoding.

The code analysis worked extremely well providing it was fed with a good quality signal. I tested it with a wide range of both simple and complex signals and all were identified and decoded very quickly. If you're seriously into data signals, you'll find the other analysis modes to be very comprehensive. Virtually any type of data signal could be completely taken apart. Not only could you freeze samples of the signal, but you could also control a pair of cursors to obtain a precise measurement of the signal's timing parameters. With all the analysis systems it's important to note that you do need a degree of technical knowledge to use them effectively.

## Specification

(abbreviated - the full spec. runs to 12 pages!)

| | |
|---|---|
| Graphics Processor: | TMS34010 32-bit Graphic system processor with host interface, 50MHz clock, 4Mb RAM and 500Kb video RAM |
| Demodulator Processor: | TMS34010 32-bit demodulator processor, 50MHz clock, 512Kb DRAM, 12-bit A/D converter, two quadrature demodulators, mark space demodulator plus GAL logic for period and bit length measurement |
| Video: | VGA output with 640 x 480 resolution |
| AF Input: | 400mV to 2.5V |
| AF/HF Input: | 200mV to 5V |
| Demodulators | |
| Quadrature 1: | 10-210Hz bandwidth |
| Quadrature 2: | 220-3500Hz bandwidth |
| Mark-Space: | Shift Range 50-3600Hz |
| AM Demodulator: | Double rectifier |
| Period length logic: | 2-3600Hz bandwidth |
| Demodulation modes: | Teletype, F1B<br>Twinplex, F7B<br>Morse, A1A<br>Morse, F1A<br>Facsimile, A3C<br>Facsimile, F3C<br>MFSK, Piccolo, Coquelet |
| Receive Modes: | ALIS, ARQ-E, ARQ-E3, ARQ-N, ARQ-M2-242, ARQ-M2-342, ARQ-M4-242, ARQ-M4-342, ARQ6-90, ARQ9-98, ASCII, ATIS, AUTOSPEC, BAUDOT, CIS-11, COQUELET-8, COQUELET-13, CW-Morse, DUP-ARQ, DUP-ARQ-2, FEC-A, FMS-BOS, GOLAY, HC-ARQ, HNG-FEC, INFOCALL, METEOSAT, NOAA-GEOSAT, PACTOR, PACKET RADIO, PICCOLO-MK6, PICCOLO-MK12, POCSAG, POL-ARQ, PRESS-FAX, RUM-FEC, SI-ARQ, SI-FEC, SITOR-AUTO, SITOR-ARQ, SITOR-FEC, SPREAD-11, SPREAD-21, SPREAD-51, SSTV, SWED-ARQ, TWINPLEX, WEATHER-FAX |
| Review Software: | W4100 ver 3.0.08 |
| Frequency Ranges | |
| 1st i.f.: | 3800Hz bandwidth |
| 2nd i.f.: | 20-1000Hz and 3800Hz |
| AF Input: | 400-4000Hz or 400Hz-10kHz with translation |
| AF/HF Input: | 400Hz-4kHz or 400Hz-1.5MHz with translation |
| Frequency shift: | F1A and F1B 20Hz to 3.5kHz |
| Frequency Shift: | F7B 20Hz to 2kHz |
| Dimensions: | 133 x 483 x 370mm |
| Weight: | 8.5kg |

## Summary

As you can see from my review, the Wavecom 4100 is a very comprehensive decoding systems with an extremely wide range of options. Wavecom have achieved a masterful design in making such high technology equipment so easy to use. I believe the operation is so straightforward that comparative newcomers would be able to make good use of the Wavecom's main decoding modes. However, to really make the Wavecom fly, you need a good technical comprehension of data transmission systems. I thought the way in which the Trackman mouse was set-up to control the Wavecom's features was very well thought out. However, I did feel that the responsiveness of the mouse could benefit from some additional smoothing.

The off-air decoding performance of the 4100 was extremely good and could be optimised by choosing the appropriate demodulator system. Likewise the analysis modes were extremely powerful in the right hands. So what of my original question regarding value for money? I believe the answer to this is a resounding yes. In considering this you have to remember that the 4100 is a very specialist piece of kit, which means low volume sales.

When you combine this with the high development costs, the **DM 11250** ex works price tag becomes quite reasonable. For more details contact **Wavecom Elektronik AG, Badenerstrasse 122, CH-5466 Kaiserstuhl, Switzerland. Tel: 0041 1 858 02 00, Fax: 0041 1 858 02 11**. My thanks to Wavecom for the loan of the review model ■

MIKE RICHARDS G4WNC PRESENTS SWM'S DECODE SPECIAL

# RTTY - A Gentle Introduction

**For many people the data modes are considered to be a form of black art, only understood by those with a thorough technical backg round. Thankfully this is not actually true, as the basic principles are really quite easy to grasp. In this short feature I will take you through the operation of a basic RTTY signal as used by many press stations on the h.f. bands.**

So what's a Radio Teletype (RTTY) link used for? It is simply a way of sending text messages over a radio link, so the range of material transmitted is almost limitless. The most common examples to be found on the h.f. bands are press reports, weather information and amateur radio messages. In each case, the RTTY link starts with a text message that needs to be sent to a distant point. For the sake of simplicity, I will assume that both the sending and receiving stations use computers to generate and decode the RTTY signal.

## The Conversion

Once the message to be sent has been typed into the computer, we are ready to follow the transmission right through to the displayed output at the far end. At the very start of the process we need to carry out some form of conversion to convert the individual letters that make up the message into a form that can be handled over a radio link. The first part of this process is to convert each letter into a number simply because computers can only deal in numbers! The method of converting letters to numbers is done using what's known as a look-up table. As the name implies, this really is just a table where each letter is cross referenced to a specific number. Rather than use a decimal number that we all know so well, the RTTY system uses binary numbers. The important point about a binary number is that it is made up from just 1s and 0s. If you've not covered this in your school maths you might be starting to worry - don't, it's very simple. In **Table 1** I've shown that each column in a binary number has a weighting that shows how it can be converted back into a decimal number. As an example, you can see that the binary number 10000 is the same as decimal 16 and 10101 is 21. Try using the table to work-out the following binary numbers: 01101, 01011, 11010 and 10011. You can see that, with just a little practice, you can quickly convert between binary and decimal numbers.

**Table 1**

| Decimal | 16 | 8 | 4 | 2 | 1 |
|---|---|---|---|---|---|
| 16 | 1 | 0 | 0 | 0 | 0 |
| 21 | 1 | 0 | 1 | 0 | 1 |
| 29 | 1 | 1 | 1 | 0 | 1 |

## International Alphabet

In order for the system to work effectively for radio communication across the globe, we clearly need some standardisation of the way letters are converted to numbers. This is all catered for by using the International Telegraph Alphabet No 2 (ITA2) which can be seen in **Table 2**, and defines the RTTY conversion rules. One of the important points about the ITA2 is that the binary numbers only contain five binary digits (bits). Now if you care to do your sums using **Table 1**, you will soon see that using just five bits provides only 32 combinations. Now this isn't enough to cover our alphabet plus numbers and punctuation. The solution is to use what's known as a shift character. This gives each of the 32 combinations an extra meaning depending on whether a shift character has been sent or not. The best way to think of it is rather like a toggle switch - when it's switched one way the codes represent letters and the other way they represent figures and punctuation. Although an ingenious system, it has the drawback of increased errors. This is because the loss of a shift character turns all the following message into gibberish!

The next stage is to transform the binary number into an electrical signal that it can be applied to a radio transmitter. This is done by first breaking the binary number into it's individual digits and then passing them, one at a time, to a device that can generate an electrical signal. This is rather like putting coins in a money box or parking meter! As the individual binary digits (bits) can only be a 1 or a 0, the circuit just needs to generate two output voltages. In a typical computer based system, these voltages would be approximately 5V for a 1 (called logic 1) or 0V for a binary 0 (logic 0). I've shown what this signal would look like in **Fig. 1.** What we've created here is known as serial data as the signal is broken into a series of discrete elements.

## The Transmitter

The commercial transmission of RTTY signals is usually handled by a special transmitter set-up for what's known as frequency shift keying or f.s.k. This type of keying is very easy to understand and, in simple terms, means that the transmitter can send just one of two specific frequencies. These two frequencies are very closely spaced and typically are only 400Hz apart. So to create our RTTY

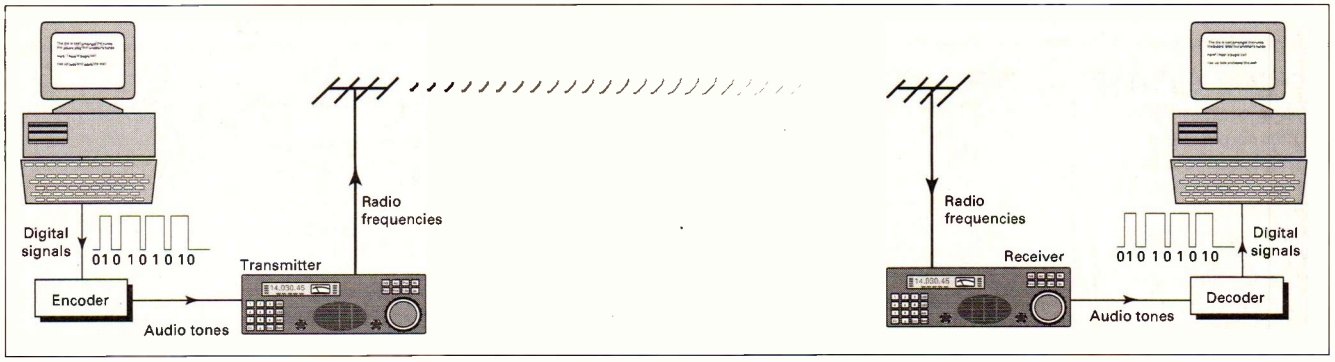


**Fig. 1.**

transmission, all we have to do is feed the serial electrical signal from the computer to the transmitter and we have a f.s.k. RTTY signal. Now's a very good time to take a listen to a typical RTTY signal, so set your short wave receiver to s.s.b. and tune to 4.489MHz. If you don't hear a fast warbling (diddle- diddle-diddle, etc.) sound try tuning around by ±10kHz. The station you're listening to is the meteorological data signal from Bracknell. This signal runs at 75 baud and uses a shift of 400Hz - don't worry about bauds yet - I'll cover those later.

## Receiving

Now that you have a basic understanding of the RTTY transmission process we can look at how we can reverse the process at the receive end and display the message. If you managed to find the Bracknell Met signal you will realise that our RTTY transmission can be converted to two audio tones simply by listening to the signal using an s.s.b. receiver. These two tones also have the same spacing as the original transmission which in this case is 400Hz. So the first stage in RTTY reception is to convert the alternating tones into a d.c. signal that can be fed to our computer. In this case we want the higher of the two frequencies to produce a 5V signal and the lower to give 0V. There are lots of different ways of doing this, but the general name for a unit that performs this task is a terminal unit. Having recreated our serial data the computer can re-construct the binary number and use the ITA2 look-up table to recreate the original message and display it on the screen. That's really all there is to the receive process. However, few modern systems use a separate terminal unit and the two most common methods are, a) decode the tones directly in the computer or b) include the terminal unit and decoder in a stand-alone unit.

## Baud Rates

Having grasped the basic concept of RTTY, you're probably wondering where baud rates fit in. One of the problems with the transmission of serial data signals is the need for some synchronisation between the transmitting and receiving stations. This synchronisation is required to ensure that the receive decoder processes the serial data signal at the same rate as its being sent. A good analogy here is to think of an orchestra without a conductor - you can just imagine what would happen if everyone used a different tempo! The same principle applies to our RTTY signal and the receiving computer wouldn't know where to start reconstructing the message. The term baud is derived from one of the pioneers of teletype equipment, Emile Baudot. In technical terms the measure refers to the transmission rate in bits per second. So a 50 baud signal will be transmitting its data signal at a rate of 50 bits every second. When listening around the h.f. bands you will find that there are a number of standard baud rates in use. The most common are: 45.45 baud (amateur RTTY), 50, 75 and 100 baud (commercial press and met stations).

## Summary

That about completes this basic introduction to RTTY, but the basic principles described here apply to most of the data modes used on the h.f. bands. If you'd like to try receiving RTTY and you have access to an IBM PC or compatible, why not take-up my Decode offer (page 69) and get yourself a copy of HAMCOMM. ■

**Table 2.**

**International Alphabet No 2**

| Letters | Figures | Binary Number |
|---|---|---|
| A | - | 11000 |
| B | ? | 10011 |
| C | : | 01110 |
| D | $ | 10010 |
| E | 3 | 10000 |
| F | ! | 10110 |
| G | & | 01011 |
| H | # | 00101 |
| I | 8 | 01100 |
| J | Bell | 11010 |
| K | ( | 11110 |
| L | ) | 01001 |
| M | . | 00111 |
| N | , | 00110 |
| O | 9 | 00011 |
| P | 0 | 01101 |
| Q | 1 | 11101 |
| R | 4 | 01010 |
| S | ' | 10100 |
| T | 5 | 00001 |
| U | 7 | 11100 |
| V | = | 01111 |
| W | 2 | 11001 |
| X | / | 10111 |
| Y | 6 | 10101 |
| Z | + | 10001 |
| < | < | 00010 |
| * | * | 01000 |
| let. shift | let. shift | 11111 |
| fig. shift | fig. shift | 11011 |
| space | space | 00100 |

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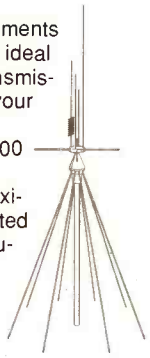

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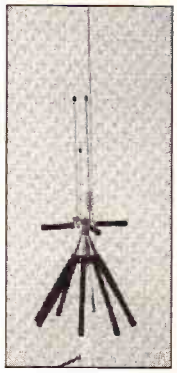

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MIKE RICHARDS G4WNC PRESENTS SWM'S DECODE SPECIAL

# Choosing a Data Modes Receiver

**In this feature I'll attempt to guide you through the various elements you need to consider when choosing a receiver for monitoring the data modes. A little time spent carefully considering your requirements before you buy can save disappointment for those new to the hobby.**

## Variety

When first considering moving to the data modes, you may be put off by the thought that, as well as a decoder, you'll have to splash out on an expensive receiver. You'll be glad to hear that is not the case in practice and there is a very wide range of receivers in regular use by decoding enthusiasts. These span from simple portable receivers that are available from the major high street chains, through to top flight professional receivers costing several thousands of pounds. Now somewhere within that range is a receiver that will suit both your budget and decoding requirements. Rather than try and list all the available receivers here, I will concentrate on the most important features of a data receiver so you can make your own decisions as to which is the most suitable for you. One of the main factors that will determine your receiver is the type of data signals you intend to monitor. Whilst a simple portable may well be fine for occasional RTTY use, if you're into the more complex modes, you may need a very stable receiver that can be set-up for unattended operation.

## Frequency Selection

One of the most important aspects to consider with most modern receivers is the tuning frequency steps. Although the receiver may have a conventional tuning knob that gives the impression of continuous tuning, virtually all modern receivers use digital frequency synthesis. With this system, the movement of the tuning control is converted into small frequency changes in line with the direction the knob is being turned. Now the size of these frequency steps varies from one receiver to the next, but is vitally important for the data monitor. If, for example, you were trying to receive a typical ship's Telex transmission and your receiver's tuning steps were set at 100Hz you would find it very difficult to decode the signal reliably unless you were very fortunate. This is because the ship's signal uses a shift of just 170Hz and you could find that your receiver is always straddling the signal and never able to tune spot-on. However, if the required signal was using a shift of, say, 800Hz, the effect would be far less noticeable. You can see from this that you will need a receiver with much smaller frequency steps if you regularly want to decode systems that transmit using a narrow shift such as many ARQ modes plus amateur RTTY and Packet. If you're stuck with a receiver that uses 100Hz frequency steps all is not lost as some data decoders have a trick up their sleeve that can help. These decoders feature an adjustable centre frequency that can be used to compensate for the tuning deficiencies in the receiver. Some decoders even include fully automatic tuning, which can be very convenient. The downside here is that the automatic systems don't work too well with noisy signals as they can't tell the difference between noise and signal! So what frequency steps do you really need? One of the most common in the better receivers is 10Hz steps though for most purposes you can get away with frequency steps up to about 25Hz. With steps greater than that you may find problems if you're interested in receiving signals with shifts of 200Hz or less.

## Stability

The more critical nature of data signals means that the frequency stability of the receiver becomes more important. This is because of the fine tuning required to resolve narrow shift signals combined with the need to be able to stay tuned for long periods. As with the frequency steps described earlier, the need for good frequency stability increases as you explore the more complex transmission modes. If we take FAX reception as an example, to receive Offenbach Met on 132.4kHz we need to be able to tune the receiver within about 30Hz of this signal and it has to stay on that frequency for at least the time taken to receive one image, e.g. fifteen minutes. The serious FAX listener may also want to use fully automatic picture reception where the receiver may be required to stay on frequency for hours at a time. The good news is that the stability of most modern communications receivers is well up to this standard. If you're considering an older receiver or maybe a portable you may find the stability to be somewhat lacking. However, there are a few tricks you can use to minimise the effects. The first is to note that most frequency drifting is caused by temperature changes within the receiver. To minimise this you need to make sure the receiver is kept well away from any draughts. You can also help by switching the receiver on an hour or so before you begin your monitoring session. This will give the receiver time to stabilise at its normal working temperature. If your shack is left without heating you also need to make sure this has been on for a while before you start operating. Closely related to the stability of the receiver is its frequency accuracy. For most, this is not particularly critical, providing the receiver has a digital display to get you close to where you want to be. One of the few situations that demand particularly good frequency accuracy is the use of your

station for unattended operation under computer control.

## Modes

This is the easy part as all you need is straight forward s.s.b. mode preferably with selection between upper and lower sideband. The only point to watch for is the use of a beat frequency oscillator (b.f.o.) on some of the cheaper and older receivers. Whilst these systems are fine for s.s.b. audio signals you can hit stability problems. The trick here is to try before you buy. You can do this by tuning into a broadcast signal, switching the b.f.o. on and tuning the b.f.o. knob to produce a strong beat note. Now just leave it like that for a while and listen for any change of pitch. If there is any fluttering or a steady change of note, you will have trouble with data reception. You will note that some of the more sophisticated receivers include a FAX mode. This is usually the same as s.s.b. except that the carrier insertion frequency is changed. In my experience, there is little, if any, difference between the reception quality using specialist FAX modes or s.s.b. The only way you can really see a benefit is if the FAX mode offers a slightly wider bandwidth than s.s.b. as this will help to preserve fine detail in the chart.

## Filters

You will no doubt have noticed that many of the more expensive receivers often include a selection of filtering systems. This can range from switchable i.f. bandwidths through to quite complex audio filters. Although many of these are designed and optimised for dealing with speech signals, they can be very useful for the utility enthusiast. However, you need to be wary of over-using these filters as you can cause a degradation of the signal if you apply too much filtering. It's also important to remember that there are many external filters on the market that can also prove very useful for the data listener. The ones to watch out for here are the new digital signal processing (d.s.p.) filters. These provide extremely sophisticated, yet simple to use filtering systems that can transform many difficult signals.

## Connections

Before you finally decide on your receiver you need to consider how you will make the connections to your antenna and decoding systems. If you're using a computer for your decoding and are considering a portable receiver you need to be very careful with the antenna connection. Whilst some have a proper external antenna socket that disconnects the telescopic whip, others do not. If you try using a portable receiver and computer with the telescopic antenna still active you will suffer severe interference problems. Another area to consider is the audio feed from your receiver to the decoder. The best choice is to feed the decoder from the line output of the receiver (if it has one). This provides a relatively constant output level that's independent of the volume control setting. If your receiver doesn't have a line-out then you will have to use the external speaker or headphone jack. The problem here is that by plugging into this jack you disconnect the internal speaker so can't hear what's going on! The answer is to make, or buy, what's known as a Y adapter. This is very similar to a telephone adapter and converts the single external speaker socket into two sockets, one for an external speaker the other for your decoder.

## Summary

As you can see, there are many parameters that need to be considered when choosing your data mode receiver, but one of the most important is the modes you are intending to receive. To help you with that decision, here's a summary of the typical demands made by a selection of popular modes:

## Morse

Least demanding of the utility modes is c.w., providing you're prepared to manually adjust the tuning. The frequency steps will depend very much on the decoder and whether or not the centre frequency can be adjusted. A narrow i.f. filter (500Hz) can be a very useful accessory for pulling signals out of the noise.

## RTTY

Press and other commercial RTTY signals are usually receivable with frequency steps of 50Hz or less. The stability demands are modest providing you are prepared to manually adjust the tuning during the monitoring period. If you're interested in amateur RTTY you will need 20Hz or better tuning steps as these signals operate with 170Hz shift.

## SITOR (or AMTOR)

These signal use a 170Hz shift so demand tuning steps of 20Hz or better. Stability requirements are generally the same as RTTY and ARQ variants. These advanced modes require 20Hz or better tuning steps and good frequency stability to support the extended monitoring periods often required with these modes. Piccolo and Coquelet demand very precise tuning and frequency accuracy with 10Hz tuning steps being the minimum.

## FAX

The tuning steps depend very much on the decoder as many systems have built-in automatic tuning to off-set shortcomings in the receiver. However, stability demands are high as the receiver must be able to remain within a few hertz for extended periods. Whilst you can manually adjust the tuning during picture reception, this inevitably produces stripes on the final image. ■

MIKE RICHARDS G4WNC PRESENTS SWM'S DECODE SPECIAL

# Books for Data Listeners

**With so many different types of data signal it's not surprising that there are a wide range of publications available. In this article I will cover the most popular data mode books and explain how they can help the listener get more from the hobby.**

## Frequency Guides

Probably one of the first books bought by the new listener is a frequency guide. Although they form an essential reference they are also the cause of disappointment for many. This is because inexperienced listeners mistakenly think they will be able to hear all of the many thousands of frequencies listed. The main point of these frequency guides is to act as a reference document rather than a simple list of stations to monitor. Most experienced listeners use these frequency guides to help with the identification of signals that have been found whilst tuning around the bands. You can, of course, use the guide to find stations - you must take into account propagation conditions and operating times.

*1995 Guide to Utility Radio Stations 13th Edition* by Joerg Klingenfuss

This is one of the best established of the frequency guides and is regularly updated every year. This makes it one of the more up-to-date publication available. In addition to listing some 15000 frequencies, the guide contains a host of valuable material. One of the most popular type of station is the foreign press RTTY transmissions. These emanate from most of the world's Third World countries and can make fascinating listening. The guide includes a very handy section that lists press transmissions by time. So all you have to do is look-up the required time of day and all the active transmissions will be listed. Another very useful feature is the FAX schedules. This list includes all the h.f. weather FAX stations by country transmission schedules and frequencies. All this is supplemented with a comprehensive listing of abbreviations, call signs and QSL addresses.

*Ferrell's Confidential Frequency List 9th Edition* compiled by Geoff Halligey

Another very popular frequency guide that has been running for many years. One of the great attractions of this book is the spiral binding. Not only does this make the book physically very strong, but it also makes it very easy to keep your place. You can even fold the book back on itself to save desk space. The main frequency listing covers from 1.6MHz through to 30MHz. In addition to the frequency and station details many of the stations include mode, shift and speed details. This is all valuable information for the utility enthusiast. The last section of the guide provides a range of useful references. Included here are details of international callsign allocations and a very useful reverse reference. This provides details of utility stations indexed by callsign. Against each callsign is the operating mode plus all the active frequencies.

*Pocket Guide to RTTY and FAX Stations* by Bill Laver

This handy little reference book makes a good starting point for those new to the data modes. By simplifying the list to just RTTY and FAX station it becomes far less daunting than the more conventional frequency listings.

## Mode Guides

*Guide to FAX Radio Stations* by Joerg Klingenfuss

This established favourite comprises 400 pages of specialist information for the FAX monitor. The frequency list of FAX stations is supplemented by full transmission schedules for every station. This book also contains a very large selection of sample FAX charts from all around the World. Not only do these charts cover original clean images but there are plenty of off-air examples. Essential in the identification of the various chart types. The charts also give a good idea of the quality of reception you can expect under different conditions. If you've often wondered what those odd codes included in FAX chart titles mean, this book has the answer. The schedules section includes a full breakdown of the chart i.d. system. There was also a section devoted to the various weather satellite systems.

*Air and Meteo Code Manual* by Joerg Klingenfuss

This specialist publication provides a host of vital information to support meteorological and air traffic utility transmissions. As well as providing a description of the services and their method of operation, there is extensive coding details. This provides a full breakdown of the meteorological code formats with examples of how to resolve them. For the air enthusiast there's details of the Air Traffic Services (ATS) message system and the NOTAM code.

*Radioteletype Code Manual* by Joerg Klingenfuss

Just about the only publication that gives in-depth technical information on the data utility modes, This is where you'll find details of all the international telegraph alphabets. The number of alphabets covered is very comprehensive ranging from the most basic systems through to Third-shift Amharic! Also covered is the operation of a wide range of utility modes. The descriptions are by necessity technical, but none the less very helpful. If you're seriously into decoding this book is a must.

## CDs and CD-ROMs

The rapid spread of the CD-ROM for home computers has made the production of specialist CD-ROMs for utility listeners a practical reality. To my knowledge there are currently three of these specialist CDs on the market.

*1995 Super Frequency List* by Joerg Klingenfuss

This new CD-ROM has been designed for use with IBM PCs or clones running Windows 3.1. The CD-ROM comes complete with its own viewing software and includes 14000 frequencies that have been extracted from the Klingenfuss *Guide to Utility Stations*. This frequency listing is supplemented by 1000 abbreviations and 1200 formerly active frequencies. As this list was last updated in January '95 it's well up-to- date.

*Intelligence Services*

This is the very latest package to be released and is likely to be of particular interest to the more experienced listener. The disk contains over 1300 pages of information covering the activities of more then 200 intelligence agencies from all over the world. Like the *Super Frequency List* this also comes complete with its own viewing software.

*Compact Disk Recording of Modulation Types*

This double audio CD has been produced to help both the newcomer and experienced operator identify utility modes. Whilst the new listener will find the examples of systems like RTTY and FAX very useful, there's even more for the experienced operator. The 2.5 hours of audio includes samples from 71 different modes from the simplest through to advanced military systems. ■

# Discoveries in

*Driving Land Rover Discoveries along disused Central American jungle logging tracks, sometimes thick with mud, often under water, the competing teams in the Camel Trophy '95 rely on radio communications. Richard Diamond explains what goes into providing the communications infrastructure.*

**Dates:**

*April 29 onwards*
- Event set-up commences.

*May 5*
- Amateur operations commence.

*May 20*
- Event starts.

*June 6*
- Amateur ops cease.

*June 8*
- Event finishes.

*June 12*
- Staff return to UK.

This year's Camel Trophy Event - 'The Last Great Adventure' - is to be held in Central America, starting and finishing in Belize. During the course of three weeks, the convoy of 20 international teams driving Land Rover Discoveries will transit Mexico, Guatemala, El Salvador and Honduras, an area known collectively as the 'Mundo Maya', World of the Maya, an ancient civilisation that has left numerous archaeological artefacts to be seen throughout the route.

## Mayan Pyramids

The 'start' is located in Belize at Lamani, an idyllic spot on the 'new river lagoon' (Lamani Lake), where a number of Mayan temples were constructed shrouding the area with the mysticism of the ball courts (a game to settle tribal disputes), ritual sacrifice and overwhelming presence of the Mayan pyramids. The pyramids are very different in concept to the Egyptian equivalents, as numerous bodies are to be found buried inside along with their belongings. Each layer of the pyramid represents about fifty years of culture and some considerable engineering skills, which are so often only associated with the Egyptians. The peace and tranquillity of this site will be only momentarily disturbed by the arrival of the competing teams, who will be treated to an evening of cultural presentation including a Solair illumination of the Jaguar temple. Of course, none of this happens by itself and a great deal of planning and effort goes into making the whole Camel Trophy event a success, supported by a management group, headed by Event Director Iain Chapman, and boasting a variety of skills including communications.

## The Team

Gerry Brennan G4GOL, who surprisingly is not attached to the communications team, acts as Logistics Director, applying skills picked up during his 26 years service with the British Army. Gerry now runs his own logistic company, Logistic Support Services Ltd. (LSSL) and has the responsibility of getting all the equipment onto site including 2 x 100kW diesel generators and a 6m container full of communications equipment.

Richard Diamond G4CVI, a director of South Midlands Communications Ltd., heads up the communications team on his fourth Camel Trophy Event supported by Mike Devereux G3SED, Managing Director of Nevada Communications, Paul Simons G4CCZ of Westwood Communications, Richard Mumford G8SVC of SMC, Darren Bito and Adrian Collins, both service engineers at SMC.

On arrival in Belize City, the group will set about fitting out some 54 Land Rovers with Yaesu v.h.f. 169MHz transceivers, Trimble and Garmin GPS units (Global Positioning Systems), Codan 100W h.f. transceivers and a quantity of associated equipment. Fortyone of these vehicles were pre-fitted at Land Rover's Solihull factory during February. The pre-fit exercise carried out by the communications team was undertaken during somewhat contrasting weather conditions to those found in Belize at this time of year (hot and wet). While Richard Mumford installed the GPS antennas on the vehicle roofs, a blizzard started with temperatures approaching 0°C. Perhaps it would have been better not to fit out the vehicles in the British winter, but to have waited for the warmth of Belize - a simple decision after the event!! Surprisingly, the vehicle fits are only a small percentage of the work carried out. The Event HQ located at the Ramada Hotel, Belize City, has to be fitted out with a total communications package including Satcom links, telephone lines, v.h.f. base stations, h.f. equipment and of course the amateur radio facility, callsign V31RD, not to mention numerous photocopiers, faxes, computers, etc.

## Base and Repeaters

Mobile operations centres are set up at Lamani (start) and Xunantunich (finish) with both h.f. and v.h.f. communications, the latter being enhanced by placing two Icom repeaters fitted with 'phone patch and rural cellular 'phones on top of Pine Ridge, a mountainous region to the South West of Belize City. The repeaters being some 1000m a.s.l., will provide extensive coverage throughout the Northern region of Belize. Of course, it's not possible to find a convenient power point at the top of most mountains, consequently, everything has to be brought to the site. The repeaters are solar powered with a reserve battery

# 'Mundo Maya'

capacity of 500Ah. Unfortunately, as it is now the wet season, this may not give sufficient capacity, so to minimise current consumption, the rural cellular units are powered down until a control DTMF signal, requesting patch operation, is received at the repeater. This simple arrangement saves nearly 60Ah consumption per day! Even with these savings, it is unlikely that the reserve capacity will cope with the heavy airtime usage at the end of the event. For this reason a 70Ah charger and generator has also been placed on site. Various discussions took place regarding automating the start up, but in the end, it will be just as easy to send someone up to the site for a few hours to top up the batteries.

At the start and finish sites, an AV system has been specified as a requirement for the initial briefing and the final awards ceremony. The requirements, whilst apparently straightforward, slowly became more and more complicated with sequenced light switching synchronised to the musical build-up, complimenting the solar illumination of the Jaguar pyramid and the later introduction of the 16-screen video wall complete with multiple camera feeds, video feed and interactive CD. The only straightforward part of the presentation is the operation of the 2.5kW audio system!

## High Radiation Angle

A 24-hour radio watch is maintained throughout the event primarily for safety cover followed by logistics requirements and as a means to propagate journalists' reports. In order to provide this level of cover, frequencies in the region of 5.5 and 9MHz are used in conjunction with a variety of antennas, some of which are as low as 3m above ground level in order to produce very high angles of radiation, in fact as near vertical incidence as possible. This is done to fill in the short range communications out to about 160km, the higher antennas being used for the lower angle requirements.

Three FT-1000 transceivers from Yaesu are used as they have the facility of a second receiver. This gives the option of monitoring six channels simultaneously - an option that is necessary, particularly at dawn and dusk when propagation can change dramatically. Even though all usage of radio equipment is licensed by the local authorities, interference can be a significant problem, both man made and static.

Because of the nature of the region, telephone lines are not predominant. Consequently a great deal of communications is made by radio and there is no such thing as an exclusive channel on h.f. and v.h.f.! Static is another worry. Even though the FT-1000 'S' meter is not known for its great sensitivity - sometimes as much as 15dB down on a Kenwood one - it still manages to read S9-S9 + 10dB on back ground noise which means that the mobile stations have to put in a big signal or the operators have to have sharp ears - the latter prevails.

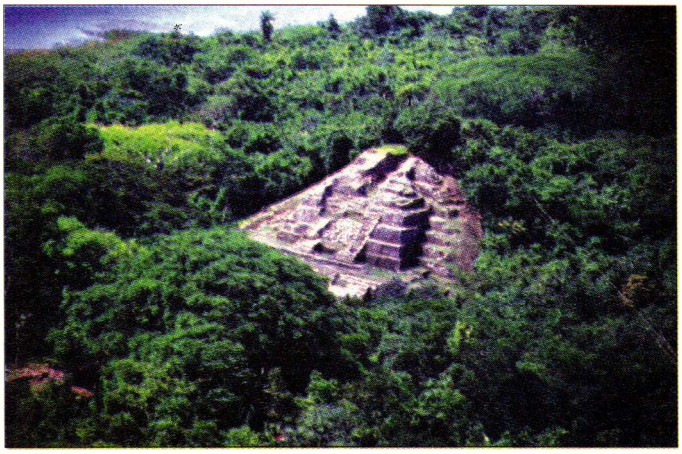
## Event Communications

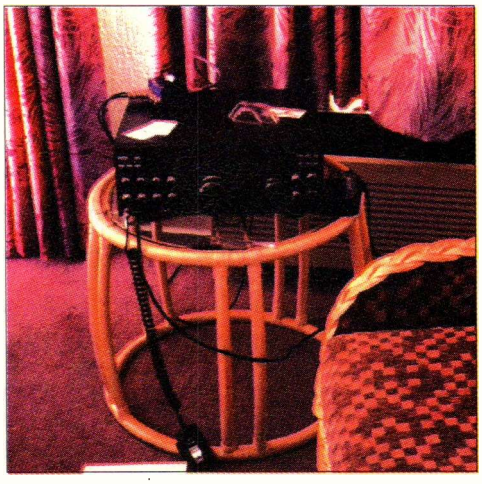
In addition to the team's responsibilities to the Camel Trophy, they are also active on the amateur bands. This year the 160-2m bands are being catered for. The 2m result will be most interesting with e.m.e. operation on 144.022MHz from moonrise to moonrise +1hr, the team are using 'even' one minute periods for transmit and will listen 2-3kHz h.f. Being the 'E' season, direct contacts into the USA are expected and the entire operation is likely to create a great deal of interest.

Of course, amateurs calling V31RD must remember that the primary function of the team is 'event communications' and this may cause the operator to instantly vacate the frequency to deal with such matters. However, it is normally possible to resume operations after only a short delay, so please wait on frequency.

All QSL cards should be via G4SMC at South Midlands Communications Ltd., School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4BY. QSLs will be issued for s.w.l. reports.

■





**A view of the Jaguar Temple at Lamani where the Event starts.**

**The station during last year's recce trip. Over 1000 c.w. QSOs were made from this site.**

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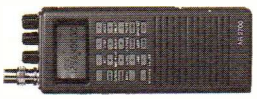

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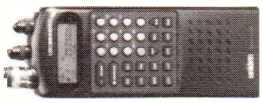

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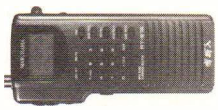

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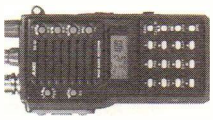

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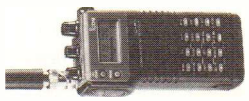

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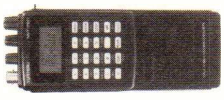

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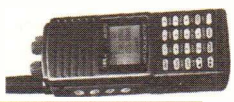

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| | |
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# A Super-regenerative VHF Receiver


*In this first part of a receiver construction mini series, Brian Adkinson has come up with a hand-held design for v.h.f. listening. If this part of the spectrum has had you tempted, then why not have a go with this two part project. The first part covers the theory and parts required, next month Brian covers the construction and setting up of the receiver.*

This hand-held receiver will cover the v.h.f. band from about 105 to 185MHz. It gives reasonable audio quality from either a.m. or f.m. transmissions making it suitable for reception of the air, 2 metre amateur and marine bands as well as various other services that use this portion of the radio spectrum.

Regeneration is automatic in this particular design so no adjustment is required once the receiver has been built. Also, the detector stage is largely un- affected by 'wilting' battery supplies and will maintain its sensitivity even when the battery is nearly exhausted.

The circuit is based upon the super-regenerative principle of detection which can give truly outstanding sensitivity. Like many simple and effective radio designs this one was conceived of not long after the birth of radio and, using so few components, is yet to be bettered.

## High Sensitivity

Some of the advantages of the super-regen are, as mentioned, very high sensitivity, particularly at higher frequencies where its relative - the 'regenerative receiver' becomes 'trickier' to operate. Also, the regeneration can usually be set at one optimum position with little or no further adjustment being necessary. It does have some disadvantages however, mainly - relatively poor selectivity (not too important for this application), a constant background hiss in the absence of a signal plus a strong tendency to indiscriminately 'spray' interference from the oscillating detector over a wide range of frequencies. By comparison, a simple superhet politely 'blows' on one frequency only and the regenerative receiver keeps its 'business' completely to itself (unless mal-adjusted).

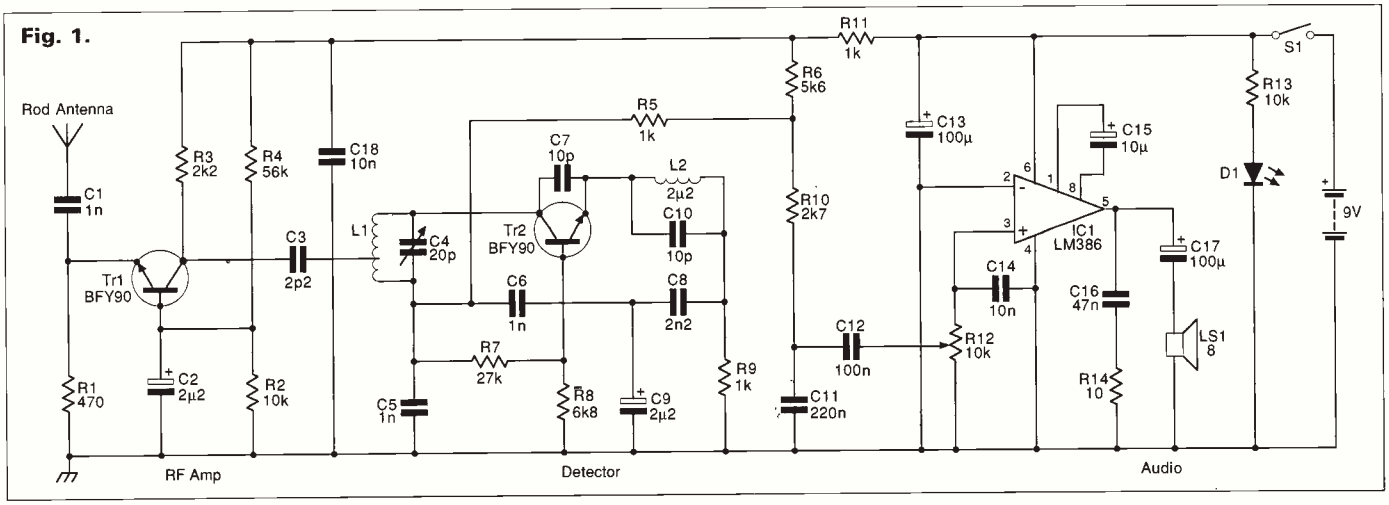
In view of the latter shortcoming, this design incorporates an r.f. stage, the primary function of which is to help isolate the detector section from the aerial. Without it you might find yourself the only one 'picking up' anything at the spectators area of your local airport, while all the sophisticated scanners are suffering from 'earache'. Fine until you get rumbled - then you'll know what it's like to have a flat battery - and a flat radio!

This little receiver could serve as an introduction to the v.h.f. spectrum before investment in a scanner. For existing scanner owners it could prove useful at new locations, such as when on holiday, where say the approach, departure and tower frequencies of an airport are not known. Here it can be used to locate local 'ball park' areas of activity before precise location with a scanner. The same goes for any other v.h.f. services in the area.

## Circuit Description

Before describing the circuit in more detail the principles of the super- regenerative detector will be explained. In the regenerative detector maximum sensitivity and selectivity is achieved by manually increasing the r.f. feedback to a point where the circuit just fails to break into oscillation. At this critical point the losses in the tuned circuit are largely offset and it is this that greatly enhances the sensitivity and selectivity of the detector. In contrast to this the super-regenerative detector is

**Fig. 1.**



designed to oscillate continuously but is stopped or 'quenched' periodically by a second and much lower frequency oscillation. This quench frequency can conveniently be generated by the detector itself and this type of detector is thus called 'self-quenching'. The quench frequency is neither a sine or square wave but rather a type of ramp waveform.

It is possible to use a separate circuit to generate the quench frequency and then inject this into the detector to control it. The main advantage in using this, more complicated method, is that precise control can be made over the waveform shape and frequency and this can optimise the detectors sensitivity.

Because the 'super-regen' detector is continually being swept through its most efficient point of operation its sensitivity is high and is automatically set at an optimum point, so no manual intervention is needed, as is the case with the regenerative detector.

Unfortunately, it is this sweeping through and past the optimum point which also causes the main disadvantage of this type of detector - poor selectivity. So it has some advantages over the 'regen' but poorer selectivity, which is why its use is usually confined to the higher frequencies or where channel spacing are large (such as its widespread use in cheap 'toy' radio controlled models).

In a carefully designed circuit with an optimised quench waveform, a sensitivity of better than 1µV can be achieved. Quite remarkable for a v.h.f. receiver using just one r.f. transistor!

In this particular receiver good selectivity would be a distinct disadvantage due to its wide frequency coverage. For the 'R/T' type communications it is intended to receive the operator would need lightning fast reflexes and nerves of steel to tune into and hold a transmission before it disappeared!

It should be appreciated that adjacent transmissions - particularly in the crowded airband - will all talk at once and strong signals will 'walk over' weaker ones! In general though this doesn't detract from the usefulness of the receiver.

## You Will Need

| | | |
|---|---|---|
| **Resistors** | | |
| *Carbonfilm,5%,0.25W* | | |
| 10Ω | 1 | R14 |
| 470Ω | 1 | R1 |
| 1kΩ | 3 | R5,R9,R11 |
| 2.2kΩ | 1 | R3 |
| 2.7kΩ | 1 | R10 |
| 5.6kΩ | 1 | R6 |
| 6.8kΩ | 1 | R8 |
| 10kΩ | 2 | R2,R13 |
| 27kΩ | 1 | R7 |
| 56kΩ | 1 | R4 |
| **Potentiometers** | | |
| *Carbon track (log)* | | |
| 10kΩ | 1 | R12 (JM77J) |
| **Capacitors** | | |
| *Ceramic* | | |
| 2.2pF | 1 | C3 (WX36P) |
| 10pF | 2 | C7,10 (WX44X) |
| 2.2nF | 1 | C8 (WX72P) |
| 1nF | 3 | C1,5,6 (WX68Y) |
| 10nF | 2 | C18,14 (WX77J) |
| *Mylar* | | |
| 47nF | 1 | C16 (WW20W) |
| 100nF | 1 | C12 (WW21X) |
| 220nF | 1 | C11 (WW83E) |
| *Electrolytic 10V working* | | |
| 100µF | 2 | C13,17 (RK50E) |
| *Electrolytic 16V working* | | |
| 10µF | 1 | C15 (YY34M) |
| *Electrolytic 63V working* | | |
| 2.2µF | 2 | C2,9 (YY32K) |
| *Variable* | | |
| 20pF | 1 | C4 a.m./f.m. Tuning Capacitor (AB11M) |
| **Semiconductors** | | |
| *Transistors* | | |
| BFY90 | 2 | Tr1,2 (QQ64Q) |
| *Integrated circuits* | | |
| LM386 | 1 | IC1 (UJ37S) |
| *Diodes* | | |
| | 1 | D1 (see text) (UF72P) |
| **Inductors** | | |
| | 1 | L1 (see text) |
| 2.2µH | 1 | L2 r.f. choke (WH31J) |

**Miscellaneous**
Speaker 8Ω (WB13P); S1 Switch (FH36P); Case (LF01B); Knobs x 2 (FE74R); Telescopic antenna (RK49D); Battery Connector (PP3) (HF28F); p.c.b.

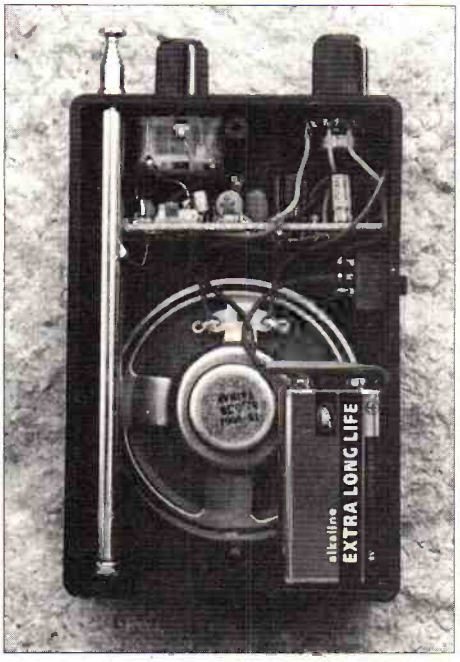
Maplin Stock Codes shown in brackets.

## In Depth

Now to the circuit in detail Tr1 is configured as a grounded base untuned r.f. amplifier and buffer stage. As previously stated its main purpose is to help prevent the detector stage from 'blowing' while it 'sucks' and causing a major communications blackout in the surrounding area. No, its not really anywhere near as bad as that but we don't want to add unnecessarily to pollution of the ether do we? This stage provides minimal gain.

Capacitor C3 couples the signal to the detector stage which is based around Tr2 and its associated components. C7 provides the feedback between the collector and emitter of Tr2 to initiate oscillation and C8 and R9 are the primary components that set the quench frequency which in this circuit is approximately 100kHz.

The audio output is taken from the collector of Tr2 via L1, R5, R10, C12 & R12 to the audio output stage IC1. The bottom end of coil L1 is grounded as far as radio frequencies are concerned but still contains the quench frequency at a high amplitude. Although inaudible, if this were allowed to enter the output stage it would cause IC1 to work very hard doing absolutely nothing at all useful! This hard work, apart from making IC1 hot and irritable, would rapidly drain the battery. Therefore, R10 and C10 form a simple low pass filter with C14 additionally added directly across the input to IC1, to filter out the 100kHz signal. The values of these components have also been selected to produce a fairly 'smooth' hiss in the absence of a signal whilst still maintaining reasonable audio clarity. C15 increases the nominal gain of the LM386 from 20 to 200 obviating the need for an audio driver stage.




***PCB layout & Constructional details next month.***

# JPS ANC-4 - Preview


*Is your listening being disrupted by local interference? If so, the new ANC-4 noise cancellation unit from JPS could be the answer. Mike Richards delves deeper.*

## Specification

| | |
|---|---|
| Operating Frequency Range: | *500kHz to 80MHz (usable down to 100kHz)* |
| Signal Loss, Main Antenna to Radio: | *6dB* |
| RF Input Level: | *3V r.m.s. (main antenna)* |
| Max Transmit Power: | *150W p.e.p. or average* |
| Time to Switch to bypass when r.f. is detected: | *7ms typical* |
| Time to Return to Receive Mode: | *0.5s typically* |
| Typical Local Noise Types: | *Power line, Computer, TV Noise, etc.* |
| Noise Cancellation: | *Typically 40dB or greater* |
| Input Power: | *+11V to +16V d.c. at 150mA* |
| Weight: | *0.91kg* |
| Temperature Range: | *-20 to +55°C operating* |
| | *-40 to +55°C storage* |
| Humidity: | *Up to 95% at 55°C* |

With so many electrical and electronic appliances appearing in the home it's no surprise to find that most listeners have interference problems to some degree. This can range from increased background noise on some bands through to a total wipe-out. Consequently, any device that purports to reduce or eliminate noise always attracts a lot of interest. Whilst most noise reduction accessories tackle the problem at the audio level, the ANC-4 attempts to correct the problem before it passes through the receiver. The main advantage from this approach is that the noise is prevented from affecting the receive parameters such as the automatic gain control. If you're suffering high noise levels you can find that the a.g.c. action will desensitise the receiver. Although you may be able to reduce the noise with audio filtering, you won't be able to recover the lost sensitivity. The basic operating principle used by the ANC-4 is certainly not new, but can be very effective and involves cancelling-out the noise before it enters the receiver.

## Heavy-Weight

Like all the products I've seen from JPS, the ANC-4 features a very high build quality. Despite it's compact size at 43 (h) x 152 (w) x 109mm (d) the case is constructed from 2mm steel - I'm sure you could drive a car over it without any damage! Setting-up the ANC-4 was very simple and involved just a few connections. As the unit eliminates noise prior to the receiver, the main antenna feed has to pass via the ANC-4. This is done using two SO-239 (u.h.f.) sockets that were mounted on the rear panel. The power requirements were +11 to +16V d.c. at 150mA connected via a standard coaxial power socket, also on the rear panel. The review model didn't included a power supply, but the voltage range of the ANC-4 indicated that it could be fed from a plug-top power unit or even the car when used for mobile operation. The final connection on the rear panel was a phono jack for the connection of an external noise antenna. An alternative here is to use the supplied telescopic antenna that's mounted through a hole in the top panel. As the review model was hot from the factory it was accompanied by a draft manual. Providing the manual content flows through to the final product, it's likely to be a very good manual with comprehensive explanations of the operating principles. There was also lots of operating hints and suggestions to cover the requirements of most listeners.

## Antenna Cancellation

To be able to use the ANC-4 with some proficiency, you first need to appreciate the principle used for the noise cancellation process. First of all, the ANC-4 is aimed specifically at reducing locally generated noise - it will do nothing to reduce atmospheric, heterodyne or other remotely generated noise. In order to eliminate the local interference, the ANC-4 uses two antennas - your main station antenna and a local noise antenna. The idea being that the local, noise antenna is located such that it will pick-up mainly noise, e.g. the opposite of what we normally want an antenna to do. These two signals, main antenna and noise antenna, are then mixed together within the ANC-4 to produce a cancellation of the local noise. This cancellation works by processing the signal from the noise antenna so that it has exactly the opposite polarity to the noise in the main antenna. If these two signals are carefully mixed together the noise elements will cancel each other out. In order for this process to work successfully, you have to adjust the noise signal so that it is both exactly the opposite polarity and exactly the same level as the interference in the main antenna. In theory, when this balance is attained, complete cancellation of the noise occurs. In practice, complete cancellation is not possible, but the ANC-4 claims and delivers very worth while reductions of 40dB or more. The limitations are primarily due to the nature of the noise and the accuracy with which the front panel controls can be adjusted.

## Operation

Once the operating principle is understood, the ANC-4 becomes very simple to use. A look at the photographs with the review shows a very simple layout with just four main front panel controls. The PHASE RANGE button and NOISE PHASE rotary control are used to adjust the polarity of the noise signal

*Continued on page 41*

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**AOR-2800E** base/mobile/portable scanning receiver, 500kHz to 1300MHz, a.m., f.m.n., f.m.w., l.s.b. (This unit is complete). **£290.00**

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**Yaesu FRG-7700** short wave receiver covering 100kHz to 30MHz. This unit is all mode and comes complete with the matching a.t.u. and v.h.f. converter. **£285.00**

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**Icom IC-R72** short wave receiver, 100kHz to 30MHz, a.m., u.s.b., l.s.b., c.w. (f.m. optional extra). This radio is as new condition and complete with box and manuals. (Internal NiCad pack also fitted). **£599.00**

**AOR-2001** h.f./v.h.f./u.h.f. base/mobile scanning receiver covering 25 to 550MHz, a.m./n.m./w.f.m. **£149.00**

**Drake SW8** short wave receiver covering 100kHz to 30MHz all modes. This unity also covers v.h.f. airband and f.m. broadcast band giving stereo output via headphones. This unit is in mint condition. **£399.00**

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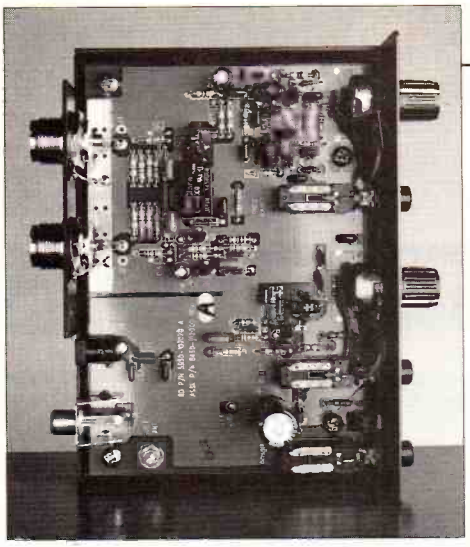


whilst the NOISE GAIN sets the level of the noise signal. The remaining FREQ RANGE button switches the unit between its low (100kHz-20MHz) range and the high (20-80MHz) range. Probably the most crucial aspect of using the ANC-4 is the choice of noise antenna. It is vital that this is placed to provide a good strong noise signal. Whilst the telescopic antenna may be great for dealing with computer noise, it's unlikely to be good enough for handling noise from the next door neighbour's workshop. So, before you start you must think about the noise source you're trying to eliminate and position the antenna so that it picks up as much as possible. The key is that the noise antenna must have significantly more noise than signal when compared with the main antenna. With the antennas sorted out, optimising the noise reduction is very straight forward. You first find a spot on the selected frequency band where you can hear only noise. You then carefully adjust the NOISE GAIN until the noise level changes then the NOISE PHASE to minimise the noise. If this doesn't produce the required reduction you simply have to change the PHASE RANGE.

## Performance

All the theory sounds wonderful, but what's it really like to use? Put simply it's very effective **but** only for reducing locally generated noise. I can't stress this enough as using the ANC-4 to tackle any other type of noise will result in disappointment. However, used for the type of local noise it's intended to tackle the ANC-4 is very effective and simple to use. It is also true to say that the simpler the noise signals are handled better that complex wideband noise sources. In my home set-up I was able to produce a worthwhile reduction in computer noise by mounting the ANC-4 next to the computer and using the telescopic noise antenna. The noise reduction held good whilst tuning around within a given band, but some trimming was required following a large frequency change. An interesting secondary use for the ANC-4 is as an active antenna. In this guise the noise antenna becomes the main antenna and the NOISE GAIN control is used as the antenna gain setting. If you have an interest in amateur radio you'll be pleased to hear that the ANC-4 can be used in the antenna feed of transmitters with powers up to 150W thanks to built-in TX/RX switching.

## Summary

The ANC-4 represents a different and very worthwhile approach to noise reduction that's ideally suited to anyone plagued by locally generated noise. The ANC-4 costs £189 and can be obtained from **Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800, Fax: (01629) 580020**. My thanks to Lowe Electronics for the loan of the review model. ■

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## Keypad for the YAESU FRG-100

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New

## Sprite Software for the YAESU FRG-100

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## SCANNERS

### AOR AR-2700

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### AOR SDU5000

Designed primarily with the AR3000A in mind, the SDU5000 enables the user to "view" up to 10 MHz of the selected band selected on a LCD colour display. Even small signals can be seen with ease, making it invaluable for the serious VHF/UHF monitoring station.

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Designed for the world market, the AR8000 covers just about everything that is transmitted in the entire usable radio spectrum. The ONLY scanner to cover 500kHz-1.9GHz in your hand, its been our best seller for some months now.

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**AR8000 RRP £449.**
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The "Ford Cortina" of all scanners, tens of thousands have been sold throughout the world.

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THE MARTIN LYNCH 5 YEAR WARRANTY

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## New ICOM IC-R7100HF GT VH

Up until now, the only way HF was possible on this excellent VHF/UHF receiver was to fit an internal "converter" using the set as a "tuneable I.F.". After a consid-enable amount of research and design, Graham Tingey, our Chief Engineer, has developed a more positive solution. Without the use of any "after-fit" internal converters, Graham has re-

### VT-225 & VT-125

These two twins are the very best for scanning the Air Band. The VT-225 covers both the Civil & Military frequencies and the smaller VT-125, Civil only.

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A Japanese receiver with an American appearance, the AR-3030 is a real alternative to the normal layout of receivers. It works well too!

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## F/UHF RECEIVER ON ZERO APR

programmed the set to tune the entire range from 60kHz to 2GHz. As before, frequencies below its usual 25MHz are tuned by depressing the original dimmer switch, now re-labelled HF. Removing the converter board ensures greater stability, strong signal handling and sensitivity.
The modifications are available to any customer already owning an ICR-7100 for only £199.95, including VAT & return delivery. (U.K. mainland). For customers wishing to purchase a new IC-R7100 with the HF "GT" conversion, the price is only £1549.00.

**RRP £1549 Available on FREE Finance.**
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### Lowe HF-225

The big brother of the HF-150.
**Only £499, Deposit £99, 12 x £33.33**

### Drake R8E

The Drake is my own personal favourite. It doesn't look or feel like a normal receiver, but the PassBand tuning and American designed filters win me over every time. If you can afford that little extra, then go for it!
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Supplied with computer interface, the new ICRCS-7100 will allow full computer control of the Icom ICR-7100.
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New

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**Due to a large commercial order, during May we can offer the M-8000 at only £1150.00 incl. VAT, saving nearly £200!!**
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## Lowe HF-150& "Friends"

The British "Quad" of Radio Communications, Lowe Electronics are flying the U.K. flag, thanks to the excellent value for money, advanced circuit design and overall packaging of their receiver range.
**This month, Martin Lynch is offering the "HF-150 Stack", not only on FREE FINANCE, but offering an EXTRA ONE YEAR WARRANTY for every system ordered during May '95.**

| | |
|---|---|
| **HF-150** | RRP **£419** |
| **PR-150** | RRP **£235** |
| **SP-150** | RRP **£219** |
| **Rack** | RRP **£59.95** |

**Total Value £932.95**
**Deposit £132.95, plus 12 x £66.66.**

## WHY "RADIO READY?"

PEACOCK

All items are available on Low Cost Finance, call for details. Please note: The QUAD speed CD-Rom, 16 BIT sound card & speakers shown in the photograph are optional extras costing £295.

**Specifications**

| | |
|---|---|
| Motherboard | VLB |
| Cache | 256K |
| RAM | See each machine |
| HDD | See each machine |
| Controller | VL Bus |
| VGA card | SPEA VEGA PLUS |
| VGA Mem | 1MB, VLB |
| FDD | 3.5" 1.44MB |
| Keyboard | Yes - Cherry |
| Mouse | Yes - Logitech |
| Software | DOS V6.2, WFW V3.11 |
| Monitor | 14" SVGA .28 pixels Non-interlaced, Low Radiation with Power Management |

Now there's a question! Firstly, the PEACOCK range of PC's were chosen by Martin Lynch for their LACK of RFI in comparison to other makes evaluated. Secondly, the machines are configured for your own specific requirements. For example, if you wandered into your local PC store and asked for the system to be set up to run a new PK-900, operating your six metre rig and at the same time control a logging program for all the contacts you've made over the last fifteen years, he'll probably look at you with a rather blank expression. Get the picture? People buy computers from MARTIN LYNCH because we understand your requirements and make sure it operates with software and products related to the 'Ham Shack'.

Furthermore, buying a NON BRANDED MACHINE is rather like buying a 'KIT' car; (would you feel confident buying a 'Chinese' copy of the latest HF rig, made up from whatever bits the supplier had at the time?). Buying a recognised name will ensure a better resale value, not to mention quality of assembly.

## FOUR OF THE BEST

### PEACOCK DX2/66 BASIC PC
4Mb RAM, 420Mb Hard Disk ..... **Price incl. VAT, £1099.00**

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8Mb RAM, 540 Mb Hard Disk ..... **Price incl. VAT, £1499.00**

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**All machines are loaded with HAM software, including Log Program, Packet Controller, Word Processor, DOS V6.2, Windows for Work Groups V3.11, plus lots more.**

***Pentium 90 and DX4/100 Machines are also available.**

*uy From Martin Lynch!*

# SETS IN CONFLICT

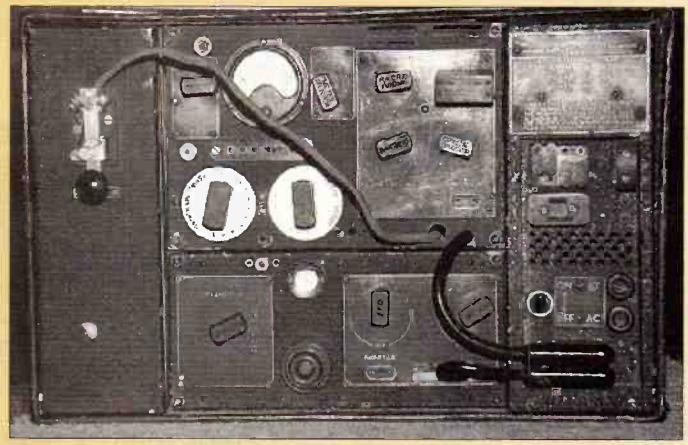


Fig. 1.

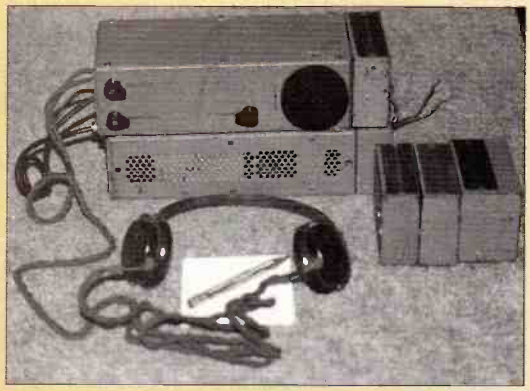


Fig. 2.

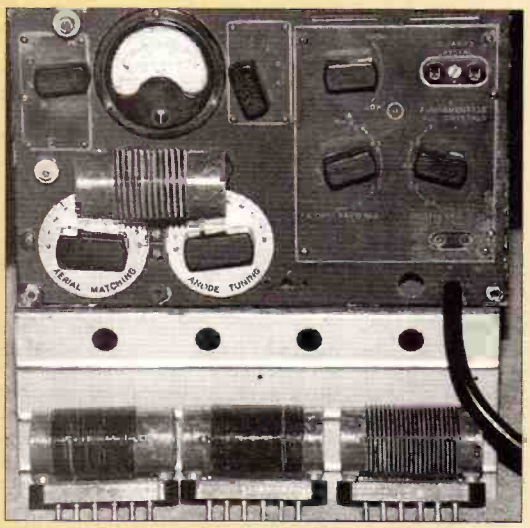



Fig. 3.

Fig. 4.

*Ron Ham explores the radios used during the Second World War and in particular those concerned with the activities surrounding the campaign that culminated in VE Day.*

Last June, I showed you some of the wireless sets used by the army during the D-Day landings in Normandy on June 6, 1944. This year we are commemorating the ending of the war in Europe, VE-Day, on May 8 1945. Technology has changed since then, we now have micro-chips instead of valves, tiny transceivers and mobile 'phones working from small dry batteries and world-wide communications via computers and satellites. fifty years ago there was none of this and wireless communications depended on the mechanically delicate and current hungry thermionic valve.

## Vital Information

Communications between Allied agents working in enemy occupied Europe and the United Kingdom must have been a hairy business to say the least. The various resistance groups were frequently asked by London to obtain information about German military activity in their particular area. Having obtained this material it had to be coded ready for transmission to one of the monitoring stations in the UK. Can you imagine connecting up and tuning a transmitter at some secret location, sending the message and waiting for confirmation and all the time knowing that there would be terrible consequences if caught?

## Wireless Equipment

In addition to it being a serious offence to own a short wave receiver or transmitter in occupied Europe, most of the good domestic sets had been confiscated by the occupying forces. This made it almost impossible for locals to hear the special programmes transmitted for their benefit by the European Service of the BBC. Among the sets used by Allied agents for clandestine work was the 'B2' transmitter and receiver, **Fig. 1.** and a miniature communications receiver. M.C.R.1., shown in a typical operator's layout in **Fig. 2.** The latter was packed into a 2lb biscuit tin and dropped by parachute to the various resistance groups.

## M.C.R.1

Whereas the 'B2' has four indirectly heated (6.3V heaters), octal-based valves, type 7Q7 and 7R7, in the receiver and two international octals, EL32 and 6L6, in the transmitter, the M.C.R.1 uses five, directly heated, miniature glass valves, from the 1T4, 1R5 range, with 1.4V filaments. Because of these low voltage valves the M.C.R.1 could work from a special 'all-dry' battery as well as its dedicated, variable voltage, mains power pack, seen under the receiver in **Fig. 2.** The tuning scale, scribed 0 to 180, is viewed through a tiny window above the large tuning knob on the right of the receiver unit. One of the four coil packs, centre right, **Fig. 2.** is plugged on the end of the set to change the frequency range. Pack 1, = 150kHz to 1.6MHz, 2, = 2.5 to 4.5MHz, 3, = 4 to 8MHz and 4, = 8 to 15MHz. Each pack has a scale on the top which relates the frequency to the dial reading.

## The 'B2'

The Morse key for the 'B2', upper left **Fig. 1,** is screwed to the lid of the accessories box when in use and afterwards stored inside the box along with four transmitter tank-coils, headphones, antenna wire, quartz crystals and spare valves. A similar shaped box on the opposite side contains the adaptable power unit which supplies the transmitter, upper centre **Fig. 1** and the receiver below it. All four units are neatly packed inside an attaché case which disguised the set when being moved between transmission sites. It weighed more than two-stone, so carrying it could not have been easy!

## Frequencies

Instructions for tuning the receiver and transmitter are glued to the underside of the accessories box lid. For instance, like the M.C.R.1,

the receiver dial is calibrated 0 to 180 and seen through a magnified glass positioned at the top centre of the receiver panel, **Fig. 1.** On the set in **Fig. 1**, a dial reading of 100 represents 3.95MHz on Band 1 (3.1 to 5.4MHz), 6.60MHz on Band 2 (5.2 to 9MHz) and 11.30MHz on Band 3 (8.7 to 15.5MHz).

Each of the transmitter's six-pin tank-coils is designed to work on two frequency-ranges and fit into the socket under the meter in **Fig. 1**. For example, the base of one coil is marked L1A (3 to 4MHz) on one side and L1B (3.75 to 5.25MHz) on the other. By reversing the coil the tuning range of the transmitter's tank circuit is changed. The other three 'tanks' carried the overall range in similar steps to 16MHz. **Fig. 3** shows the transmitter unit with its set of tank-coils. The transmitters frequency was determined by a 10XJ type quartz crystal plugged in at the top right of the transmitter panel, **Figs. 1** and **3**. Tuning such a transmitter to give its best performance on a given frequency required a good understanding of radio. The crystal's fundamental frequency is selected by the knob below it, the grid of the p.a. valve is tuned by the upper and lower knobs to the left of the crystal and the p.a. anode and antenna matching is adjusted by the two large knobs under the tank-coil.

## Special Features

Even running the 'B2' from the mains was not straightforward for the operator. First the mains voltage at the location had to be known before the 'jumpers' on the mains adjustment panel, upper left of the p.s.u., **Fig.1**, could be set. Secondly, if the German detector vans heard a 'suspect' transmission they would have the supply cut off in the area to see if the signals stopped, if they did, then a thorough search was made of that area. However, the oblong plug under the mains 'jumper' block helped toward solving this problem because, the power unit also contains a six-volt vibrator pack, which enabled the 'B2' to run from a 'wet' vehicle battery if no mains supply was available. To select mains or battery this oblong plug is reversed. Now, if the operator had the battery connected, via the large plug on the right of the 'jumpers', while transmitting on the mains and the supply was cut off, the oblong plug was quickly reversed and transmissions continued. This gave the enemy detectors the impression that they had cut off the supply in the wrong area.

## Bravery

It's well documented that the clandestine wireless operators were very brave people who used their sets under really hostile conditions. You can find out much more about the 'B2' and the M.C.R.1 in action, the operators' codes and weapons, the enemy's efforts to trace them and the services who supported them, by reading the book, which I strongly recommend, called *Secret Warfare*, by Pierre Lorain, published by Orbis, ISBN. 0-85613-586-0

## Monitors

Sophisticated monitoring stations in the UK used numbers of high quality communications receivers like the AR88. **Fig. 4**, the HRO, the Royal Navy's CR100 and the RAF's R1155, **Fig. 5**, to listen for the clandestine signals at prearranged times. Each of these sets are sensitive and selective and are fitted with very stable tuning mechanisms. Such features were essential because the agent's signal may have been weak because of their temporary antenna and shielded location.

In my view, the AR88, beautifully engineered by RCA, was the finest communications receiver built during the Second World War. Its two r.f. stages ensures good sensitivity and the gear box, between the tuning knob and the 4-gang variable capacitor, makes the tuning very smooth and positive. Mechanical and electrical stability are very important in such a receiver and essential when looking for tiny signals. The logging scale, top centre **Fig. 4**, is conveniently above the main tuning knob. This scale has the six-waveband main dial to its left and the 'S' meter on the right. Other controls are for antenna matching, b.f.o., audio-gain, noise limiter, selectivity and on/off switches for the a.g.c. and mains. The set in **Fig. 4** has a contemporary field telephone on the top which was often used between wireless operators in a group.

## Special Features

The American HRO and the British CR100 and R1155 receivers have purpose-designed, slow-motion, dial drives. Each one of these sets have different features. For instance, the HRO has plug-in coils to change the frequency and the numbers on the dial correspond to a frequency graph on the front of the coil pack. Two logging scales work in conjunction with the main dial on the six-waveband CR100 which also has a super five-position selectivity switch ranging from 100 to 6000Hz. The R1155 is a 'special' designed for the RAF and used as a partner to the T1154 transmitter, in aircraft, air-sea rescue launches and dedicated base stations. Sometimes an '1154/'1155 combination was installed away from the main RAF station in order to keep in touch with any 'stragglers' who did not make it home with the main squadron. The R1155 has five-ranges, 75 to 200kHz, 200 to 500kHz, 600kHz to 1.5MHz, 3 to 7,5MHz and 7.5 to 18MHz. Each range on the 180 degree dial is coloured to match the tuning knobs on the '1154 transmitter.

**Fig. 5.**

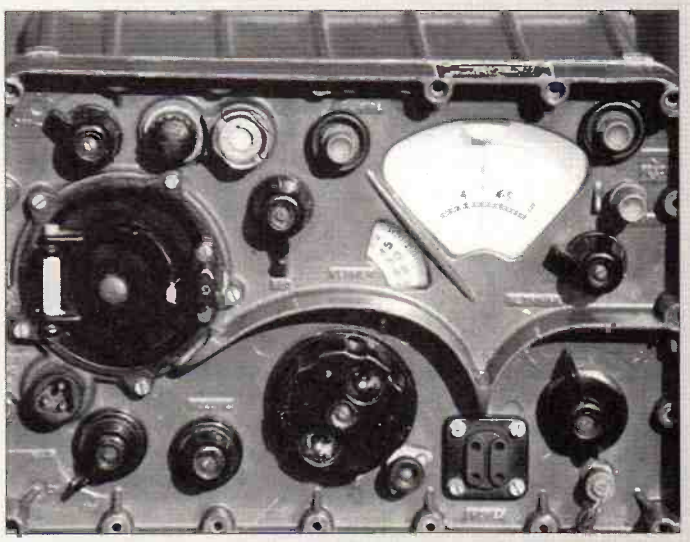


**Fig. 6.**

The tuning on the '1155 has two extremes, a fast dial sweep by the outer knob and ultra slow-motion by the inner. The fast sweep enabled the airborne wireless operator to quickly locate the German night-fighters' R/T channel and then, if possible, jam it with the transmitter. Several controls on the '1155 are dedicated to its direct finding capabilities.

## Post-War

Fortunately, many of the outstanding features of these sets, designed and built for conflict, were incorporated after the war in both civilian and military equipment. Nearly all the valve types used in the AR88, B2, CR100 and R1155 were used in mains operated domestic receivers and those from the M.C.R.1 appeared in many battery portables and the early post war army receivers like the R209, **Fig. 6** and the R216, intended for use in vehicles. ■

# New Products

**This month's round-up of new products, books and catalogues**

### *More Memory for the Scout*

Optoelectronics have just updated their Scout. We took a look at the previous version in the March issue of *SWM* and improved the storage. The new version, the Scout 400 derives its name from the number of captured frequencies it can store. The memory is now non-volatile, whereas its predecessor was dependent on battery support.
The importers of the Scout, **Waters & Stanton Electronics** can be contacted at **Spa House, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (01702) 206835, Fax: (01702) 204965**.

### *Selcall Directory*

Seldec have just published a new *Directory of Aircraft Selcalls* . This directory lists approximately 8000 aircraft Selcalls, including civil airliners, military aircraft and business jets and makes the ideal partner to their Selcall decoder reviewed recently in *SWM*.

The information is presented in some 250 pages. The A5 size volume is spiral bound, and is therefore able to lay flat on the desk.

This book contains four main sections presenting tabular formatted information. Section one gives Selcall, registration, aircraft type, operator and serial number. Section two and three provide the same information but indexed by registration number. Section three likewise, but indexed by operator. Finally section four gives airline three letter codes.

Seldec will also provide an update and amendment service, whereby, for the price of the return postage a monthly update is sent to the purchaser. Full details of this useful service are given in the directory. The Directory costs £10.85 plus £2.00 and is available from **Seldec, PO Box 3, Kidderminster, Worcestershire DY12 1YZ. Tel: (01299) 861372, Fax: (01299) 861530**.

### *Loop from Lowe*

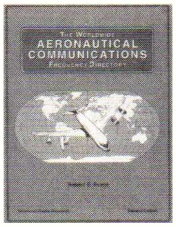
Lowe electronics have just announced that they are stocking the unique Kiwa MW Air-Core Loop Antenna. This marvellous piece of engineering is worthy of a place in an art gallery, as can be seen from the accompanying picture.
The antenna is tuneable over the range 530-1700kHz using the main and fine tuning controls. It features a separate control box to facilitate adjustments.
The antenna may be rotated for maximum signal pick-up. It may also be tilted via a 3:1 reduction gear for precise nulling of local signals and interference. Maximum tilt is ±90° from vertical. With the tilt angle is read directly in degrees.

To enable heading to determined the antenna is fitted with an integral liquid-filled compass. The antenna features a regeneration control to provide a '*Q*-multiplier' type of arrangement. The claims for this antenna are really excellent. The antenna costs **£349** plus £10 P&P. More details are available from **Lowe Electronics, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800, Fax: (01629) 580020**.

# LOWE BOOKSHELF

Radios are great things, opening your mind to a welter of broadcasts and communications. A number of good books kept by your receiver will help you to get more out of your listening and expand your knowledge. Here's what's currently sitting by my receiver . . .

## WORLD AERONAUTICAL COMMUNICATIONS FREQUENCY DIRECTORY

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A useful companion to AIRWAVES '94, this book gives you an alphabetical listing of civil and military aviation callsigns. For military traffic, this allows you to discover the aircraft type, the air arm it belongs to, it's unit code, squadron and base. For civil callsigns, you can find out the three-letter air traffic prefix, company or operator and country of origin. A super book that will help you get more out of airband monitoring. 108 pages, A5.


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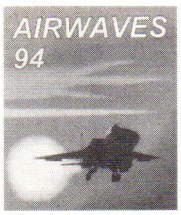


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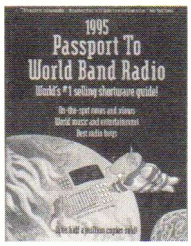


The definitive guide to English language short-wave programs. Also crammed with informative articles about world radio stations and the broadcasters themselves and a very comprehensive guide to buying short-wave receivers.

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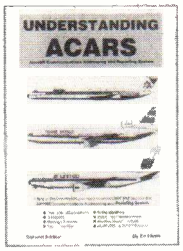
## UNDERSTANDING ACARS

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## WEATHER REPORTS FROM RADIO SOURCES

*By Philip C Mitchell*

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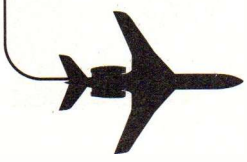
You can pick these up from any Lowe branch or order by 'phone or FAX or E-mail via the Internet.

We've now expanded our communications systems to include the Internet. You can contact via E-mail for speedy processing of orders or information requests. We have two Internet addresses for your convenience, orders@lowe.demon.cc.uk. to place your order or if you would just like the information on any of our products, use info@low.demon.co.uk. Please include your postal address and daytime telephone number.



**Lowe Electronics**

LOWE

Chesterfield Road, Matlock, Derbyshire DE4 5LE Tel: (01629) 580800 Fax: (01629) 580020

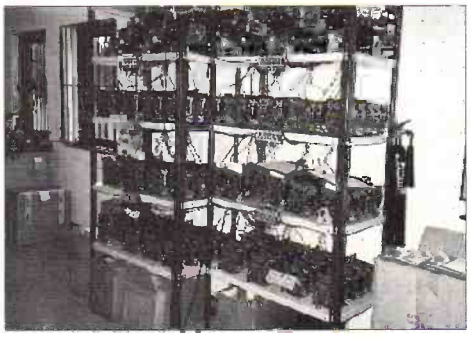
# Lowe Electronics Receiver Production

The recent 'Win a Lowe HF-225 Europa' competition in *Short Wave Magazine* proved very popular with readers. The winner, Mike Wootton, along with Dick and Peggy Ganderton, were treated to a guided tour of the Lowe Electronics establishment at Matlock to see how Europas are produced.

Lowe Electronics have just finished moving production of their range of radios from Cromford to their Matlock headquarters. All components are sourced from Matlock and kits of the parts needed to produce the main receiver assembly are then made up and issued to one of the sub-contractors who perform the initial asembly. On delivery from the sub-contractor, all the chassis are powered up and undergo extended soak testing before checking, alignment and final assembly. Our picture story shows the various stages in receiver manufacture and testing at Matlock.

**The Europa is a 'turbo-charged' HF-225. Here Steve is converting a basic HF-225 chassis to Europa spec.**

**Concentration is needed by Carl as he works on one of the smaller sub-assemblies.**



**Shelves of the popular HF-150 chassis, all under power, await the final stages of assembly.**

**Initial testing of an HF-150 chassis is carried out on the bench by Mark.**

**Above: Competition winner, Mike Wootton, watches Jon 'clothing' an HF-225.**

**The Matlock showrooms of Lowe Electronics has a working display of their range of receivers.**

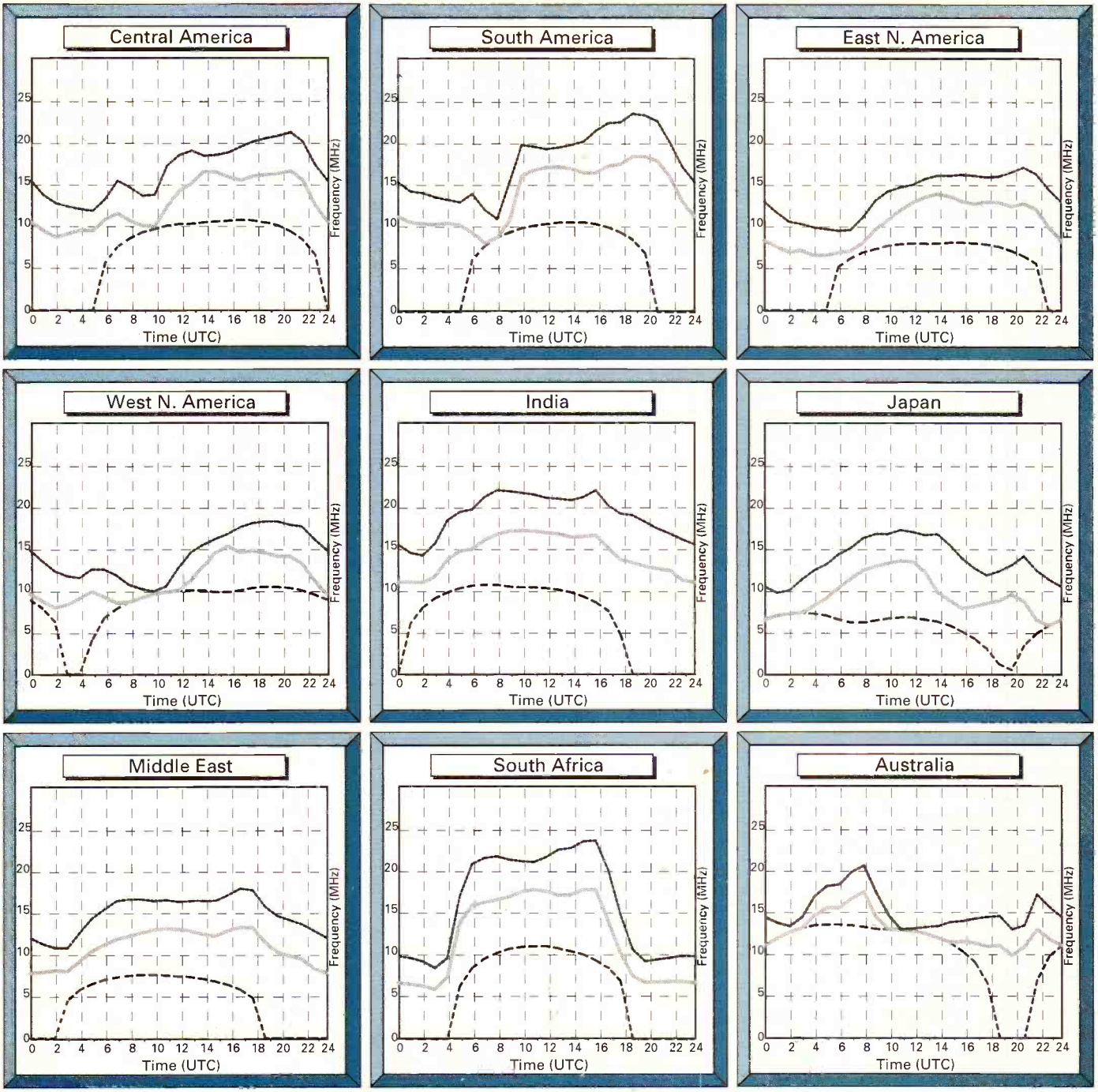
**Below: Tom Crosby on the left and Kevin Whitehead, General Manager Production at Lowe Electronics discuss something about the production facility with Peggy Ganderton.**

**Right: HF-225 chassis, in from the subcontractors, undergo a lengthy period of soak testing before being tested, aligned and finished off.**

Jacques d'Avignon VE3VIA

# World Propagation Forecasts May

Circuits to London




## How to use the Propagation Charts.

The charts contain three plots. The lower dashed line represents the lowest usable frequency (LUF), or ALF (Absorption Limiting Frequency). The chances of success below this frequency are very slim.

The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

Lastly, the upper dashed line, represents the maximum usable frequency (MUF) a 50% probability of success for the path and time.

To make use of the charts you must select the chart most closely located to the region containing the station that you wish to hear. By selecting the time chosen for listening on the horizontal axis, the best frequencies for listening can be determined by the values of the intersections of the plots against frequency.

Good luck and happy listening.

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HF-225 Europa **£Phone**

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PRO 43 **£225.00**

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**ICOM**

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| SDU5000 | £649.00 |
| 8000 Case | £17.00 |

SDU5000 **£649.00**

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|---|---|
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|---|---|
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DXR29 80/40/20 receiver metres. SSB with HF airband **£49.00**

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|---|---|
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| HX9000 | £29.95 |

### ICOM

| | |
|---|---|
| SP3 | £69.00 |
| SP7 | £35.00 |
| Various | £25.00 |

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| | |
|---|---|
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| NRF-7 | £279.00 |
| NR-10 | £399.00 |

### KENWOOD

VC20

HS-6

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### LOWE

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|---|---|
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| PR150 | £235.00 |
| RK150 | £55.00 |
| IF150 | £39.00 |
| Keypad | £39.00 |

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|---|---|
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| Desk Stand | £19.95 |
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| GW2 Pre-amp | £59.95 |
| Notch filter | £29.90 |

### TIMEWAVE

| | |
|---|---|
| DSP 9 VER2 | £189.00 |
| DSP 9 plus | £225.00 |
| DSP 59 plus | £289.00 |

### VECTRONICS

Active ATU

| | |
|---|---|
| Preselector | £75.00 |
| 2 way antenna switch | £18.00 |

### CABLE

| | |
|---|---|
| RG58 | £0.50 |
| 5DF8 | £0.85 |
| 8DFB | £1.95 |

Per metre

## AERIALS

Skyscan 1300 **£49.00**

Skyscan Desk **£49.00**

Skyscan Mobile **£24.00**

Scanmaster Base **£38.00**

Scanmaster Discone **£49.00**

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BSS1300 Base station **£65.00**

DSS1300 Desk top **£41.00**

MSS1300 Mobile **£41.00**

SWA30 Shortwave with Bauln **£40.00**

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Diamond D707 active VHF/UHF antenna 20dB amp **£129.00**

Watson Bauln **£18.00**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| AOR 3030 | as new | £499.00 | ERA Micro reader 2 | ex demo | £125.00 | Lowe PR150 | fair £250.00 |
| AOR 2000 | used | £175.00 | | | | Lowe PR225 | good £325.00 |
| AOR 1500EX | used | £199.00 | Realistic Pro 2022 | good | £125.00 | JRC JST125+spk | good £899.00 |
| AOR 3000A | as new | £599.00 | | | | | |
| Icom ICR-1 | as new | £279.00 | Realistic Pro 2006 | new | £185.00 | Yaesu FT290RII inc-linear | good £325.00 |
| Icom ICR-100 | as new | £375.00 | | | | | |
| Icom ICR-7000 | demo | £695.00 | Realistic Pro 2035 | ex demo | £250.00 | Alinco dual bander with extended RX | good £325 |
| Icom ICR-7100 | as new | £875.00 | | | | | |
| Icom ICR-72E | demo | £625.00 | Yaesu FRG100 | tatty | £250.00 | | |
| Yupiteru 7000 | 2 in stock | £189.00 | | | | | |
| Yupiteru 7100 | 3 in stock | £199.00 | Yaesu FRSDX400 | good | £255.00 | | |
| Sony SW55 | used | £155.00 | | | | | |

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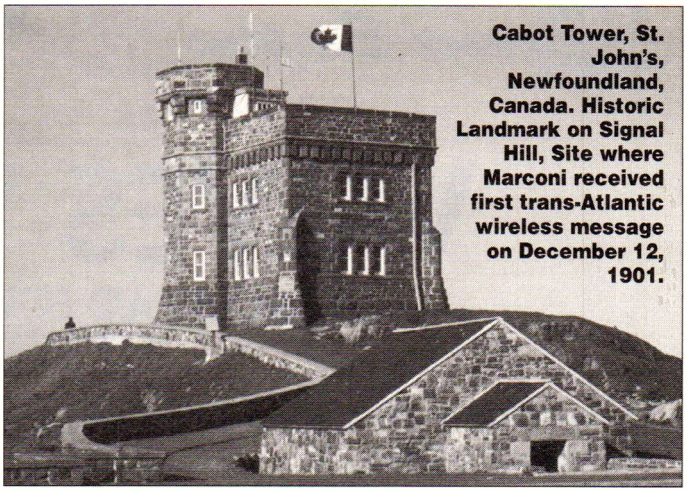
Gerry L Dexter, c/o SWM Editorial Offices, Broadstone

# Bandscan

## America



**Cabot Tower, St. John's, Newfoundland, Canada. Historic Landmark on Signal Hill, Site where Marconi received first trans-Atlantic wireless message on December 12, 1901.**

The North American short wave hobby community received quite a shock when two DX clubs discontinued operations, the announcements coming almost back to back. The Association of DX Reporters ceased activity because of what was termed insufficient member support. ADXR was an outgrowth of the old Newark News Radio Club, which was founded in the early days of commercial radio and ceased publishing in the early 1980s. ADXR continued NNRC's tradition of being an 'all wave' club for 13 years (and it was the only national club still trying to cover all the major bands - amateur, SWBC, medium wave, utilities and amateur).

Speedx discontinued operations after its January issue. Declining membership had left the club with no operating funds and thus unable to publish another bulletin. Speedx had operated for nearly a quarter century.

**ANTARCTICA** - Unfortunately, the news of AFAN-McMurdo's reactivation on short wave seems to have been wrong. It appears that the station's only activity is on the f.m. band.

**BOLIVIA** - Recently logged stations include Radio Movima on 4.472MHz around 1000, Radio Abaroa 4.713MHz after 1000, Radio Illimani 4.945MHz around 1015 (and also on 6.025MHz) and Radio Santa Cruz 6.135MHz about 2300.

Also Radio Perla del Acre 4.600MHz at 1000 and Radio El Mundo 6.015MHz also around 1000. Other activity includes Radio Eco on 4.409MHz, Radio San Joaquin on 4.509MHz and Radiodifusora Tropico on 4.552MHz, all received at around 2300.

**BRAZIL** - Recent loggings and other notes from this country include: Radio Nova Visao, Santa Maria on 11.705MHz at around 0000. This is the former Radio Transamerica. Radio Alvorada, Parintins is heard on 4.965MHz around 0945. Radio Nacional Amazonia 6.183MHz (normally 6.180MHz) at 1000. Radiodifusora Londrina is coming through on 4.815MHz around 0330 (in Portugese).

Radio Cancao Noa 6.105MHz with religious programming around 0600. This station also uses 4.825 and 9.675MHz, all Portuguese.

Radio Gazeta is noted on 9.685, parallel 15.325MHz in Portuguese around 2230.

**CHILE** - The long silent government station Radio Nacional and La Voz de Chile, that had a 'for sale' sign posted on it for quite some time has a new owner. Reverend Jose Holowaty, former programme director for the now closed KGEI in California, has purchased the facility and will put a new station on the air in the form of Radio America International. It may even be active as you read this. The facility includes eight 100kW transmitters, 22 acres and nine towers - which went for a reported $350 000US. Initially the station plans to focus coverage on Latin America, more or less trying to pick up the audience KGEI had. Later the station may beam broadcasts to Russia and Europe.

Frequency and scheduling information has not yet been made available, but keep an ear to the old Radio Nacional frequency of 15.140MHz, just in case!

Radio Esperanza, variable 6.089MHz, has plans for a new 5kW transmitter and 24 hours per day operation.

**COLOMBIA** - Radio Nacional de Colombia has begun use of a 60m band frequency - 4.955MHz and is being heard well in North American evenings, i.e. 0200UTC. Reception reports are requested to Radiodifusora Nacional de Colombia, Radio Canal Internacional, PO Box 93994, Bogota.

Radio Super de Ibaque on 4.785MHz is the former Ecos del Combeima, a part of the Super network. Combeima left short wave and took over the facilities of medium wave stations La Voz del Navado.

**DOMINICAN REPUBLIC** - Check 4.780 until 0300 for Onda Musical, Santo Domingo, which is active again. The frequency varies ever so slightly. And be wary of another Central American, Radio Cultural Coatan, Guatemala. There's often just a fraction of a kilohertz difference between the two.

**ECUADOR** - A new outlet in this country is Radio Alianza on 5.454MHz, being heard in Spanish until sign off sometime after 0200. Another fairly new one is Estereo Carrizal in Calceta (Manabi), which runs until just after 0400.

And a station expected to be active soon is Good Shepherd Radio, located in Saraguro. Broadcasts will be aimed at the local Quechua Indians.

The government's 'Radio Nacional' service, mentioned last time as being carried on HCJB has been suspended. I've no idea why or for how long.

**GUATEMALA** - Union Radio - the AWR station is Guatemala is sometimes noted on 5.981MHz, running until 0100 close. The new Radio Cultural Coatan elbow each other and battles it out with Onda Musical.

**HONDURAS** - Radio Copan International 15.675MHz is carrying some independent programming, some of it produced by current, former or would-be pirate broadcasters. Check Saturdays at 2000-2100 for Southern Music Radio, based in New Zealand, Radio Albatros from 2100-2200 on Sundays. Others include Radio Marabu, based in Germany, 2100-2200 Fridays, Radio Modern Rock, Tuesdays at 2200-2230, Wednesdays 0000-0030, Saturdays 2230-2300. Not that these times are the winter schedule, which has probably changed now, so add an hour to each time - 2200UTC instead of 2100. These kind of broadcasts stay on the schedule only as long as the money lasts and, as a result, some have short life spans.

A reactivated station is Radio Luz y Vida on 3.2495MHz from San Luis, in Santa Barbara department. The station operates daily until just before 0400 and includes some English language religious programming in its mainly Spanish language schedule.

**KIRIBATI** - Radio Kiribati is being heard with news from Radio Australia at 0600 on 9.825MHz, followed by local and regional news.

**NICARAGUA** - Radio Miskut can occasionally be picked up in upper sideband mode on 5.770MHz running until sign off at 2330 or slightly before.

**PERU** - New and sort of new ones from Peru, Radio Soledad on 4.6335MHz running to sign off a few minutes past 0400. Radio Sensacion 6.895MHz is heard to sign off a bit past 0100. Radio Vision dos Mil on 5.131MHz has been reactivated. Try around 2330.

More from Peru include Radio Marginal on 4.039MHz, Radio Paucartambo 4.510MHz, Radio Ondas del Sur Oriente 5.069MHz, Radio Miundo 5.082MHz and Radio Tacna 9.505MHz. Radio Jaen, off short wave for a decade, has returned to 5.005MHz. Its slogan is La Voz de la Frontera.

The Peruvian short wave broadcasting scene is - with Bolivia - the most changeable in all of Latin America, with stations coming and going all the time. Schedules and frequencies also tend to be variable.

**UNITED STATES** - Another opposition group is using a commercial US broadcaster to sell its message. The Voice of Oromo Liberation was recently discovered on WHRI, Indiana on 13.760MHz. Check around 1600. This may not be a daily broadcast, exact schedule has not yet been confirmed. The broadcast is produced by the Ormo Liberation Front which opposes the present government of Ethiopia.

Now having paid all the money, Prophecy Countdown (WVHA) has taken complete control of the former WCSN (Christian Science) short wave facility in Maine. WVHA announces their location as Greenbush, WCSN announced it as Scott's Corner. There's been no physical move of the facility.

**WRMI** - Radio Miami International includes DX information as a part of its programme *Viva Miami*. The feature is *Wavescan* a media/DX programme produced by Adrian Peterson on behalf of Adventist World Radio. It airs on Sundays (UTC) at 0100. The English version of *Viva Miami* is scheduled at 0000-0030 Mondays (UTC) and at 0100 Tuesdays through Sundays. All WRMI transmissions are on 9.955MHz.

**URUGUAY** - Radio Monte Carlo (not the station in Monaco) is being noted from Uruguay occasionally around 0000 on 11.730MHz. You may also hear mentions of or IDs from Radio Oriental, the listed station on this frequency. It sometimes relays Radio Monte Carlo. Monte Carlo programming can also be heard on occasion around 0000 on 9.595MHz.

**VANUATU** - Radio Vanuatu's two new 10kW transmitters are registered for use on 2.485, 3.330, 3.945, 4.960, 6.100 and 7.260MHz. 3.945 and 7.260 are frequencies that have been used by the station all along. The old transmitters are to be retired. At this writing, the new transmitters do not appear to be on the air and, apparently, the old ones are operating only irregularly.

**VENEZUELA** - Watch 3.375MHz for the return of La Voz de la Fe in Maracaibo, which says it plans to return to short wave.

Radio Barquisimeto still plans a return to short wave, but its initial start-up date had to be delayed. When (or if) they do reactivate, the frequency reportedly will be 9.510MHz.

That covers things from the America's for this time. Will have more for you in three months. Until then - good listening.

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

# Reflections

My quick reply to a question, "how long has the transistor been with us?" was, "a good 30 years." However, I looked it up in the encyclopedia, *Encarta '95*, CD-ROM and found that this little device, which revolutionised the radio and electronics industry, was developed in 1948 by three American physicists at the Bell Telephone Laboratories in the USA. In 1956, they, Walter H. Brattain, John Bardeen and William B. Shockley shared the Nobel prize for Physics. It doesn't seem possible that my answer should have been nearly 50 years!

## Valve

It's unlikely that the exploration of space, which began when Russian scientists launched *Sputnik I* in October 1957, would have been possible without the transistor. I doubt that a delicate glass valve could have withstood the shock of the launch and would have required too much electrical power from a satellite's limited supply. Compared to the transistor, all valves are current hungry. For instance, the 1T4 valve, standing left **Fig. 1**, in a seven-pin holder, needs 1.4V at 50mA to light its filament and up to 90V on its anode. A screening can is fitted over the valve and retained by the metal part of the holder that remains above the set's chassis. Even that small valve assembly, measured from the base of the holder to the top of a screen, is approximately 65mm and has a 20mm diameter base.

At least four such valves make up a domestic receiver. Now compare that to the GEC radio on the right of **Fig. 1**, which measures approximately 95 x 60 x 25mm complete with a PP3 battery which fits under a flap at the lower rear of the set.

## Domestic Market

From the retailer's point of view, our radio battery stocks rapidly changed from the large 90 and 1.5V packs, for the valved sets, to the 'PP' range that included the six-volt PP1 and the nine-volt PP3, PP4, PP6, PP7 and PP9. Other battery makers used 'VT' and 'DT' in front of the number.

I believe that the transistor gave millions more people around the world a chance to have a radio. Compared to the valved receivers, the transistorised sets were relatively small, cheap to run and less costly to maintain.

Among the sets made prior to 1965, now sought after by collectors, is the 'palm-held' GEC, **Fig. 1**, the Ekco PT352, **Fig. 2**, with its preset tuned 'Light' programme (currently BBC Radio 4) on the long wave and the Regentone TR410, with a band-spread for Radio Luxembourg. In some areas the reception of this famous station was difficult and that special band helped to overcome the problem. Each had its place with the user, especially for listening to the news and sport when away from home. At that time sets like the GEC were popular for the handbag or pocket and the Ekco for the brief-case, desk-top and work-bench.

## Red Shift

Last month I selected 'Main Program' from the opening options in *RedShift*, so this time we will look at the alternative 'Guided Tours'.

The *RedShift* instruction book suggests that the user begins by following one of the 20 guided tours.


**Fig. 1**

This I did and was offered a number of titles covering movements of the earth, moon, planets, eclipses of the sun, as seen from the surface of the earth or moon and 'The Sky Viewed From Earth'. The latter produced the night sky above the horizon, as seen from London in real time. Also on screen came a 'box' of instructions and the controls and settings menus.

According to the chosen subject, the *RedShift* photo library can be accessed from the 'box'. Watching a solar eclipse from the earth or moon or seeing the movement of the planets and their moons is both fascinating and informative. The settings, control and zoom menus enable the user to better understand how the mechanics of these subjects work. In addition, the library has photos of comets, taken by NASA and the National Optical Astronomy Observatories and about nine sections, each with a number of titles, under the 'Galactic' and 'Extra Galactic' headings.

I tried 'Gaseous nebulae' from the galactic menu and looked with amazement at more than 30 pictures including some spectacular views of Orion's Horse-head nebula.

From the 'Information' menu I selected 'Movie Gallery' and was offered five moving pictures of the surface of Venus, two of the moons surface and four from the Apollo landings, including a 'ride' in the Lunar Rover.

The more *RedShift* is used, the more obvious it becomes that this is a big program with many features. If your geography is rusty, it has well featured maps of the earth, moon and mars which are complete with gazetteers to help you quickly find a named location.

As yet I have not tested this, but *RedShift* allows the user to set the time and date anywhere between 4712BC and 11000 AD.

## Observations

Although close to sunspot minimum, "there is still a bit of activity about coming from the sun's corona," wrote **Ron Livesey** (Edinburgh) at the end of January. Ron uses a 2.5in refractor telescope with a 4.0in projection screen and his daily observations revealed one active area on the solar disc on days 22, 24, 25, 26 and 28 and two on the 18th, 19th, 20th and 23rd.

During his morning sunspot observations, **Patrick Moore** (Selsey), found a small group of spots on his projection screen on February 4, two single spots on the 7th and a spot, followed nearby by a group of four tiny spots, **Fig. 3**, on the 18th.

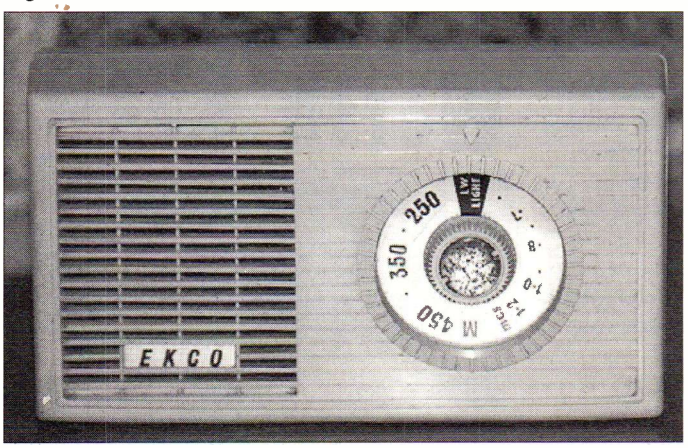
## Aurora

Ron Livesey, the auroral co-ordinator for the British Astronomical Association received reports of aurora described as 'homogeneous arcs and bands' for the overnight periods on January 2/3, 5/6, 17/18 and 29/30, 'rayed arcs and bands' on 17/18 and 29/30, and 'active aurora' on 3/4, 17/18 and 29/30, from observers in Aberlady, Banff, Edinburgh, Kincardine, Kinloss, Portpatrick, Kirkwall and St. Andrews.

## Magnetic

The magnetometers used by **John Fletcher** (Tuffley), **Tony Hopwood** (Upton on Severn), **Karl Lewis** (Saltash), Ron Livesey, **David Pettitt** (Carlisle), **Tom Rackham** (Goostrey) and **Tony Rickwood** (Gillingham), between them, recorded strong disturbances to the earth's magnetic field on

**Fig. 2**



January 16, 17, 18 and 29 and lesser events during the first week and the last three days of the month.

## Weather

In February I recorded 6.35in of rain compared to 3.44in for the same period last year. Large amounts of 0.95in and 0.80in fell on the 14th and 19th respectively and lesser amounts, ranging from 0.10in to 0.68in, was spread among 15 other days. Hail and thunder accompanied the rain on the 15th and slight frosts occurred overnight on the 26th and 27th.

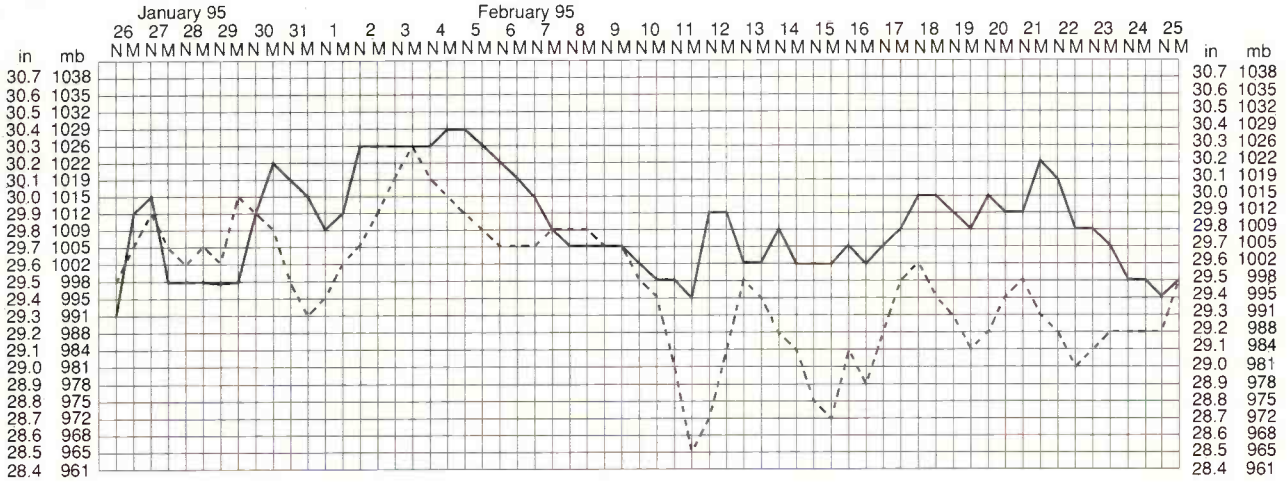
"February's weather systems gave us all sorts of conditions," wrote **Arthur Grainger** (Carstairs Junction) and added that most days were wet with some gales and a few sunny days in between.

Although he did not notice any big tropospheric openings during the period he found that Radios Gloucestershire and Lancashire, on 104.7 and 104.5MHz respectively, gave good signals throughout the month.

The daily variations in atmospheric pressure from January 26 to February 25, **Fig. 4**, were taken at noon and midnight from Arthur Grainger's barometer in Scotland (dotted trace) and from my own barograph here is Sussex.

**Fig. 3.**

**Fig. 4.**




# COMPETITION

# WIN THIS PRO-2035 SCANNER

## Worth £350

The Realistic PRO-2035 base station scanner was reviewed in our recent *What Scanner* magazine presented free with the March 95 issue of *SWM*. **SRP Trading** have generously given the review model as a prize in a three-part competition.

The second part should have appeared in last month's *SWM*, but fate conspired against us and the second part is presented here. The third and final part will now appear in the June 95 issue.

To enter, just write the answer to the question on the coupon on this page. Save the coupon, together with the coupon from page 3 of *What Scanner*, March 95 and the final coupon from next month. Full instructions on submitting your entry will appear with the third part. If you missed the first part of the competition, back issues of *SWM* March 95 - with *What Scanner* - can be obtained from the Broadstone Offices price £2.30 inc. postage.

## QUESTION 2

**What is the total number of channels the PRO-2035 can store in its memories?**

**ANSWER...**

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

# Amateur Bands Round-up

## Listening to the Amateurs

We kick off this time with a mention of the White Rose SWL Contest, that runs from 0900 to 2100UTC on June 25. Use 3.5, 7, 10 14, 18 and 21MHz bands. Log up to five stations on each band in as many countries as possible, as defined by the *ARRL Countries List*.

Scoring is: one point for each station heard on each band, plus five bonus points for each new country. (Your first G on any given band then, one plus five, subsequent Gs one point each). Final score, sum of the band scores. NO CQ, QRZ, or similar calls count; aeronautical or maritime mobiles not to be logged. Logs to show Date, Time in UTC, Station Heard, Station being worked, RS(T) at s.w.l. station. If both sides of the contact are heard they may be claimed and both calls logged. No station can be logged more than once on any given band. Separate log sheets for each band, plus a cover sheet listing the countries claimed on each band.

Entries to **D. A. Whitaker c/o White Rose ARS, 57 Green Lane, Harrogate HG2 9LP**, postmarked no later than July 24 1995.

A word from me on this: get a copy of the rules from the address above and study them. In the January effort, someone lost 17 000 points by misunderstanding!

### Problems!

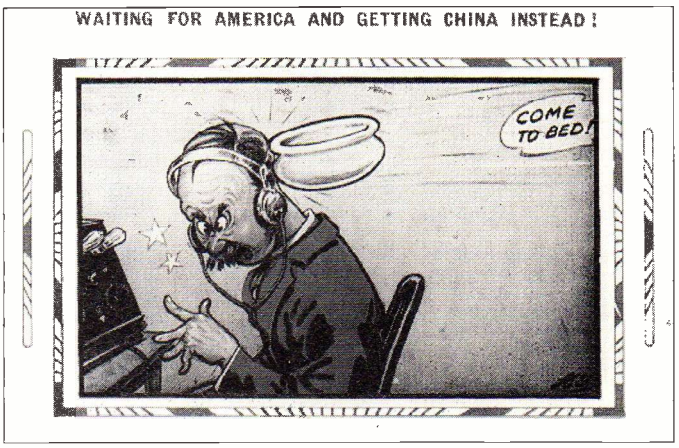
This one comes from **Bob Taylor** of Stourbridge, who wants to run more than one receiver from his one antenna. Personally, I would simply use a wafer switch between the antenna tuner and the receiver, which implies switching at low impedance. True 'diversity' reception calls for a separate antenna for each receiver, since it is meant to combat fading. To achieve what Bob says he wants would call for feeding the output of the tuner into an isolating stage, followed by two isolated outputs, one for each receiver. It could be made to work, but it would degrade the overall performance to an extent determined by the theoretical design.

A noise 'like hot fat spitting' plagues **F. Lennon** in Hyde, Cheshire; worst in the morning, but seems to go away as the day wears on. It is worst on the lower frequencies. It seems unlikely to be anything to do with propagation, and sounds man-made to me. Something breaking down in the morning dews maybe? He mentions W1TRC, KP2BH (American Virgin Is), US0GA, AB4RU, 9K2MU and W8KTH all around 3.790-3.8MHz. On 14MHz he notes W0GKL in Nebraska, VU2MPS, W7ZQ in Wyoming, 5Z4SM, UA0AP, TJ1A, 4W1KZ, JA1PJ, A22MN, ZS6KRU, 9J2AE, ZL1AV and EP2MHB; 18MHz showed PJ8AD on two occasions and US0NZ. Finally 21MHz where K6OKW, K0TPF (S. Dakota), W7LTH and K7RST in SE Arizona were all entered in the log.

Skibbereen in South-West EI is where **Finbarr O'Driscoll** listens from. This time, Finbarr was tuning around the VOLMET frequency of 6.676MHz in the middle of last year when he came across a group using what appeared to be amateur operating techniques and fairly low power. They seem to call on 6.670MHz lower sideband and then shift away slightly for a natter. Finbarr has heard various countries in this group. In fact, this sort of thing has been going on for many years, and it is long overdue for the EC countries to bust them once and for all.

Now to Derby where **Ian Hatton** runs a Yaesu FRG-100 into a triband rotary dipole at around 9m, plus an extended double Zepp for 18MHz that can also be tuned over all the other bands. On 28MHz we see 9G1MR, CX2UO, EA8AMT, ZS6TB, ZS6MB, PU2MHB, 5R8EH, 5R8DS, ZS5AFJ, 5N0GC, all on sideband, plus 9J2FB on f.m. 24MHz came up with Z21CS, WP4ENA, 9K2ZZ, HZ1MM, A45ZZ, W5IZ, 4X4DK, KF7E, S0/KC0PA, OD5YT, KP4TB, TA2ZY, ZS6WB, A71AN, A71CW, 5N0CGC plus HZ1AB on the key. At 21MHz we see PT7BZ, TI2/NZ4K, ZS5RF, VP8CQG, BV4FH, BV4AS, TG9GI, YV5IVB, FS5PL, CO7JC, OD5NH, S0/KC0PA, ZS6PW, P49V, 9G7MW, 7Q7CT, 3XY0A, TU2JL, YC8DDU, VK5YN, DU7KGJ/DU4, TJ1AG, A22MN, 9J2GA, 5N0GC, ET3AA, V59T and J55UAB.

A look at 14MHz resulted in FG5KA, FM5CW, VE8GL, FY5GJ, 3B8GF, ZL3GS, KL7XD, SU3AM, V44KBP, FY5FJ, SU1SK, V29NR, VP8CPC, 8P9AF, ZS3JR, 5R8DS, VE6JFS, VE8RCS, KH6WU, A41JR, AH8A (US Samoa), ZL3RD, VP2MDY, D68QM, EP2MHB, ZP5MAL, LU3DFA, 9G1BJ, S0/KC0PA, D44AB, XT/TU5BA, YB5AQG, 9M2CW, 9M8YJ, VP8CQS (S Shetland), ZL4OD, KP4SB, VE6UML, ZD7WRG, 5Z4PL, TN2M, ZD7SM, 7Q7JL, Z22JE, TR8SX, 9Q5TT, 5H3JB, VK9CR (Cocos-Keeling Is), J28RP, 7P8PG, J52AK, VE7MCK, a couple of BVs, 5N1DNA, 4S7RF, VU2RCN, NL7J, VP5/JR3RVO, 3XY0A, WL7HP, ZD9BV, TJ7DH, FJ/OZ7SM, EL2J, TZ6VV, HR7KAS, 9Q5TR and S83H.




18MHz produced JO1DZA, CN8FD, S0/KC0PA, JR6SVM on Okinawa, KP2J, TL8MS, PY2XB, 9K2HA, EX0M, PJ8AD, CU7AX and A71AN. 7MHz showed another fine crop, as did 3.5MHz, while Top Band was used by IC8JAH (Capri), RK9XWH, SV8CS, VE1ZZ, OY9JD, T93M, S57DX, LY1FW and EU6AF.

Having acquired a nice RA17 receiver, **Mark Borthwick** of Hawick is back in business. On 7MHz, Mark noted CU3/CT1FDD in the Azores, EA8TL in the Canaries, 4X4JU, OD5NJ, CN8ET, CN8SN, PT7NK and ET3HB. 14MHz stumped up a couple of EA6s in the Balearic Is, 5B4ES, 9K2ZZ, 5Z4PL, A41JR, A45ZZ, three 4S7s, 7Q7JL, ZA0B (Sazani Is), VP9AT, three ZS5s, three VKs, A71AN, ZB2AZ, CN8CV, IC8GVV (Capri), a brace of EA8s OD5NH, EA9AU,KH6WU, FS5PL, PYs and LUs, CU2AA (S. Miguel Is), CU3YY (Azores), three VOs, and an absolute raft of American and Canadian stations, including rarities such as W2NQ/7 in Oregon, AA7MH in Arizona, a brace of Alaskans, WB8QFH in Colorado, and KO0TPF and K0CX who were both in S. Dakota. Finally, a peek at 18MHz found CU1AX (Santa Maria Is), PJ8AD, A71BH, ZA1E, ZB2GR, T77CD, K1BGT, W2YD, N2PPB, W3FX, WT4K/MM, W8AH and ND0F.

### Dangers

At the time of writing, I know of two groups proposing to activate Spratly, though both will be over by the time you read this. One group of JAs propose to be on Layang Lagang Island, March 29-April 3 with cards via JA9AG; the second effort is a Philippine group to sign DU0K between April 10-16 with the cards going to DU0RG. I just hope no-one gets hurt!

Readers will be aware that there are several countries claiming the Spratly group as theirs, and older readers will recall the death of at least one DX operator by military fire in an attempt to activate the group.

### Some QSL Addresses

AP2AMA goes via Box 1452 Islamabad

CN8HR via Said Noumani

CN8NS POB 6577 Rabat

EL2NB via PO Box 2751 Monrovia Liberia

OY2H via Cesare Casaroli

I0WDX, Piazza Conti 2, I-00010 Poli, Italy

TR8IG via PO Box 740, Libreville, Gabon

ZD8WRG via WA2JUN

Roger Bunney, 33 Cherville Street, Romsey, Hants SO51 8FB

# Satellite TV News

## The Latest from the Clarke Belt

There's a little confusion as to the happenings of the Gorizont craft t 11° and 14°W. Late February saw the 14°W bird carrying a caption indicating that as from the 28th the new Loutch co-ordinates would be Gorizont 12 @ 11°W Reuters TV Moscow have, however, been appearing on 14°W and a further confusion is that two downlinks have been monitored simultaneously (by **Maurice Hiller**, Lockerley) from this satellite suggesting that the bandwidth of the usual Loutch transponder centred at 11.526GHz is perhaps wider than thought - even suggesting up to 68MHz.

Certainly up to end March, the 14°W Gorizont was in use by Reuters Moscow bureau during mid mornings. The Gorizont 22 satellite at 40°E has also been seen running 2 downlinks though with data only (11.510, 11.545GHz).

Further speculation has offered thoughts that a new Express satellite, the up-market successor to the dated and unstable Gorizont, is now on station at the 11/14°W slot. I'm sure that the situation will become clearer over the future weeks and will be included in this column.

A little excitement for several readers who happened to come across a new channel on Intelsat 702 at 1°W, evening programming with a corner logo 'ID TV'. Unfortunately this excitement was short lived, 'ID TV' was a temporary programme feed from Oslo's Telenor Expo communications event over the March 14-18 period. The 10.970GHz horizontal frequency is one to check out periodically for other Scandinavian OB's events.

Whilst on a Nordic theme, the ex German TV SAT-2 is now operating from its new parking slot of 0.6°W and is downlinking in Ku-DBS. *Transponder* bulletin advises 11.747GHz LHC on test from March 10.

**Donald Lymn** (Melton Mowbray), our Microsoft software monitoring expert, advises that the times of Microsoft transmissions as previously mentioned on the 1st/3rd Tuesdays in each month may vary from previous data. In February the programme from Microsoft Television (MSTV) was at 1345UTC and not 1430UTC as monitored in January. Various transponders have been used, more recently the 11.472GHz horizontal trdr on Intelsat K at 21°W. Donald advises the audio appears on 6.60 and 7.38MHz subcarriers.

I wonder how many readers availed themselves of the opportunity to visit the Jason 6 Project centres throughout the UK in mid March. I know that **Andrew Sykes** (Kings Lynn) visited Lakenheath air base where a large viewing auditoria was established. Full marks though to **John Locker** (Wirral) who manned the Liverpool Maritime Museum main UK centre for Jason 6 in a voluntary PR capacity for the project. He attended 25 shows and answered questions promote the hobby and interest of satellite viewing - there is a satellite world up there other than Sky TV on Astra!

Jason this year was based on the side of an active volcano in Hawaii, uplinking onto Galaxy 4 (99W) into the 'States for local distribution - again via Galaxy 4 using B MAC. PanAmSat then received the B MAC signal at their East Coast Homestead Teleport, digitally compressed the signal and uplinked via PAS 1 @ 45°W for the feed into Europe on the Atlantic path.

Being mid March, a slight solar outage was seen first on PAS-1 around 1530UTC (as the sun passes across the dish axis and behind the distant satellite) and then on the Galaxy 4 bird at 1900ish UTC. Son of Jason (7) continues and in 1996 will be featured underwater in Florida.

**Roy Carman** (Reigate) has sent in a very long satellite logging including that of an Hispasat OB link for Canal Plus, France using the 12.591GHz vertical trdr. The Spanish have been advertising surplus capacity on Hispasat and its likely that various outside broadcast/corporate events will be carried from the 30°W Hispasat slot.

The new Intelsat 704 at 66°E can now be received across much of the UK albeit rather low on the South Eastern horizon. **Ian Waller** (Lincoln Satellite) has received strong signals at 11.479, 11.518, 11.695GHz horizontal - though being digitally compressed no pictures can be seen! These downlink signals are ex Orbit International, Rome and comprise nearly 12 TV channels covering much of Europe and the Middle East. Ian previously was very active with C Band (4GHz) reception using a large dish, unfortunately this was spotted by a planning committee member, the result was a retrospective planning permission refusal and Ian fought this decision at appeal, he is awaiting the results of that case, we wish him well.

### Transponder Bulletin

*TRANSPONDER* is an up-to-date satellite news bulletin published fortnightly giving an accurate rundown of the latest sightings in the Clarke Belt and of current news events in the world of satellite. Contributors generally are using small dishes and reports therefore reflect what most readers can be expected to achieve given the one main ingredient of all hobbies - the time! A highly recommended and respected publication, it costs £48 annually in the UK from 'Transponder', PO Box 112, Crewe, Cheshire CW2 7DS, Tel: (01270) 580099 or Fax (01836) 635510. Send £2 for a sample.

### Orbital News

Eutelsat aren't having a wonderful time this year with yet further delays to the launch of their Hot Bird 1 by Arienspace Flight 71 and at the time of writing a 3rd launch date was being discussed. At least the Eutelsat public relations department have the right idea, a pre-launch party for the 'trade' was held in Manchester mid March recently! Something that DID launch successfully was Intelsat 705 which is slotting at 50°W offering both C and Ku band downlinks (4 and 11GHz bands). This far West slot gives coverage over all the Americas with numerous customers booked from South America, if you're lucky enough to have a clear view towards the south-west then check out this craft for some perhaps exotic test patterns and news feeds.

The new Intelsat 704 bird has now opened service from 66°E with digital compressed programming for the Rome based 'Orbit Communications'. Offering 51dBW signal levels on 2 spot beams - one being across Europe and the UK - good quality reception is possible using a 900/1000mm dish provided there is a clear view to the south-east - and of course that there are conventional analogue TV signals present.

Compressed signals monitored by **Ian Waller** (Lincoln) are at 11.481, 11.495, 11.516, 11.675GHz horizontal though digital compression will not display pictures on a standard TV.

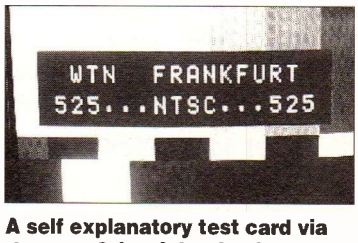
Things that go bang in the night typified the fated Apstar-2 satellite, it and the launch rocket exploded on take-off and witnessed by viewers to China's 1st programme network. Apstar-2 was fully booked with many C Band broadcast customers who are now scratching around for other downlinking capacity. Speaking of the explosion, PanAmSat vice president said "We don't call it a crash. We call it a launch anomoly". A rather loud bang for a 'launch anomoly'! Some media pundits herald the setback as a step forward for the arrival of digital compression, but India's Doordarshan are know to have offered capacity on Insat 1B and the Russians are also shuffling forward waving capacity to let on their new Express 6 bird.

**Apstar-2 goes bang on Chinese network TV.**

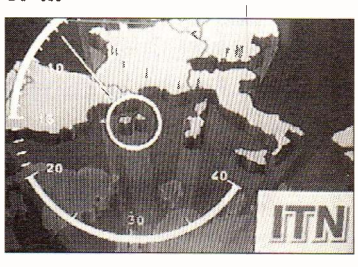

**Intelsat K @ 21°W downlinks a video package for the next day's GMTV programme.**

**The Liverpool Maritime Museum, the end of the Jason Project, here Professor Robert Ballard intros a camera on the volcano slopes in Hawaii, the large screens are for public viewing in the main hall.**


**Telecom 1C @ 3°E (12.606GHz V) was used for numerous satellite feeds during the World Figure Skating Championships 1995 ex. NEC.**




**A self explanatory test card via the new Orion Atlantic bird at 37°W.**




**Both ITN and the BBC regularly use Orion, signal levels in the UK using a 900mm dish are high and easy to receive.**

# SUMMER 1995 CATALOGUE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5698[illegible] 000 FEET
01[illegible]
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7[illegible] TIME 0830 UTC DUTCH STATION
TO COVER 1/8TH CUMULONIMBU[illegible]
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# SSB Utility Listening

## HF Sideband

Thank you for all your letters requesting copies of the new ITU Region 1 'Off-Route' frequencies. I was quite surprised to receive so many requests, it took a while to clear the backlog. Over 60 letters were received within a week, which is ten times my normal postbag!

Some were delayed as they had the wrong address, and some were addressed to a 'Mr. Turner'; since they contained s.a.e.s and a request for a frequency list, I guessed that they must have been for me! Unfortunately, very few of the letters contained copies of your logs, and only a few took the opportunity to ask questions. I have a few more ideas for listings that I may make available later in the year, but they will probably only be available to those who send me a copy of their own loggings, so you had better start recording those details now!

### ICAO

I am surprised that nobody has written to ask what has happened to all the German ICAO airfield codes. These codes are used in flight-plans and all sorts of aviation documents, they are also used by pilots. When East and West Germany combined a few years ago, airfields kept their old ICAO designator; East German airfields were 'ETxx' and West German airfields were 'EDxx'. Now that they are one country, it made sense for them to be reorganised. From January 5 1995, all German military airfields are in the range 'ETxx' and all German civil airfields are in the range 'EDxx'. The third letter is used to indicate the user of the airfield; those 'EDDx' are international airports, those 'EDUx' are British military airfields, and so on.

These new codes have been in use for a few months now, they are being used on USAF GHFS frequencies by US aircraft flying to Germany, and by RAF aircraft operating to Germany on the RAF 'Architect' frequencies.

### WUN

Many people these days have access to computers, and almost everybody must have heard about the 'Information Superhighway' (what an awful phrase).

A number of utility listeners recently formed a group on the Internet known as the 'World Utility Network' (or 'WUN'). This group was as a result of the demise of the SPEEDX group, which used to produce a monthly newsletter for Utility listeners. The new group is also producing a newsletter, but it is designed for distribution across the Internet and other electronic methods. The first 'issue' appeared during February, and makes very interesting reading. One of the benefits of subscribing to this group is that you receive regular (i.e., almost daily!) updates and information from listeners all around the world.

So, how do you join the group? If you are already active on the Internet, just send a simple message to 'majordomo@phoque.info.uqam.ca' containing the text 'subscribe wun'. That's all it takes, and there are no subscription fees to pay. Within a few days you should start to receive regular messages from the group. The messages that I have seen so far vary from callsign lists for Russian ships, to questions about a 'time' station on 4.625MHz, to loggings from all around the world.

There are plans to make paper copies of the news-letter available, but the only address that I know of is in the USA. The group's newsletter also appears on FidoNet, so if you use any BBS, I would suggest that you send a message to the SYSOP asking if they will subscribe to FidoNet.

### Your Letters

**Barry S** from the West Midlands wrote enclosing a tape-recording of San Francisco ATC, and included a written transcript of the tape. I have tried a few times to hear signals from that part of the world, but I have not had any luck. His letter explains that the recording is from 5.574MHz between 1500 and 1600UTC, which is around local sunrise on the west coast of the USA.

Although his recordings were from late December, I didn't receive the tape until early February; as soon as it arrived, I tried listening to 5.574MHz one afternoon, and there beneath the noise was the distinctive chimes of a Selcall, followed shortly by San Francisco ATC working a United Airlines flight going to Hawaii.

**Kenneth P** from Exeter writes asking for advice on which frequencies to hear VOLMET broadcasts from Paris. I have looked through quite a few books, but I cannot find any broadcasts actually coming from Paris, but Shannon VOLMET covers the Paris airports in its broadcasts at 15 and 45 minutes past each hour. Does anyone have any further suggestions?

**Stan Bethel** wants to hear from somebody who is using one of the SELDEC Selcall decoders mentioned in the August 1994 issue. He is thinking of buying, but wants to get some further opinions on the unit. Is there anybody using one of these units who can pass-on their opinions - don't worry, I'll send your comments on to Stan, I won't print them in *SWM*.

**D C Stewart** writes to ask where he can get hold of a copy of either the *Canadian Forces Flight Supplement*, or the *USAF Flight Information Handbook*. I mentioned these in the February column, and he would like to get copies for himself. Unfortunately, I do not have an answer for this question; my copies arrive quite anonymously with a brief note saying 'I hope this is of use?', but I have never found out who my anonymous benefactor is! There used to be a company in the USA who sold them, but I did hear that they went out of business. If anyone can offer any advice, it would be appreciated.

### Now Hear This...

Once in a while, it is nice to be able to report some future event that will be of interest to utility listeners. You are all aware that many Space Shuttle missions now include some form of amateur radio experiments, and these missions can usually be followed on h.f. courtesy of several US stations who re-transmit the audio directly from NASA.

During June or July, a Shuttle mission is planned that will link-up with the Russian MIR orbiting space-station, so this is an ideal time to hear live commentary from space. Even better, for those readers in the UK, the orbit of the MIR space-station comes over the UK a few times each day, so you also have the opportunity to actually see it if the weather conditions allow it.

### Traffic Log

(all frequencies are MHz u.s.b., unless stated; times are UTC)

| | |
|---|---|
| 2.182 | (6/3/95, 22.53) GKYQ/HMS *Fearless* calling Wick Radio requesting a frequency for some 'phone-patches. Wick said to QSY to 'Channel A' (2.006/2.751 ship/shore). |
| 5.670 | (4/3/95, 17.15) Indonesian 9912 working Madras ATC with a position report. Also heard were Singapore 322, Singapore 404 and Iran Air 841. Is this a new Madras ATC/SEA-1 frequency, I have not seen it listed anywhere; this frequency is also used by Portishead - I wonder if it causes problems? |
| 8.331 | (25/2/95, 21.45) Station 'OS' requesting station 'P6G' to intercept Track 5740, and to instruct the vessel to slow to 5 knots. Station '0VM' also working 'OS' reporting Track 5716 vessel 'Miava' had been handed over to the Italian Coast Guard. More Bosnia blockade traffic on a frequency that I have not seen reported before. |
| 8.933 | (28/2/95, 19.47) Springbok 2289 working Johannesburg (i.e., South African Airways Ops) reporting their position, and said that they will make their next call at 2045. |
| 8.989 | (26/2/95, 23.08) NATO 19 (a NATO E-3 aircraft) working Trenton Military. '19 said that they would need a 'phone-patch at 0000, but Trenton suggested waiting until 0015 due to their shift change-over. NATO 19 wanted to try a 6MHz frequency, but Trenton said that 11.265 was a better frequency for them. |
| 9.018 | (21/2/95) SAM 846 working Andrews VIP. '846 reported that they had some unspecified problems, and not be arriving until 1615, they also made arrangements for baggage and transportation on their arrival. Does anyone know any more about this SAM callsign, as this is a new one to me. |
| 9.352 | (22/2/95, 17.50) Station 'O8T' working 6HD and 7LT, wanting to know 'at what time do you want all stations to go XAI?', to which the reply was 'at 1920'. Almost certainly an air-defence exercise, but on a strange frequency. I have no idea what the 'XAI' code means. |
| 11.265 | (26/2/95, 23.10) NATO 19 working Trenton Military, up from 8.989MHz. Radio checks followed by a personal 'phone-patch to a number in Canada. NATO 19 said that they were 'circling over Bosnia'. |

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales

# Scanning

I'll open this month with greetings to **Anssi Nieminen** of Jyvaskyla in Finland who was in touch and sent me a 1994 copy of a Finnish magazine called *Skanneri* - no prizes for guessing the contents of that!

Anssi also writes and informs me that he lives on the Russian border and scans and searches accordingly. Magazine coverage is from 26.065 through to 2500.000MHz. I can't read Finnish, of course, but the magazine is well laid out and tabulated in a presentable way. It seems enthusiast directed, well produced and is - I'm sure - a 'must' for scannerists in Finland. Anssi does, I'm pleased to report, read *Short Wave Magazine*!

Now, help required! **Wyn Davies** of Wrexham requests assistance with the following problem he is encountering with his Bearcat BC 2500XLT. His battery pack seems to discharge after 24 hours without the set being switched on! Obviously Wyn, you're using Ni-Cads and it may well be that they have been, at some stage, overcharged and are now 'useless'. That's the obvious answer. However, I'm sure some reader may be able to throw other light on the problem.

Wyn also asks if modifications exist to be able to alter the a.m./f.m. range of the set which is set on certain bands. Wyn does say he bought the set while on holiday in the US. Again, my guess is that the set is designed for the US domestic market and modifications may well help. If you have tried a.m./f.m. switching on this set then please share with Wyn via the column.

**John W. Hepburn** of Ashington writes in with a cutting from his local paper dated Feb 2 1995. The cutting concerns new equipment for South East Northumberland Police, where they piloted a new encryption system designed to stop eavesdropping by scanner users in an effort to step-up secure communications and present a more confident face to the public.

I did warn you a while back that secure comms systems were coming in. How long before we have it nation-wide? Not, I'll hazard a guess, too long. I can see more law enforcement agencies going over to secure communications - and with the downturn in defence expenditure and subsequent competing for contracts, there are plenty of defence communications experts out there who will be able to come up with some pretty heavy systems that will be beyond amateur expertise in deciphering!

John has a comprehensive set-up at his QTHR consisting of the following: Realistic PRO-2005, PRO-30, Sony Air-7, Realistic DX-100L, Yaesu FR-50B, Selena Vega and a Maplin Ranger for 160m - which shows he covers both h.f. and v.h.f. plus.

## Frequencies Now

A letter from **S. H. Hosegood** of Carshalton in Surrey on railway frequencies quotes the following heard in the South East.

| | |
|---|---|
| 453.55 | Croydon Selhurst Depot. |
| 453.900 | Unknown. |
| 454.940 | Driver talking to Victoria Signal Box. |
| 453.625 | Selhurst. |
| 205.800 / 205.950 / 206.100 | Speaking Clock. |
| 165.4125 | London Underground Control. |

456.865 was also heard - being used by the crew filming the popular TV drama *The Bill*.

I've checked through these frequencies myself and BR Engineering are allocated frequencies in Band III with LU active on the following:

| | |
|---|---|
| 165.4625 | Central / Jubilee / Northern / Victoria. |
| 165.4375 | Hammersmith and City / Piccadilly Line / Metropolitan. |
| 165.4125 | Bakerloo / District and Circle. |

Some of these frequencies do not appear in the publications available on the market - why defeats me! - so I am indebted to listeners who send in information for inclusion. If it wasn't for you, how would we get by? An insert also appears this month listing BR Trunked Radio Channels - railway buffs should be content with that one!

A letter from **K. L. Jones** of Oswestry asks me if I know frequencies for aircraft that pass over his QTHR. I'd suggest keeping an eye on Godfrey Manning's column - 'Airband' - which is up to date. I have, on occasion, got some of my data slightly out of date when it comes to airband listening and Godfrey's very definitely the man when it comes to up to the minute information! I'd also suggest getting one or two of the many airband publications available through the magazine such as those published by Photavia Press like *Callsign 95* and *Airwaves 94*. They can be contacted at: Photavia Press, 21 Downlands, Pulborough, West Sussex RH20 2DQ.

Now, a request for help from **Tim Anderson G0GTF** who - as regular readers will recall - produces the excellent 'Amiscan' program for PCs. Tim is considering expanding and asks if readers are prepared to send in frequencies either to him, or via the column. Some criticism has been levelled at Tim for having more South East based frequencies in but, as he points out, the program is really a database program - the frequencies within are a bonus! He plans to separate the database, and produce a second disc - ASCII file type - of frequencies. Amiga and PC versions as before.

Tim suggests that if people from all over the country send in frequencies - of any sort above 25MHz - then he should get a good listing. What's more, frequencies from 25MHz would be welcome. Tim specialises in low band v.h.f. logging and promises to send in E catches through the summer - from as far afield as the US - so we should all see what's been going on during these next few months! If you'd like to assist, contact Tim at: 2 Burry Road, St. Leonards, E. Sussex TN37 6QX. Or, via packet radio on GOGTF@GB7HAS.#38.GBR.EU No 7 Plus files please!

I have used Tim's lists myself - and still do, down here in Oxford and when /P around the West Bucks area - and find them useful. I agree with his comments that maybe they're not so useful up in Scotland as most of the listings are southern biased but then, many of the frequencies that appear in publications on the market are - in a word - useless! Horses for courses isn't it?

I have some interesting news from **Pat** of E. Yorks, who wrote me an interesting and very informative letter with gen I'm only too happy to pass on. In the December *Scanning* column I reported 141.8925 as being within the airband. Pat points out it isn't but is within the allocation for outside broadcasts. So it is, sorry!

Pat also goes on to say that this band is also used by the Joint Radio Committee fuel and power people - this being a 'new' allocation used by the Gas and Electricity supply authorities in England and Wales. It uses f.m., is trunked, and is spaced at 6.25kHz.

Balloons next. 122.475 (a.m.) is a recognised frequency complementing and not replacing 129.900. Two corrections gratefully received, thanks.

Inter-agency use of sets was brought up by Pat and he reports that Humber Coastguard at their centre in Bridlington have a Fire Brigade set permanently connected and ready for use. Also that Humber Tugs have a 'duty' tug available for marine fire-fighting and also carrying a brigade radio.

I can verify that some tugs do, indeed, carry sets for brigade work. Some coastal area brigades will work alongside local tug owners for marine fire-fighting emergency work whilst others may be airlifted by the RAF, RN or HMCG helicopters, put aboard by RNLI lifeboat - the means of transport would be many! Communications would, obviously, play a great part and I suspect that hand-helds would be used a lot. I feel sure that I heard whispers that Gwynedd Fire Brigade have marine v.h.f. hand-helds available. With Holyhead being a major ferry port I suspect this is more than just a rumour!

**Maxwell Ramirez** of Islington asks a very basic question about radio waves. Like, what are they and where does each band start. I'll have to put my theory head on and simplify this! Radio waves are electromagnetic waves - two other examples being light and X-Rays. Travelling at the speed of light (299 792km per second or 186 280 miles per second ) they are one million times faster than the speed of sound!

Radio frequencies are rapidly oscillating (varying) electric and magnetic fields - in their most simplest terms - and the rate at which they oscillate is measured in Hertz (Hz) also called frequency. 1Hz = one oscillation per second. 1kHz, therefore, is equal to 1000Hz.

With regard to measurement, the Long Wave (l.w.) comes between 30 - 300kHz, and having a rough range of about 1000km or 600 miles - but subject to atmospheric conditions. Then we have the Medium Wave (m.w.) or Medium Frequency (m.f.) between 300 - 3000kHz (or 3MHz) and with a rough range of about 100km - again, dependant on conditions and with a range increase usually at night.

These are followed by Short Wave (s.w.), at 3000 - 30 000kHz (3 to 30MHz) travelling great distances by bouncing off the ionosphere, which is an atmospheric layer. Of more interest to us is the Very High Frequency band (v.h.f.) that runs from 30 000 - 300 000kHz (30 to 300MHz) and usually travelling line of sight - but again subject to conditions like 'lifts' that can enhance the short range considerably - US stations heard on low v.h.f. in the UK and so on. This is followed by Ultra High Frequency (u.h.f.) at 300 000 -

3 000 000kHz (300MHz to 3GHz or Gigahertz) - signals like TV and so on.

Lastly, we have Super High Frequency (s.h.f.) which start at 3 000 000 kHz (3GHz) and used by satellites and re-broadcasts to earth, for example.

Like I said, very simply put but it should explain where each band starts. Low band v.h.f., by the way, starts around 25MHz or 25000kHz. It's this band that offers fantastic DX potential when conditions are right. I hope this goes some way to explaining what and where the bands are. There are many theory books abound on the market - Newnes and Babani being two good publishers, though lots of titles and descriptions can be had from the *Book Service* to the rear of the magazine.

## Lastly

Regular readers of the magazine will have seen the statement from the Radiocommunications Agency on scanners and the law in the March *SWM*. I trust that each of you have written for a copy of their *RA 169 - Receive Only - Scanners, etc.* leaflet? If you haven't - do so now.

I maintain that scanning is an illegal hobby, but that, with care and consideration, we can continue to monitor if we keep it low key. I'll also state - again - that I will NOT publish frequencies sensitive, controversial or to do with stuff that could be secret - like cellphones and so on, police frequencies and Customs, Immigration and the like. The answer as to why is clearly contained in the leaflet that you can get, free of charge, from : Licensing Section, Radiocommunications Agency, Waterloo Bridge House, Waterloo Road, London SE1 8UA.

To put it in a nutshell, ASPECTS OF SCANNING IS ILLEGAL - but, with care and attention and a little bit of common sense, we can enjoy what we have within limits prescribed by law. If this angers those people who think that I should go ahead and publish then I make no apology. It would be me who'd get prosecuted - and would those who want frequencies published pay my fine? I don't think so! We can maintain what we have if we are careful - and up to now we've done that. Let's keep it this way and not get stupid over something all of us want to see continue.

That about wraps it up again for another month. Keep sending in your news, views, criticisms, comments and frequencies to me for onpass. In the meantime, keep on logging and catch you all down the log next month.

**British Rail Trunked Radio Channels**

| Channel Code | DTI Ch. No | TX | RX |
|---|---|---|---|
| 1T | 349 | 204.850 | 196.850 |
| 2T | 353 | 204.900 | 196.900 |
| 3T | 357 | 204.950 | 196.950 |
| 4T | 361 | 205.000 | 197.000 |
| 5T | 365 | 205.050 | 197.050 |
| 6T | 369 | 205.100 | 197.100 |
| 7T | 373 | 205.150 | 197.150 |
| 8EW | 377 | 205.200 | 197.200 |
| 9EW | 381 | 205.250 | 197.250 |
| 10EW | 385 | 205.300 | 197.300 |
| 11T | 389 | 205.350 | 197.350 |
| 12T | 393 | 205.400 | 197.400 |
| 13T | 409 | 205.600 | 197.600 |
| 14T | 413 | 205.650 | 197.650 |
| 15E | 415 | 205.675 | 197.675 |
| 16T | 417 | 205.700 | 197.700 |
| 17C | 419 | 205.725 | 197.725 |
| 18T | 421 | 205.750 | 197.750 |
| 19T | 425 | 205.800 | 197.800 |
| 20C | 428 | 205.8375 | 197.8375 |
| 21T | 429 | 205.850 | 197.850 |
| 22T | 433 | 205.900 | 197.900 |
| 23T | 437 | 205.950 | 197.950 |
| 24T | 441 | 206.000 | 198.000 |
| 25C | 443 | 206.100 | 198.100 |
| 26T | 453 | 206.150 | 198.150 |
| 27C | 461 | 206.250 | 198.250 |
| 28T | 465 | 206.300 | 198.300 |

C = Control.
T = Traffic.
E = Emergency.
EW = Early Warning.

Godfrey Manning G4GLM, c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex HA8 8PS

# Airband

**The author in an Antonov AN-2** *Christine Mlynek*

**Control tower & fire station at Cranfield** *Christine Mlynek*

A convention that baffles many newcomers is the omission of the least significant digit of v.h.f. airband communications frequencies. For example, **Jason Downing** (Redditch) investigated 126.92MHz that was tuned in by a receiver during a flight (see February 'Airband'). Jason is quite correct that this is Woodford's Tower, but I can't explain why a commercial flight over northern France would need it - and it would probably be out of range, anyway. Of course, the exact frequency is really 126.925MHz but, since the channel spacing is 25kHz, the final digit is usually assumed and not quoted when tuning airborne equipment. Ground-based receivers, on the other hand, may require the full frequency and it's up to you to tag the final 5kHz digit on if necessary.

## Your Experiences

A friendly RAF contact from Oxford tells me that fewer Grob 109s will be based at Halton once 612 Volunteer Gliding School moves to Abingdon, leaving 613 School behind. The good news is that 612 School will expand to 5 aircraft, the bad news being that the similar operation at Kenley will close, but their instructors should be distributed among the remaining two schools.

## Hardware

Certain upper airways frequencies are likely to be assigned 8.33kHz channel spacings (see December *Airband*). Both **George Tillett G3KXP** (Hornchurch) and **Roger Syratt** (Buckingham) have more information. Possible implementation date is January 1 1998 and one of the causes is the growth in the number of nations!

Every time a bit of the old Eastern Bloc declares independence it also has to 're-invent the wheel' and set up its own flight information region. Replacing voice by data would be an alternative solution. Whichever way, it's going to cost money all round and the airlines need to trade off the price of new equipment versus the financial penalty of not being allowed along certain routes due to inability to communicate.

## Follow-Ups

If this column can make a contribution to flight safety then its educational value will be enhanced further. A recent subject has been the use of electronic equipment in flight by passengers: can interference be caused to navigational systems? Refer to *SWM* 'Off The Record' October 1994 page 74 and January 1995 page 63, as well as this column last month ('Information for Passengers'). My attention is drawn to NASA safety reports by an article in *The Log* (February/March 1995, 'Safety Reminders'). Out of 40 reports in which passengers' electronic devices affected aircraft systems, three are studied in detail.

Deviations from a v.o.r. track were traced to either a portable radio (with headset) or a cellular telephone (that was claimed to have been unused), although exactly which of the two was responsible was not determined. The equipment owners did not respond to cabin announcements to turn their apparatus off, so perhaps it did not register with them that they could cause interference. In another instance, the electronic flight instrumentation screens blanked when a portable radio was switched on.

Finally, the compass deviated during operation of a lap-top computer, the cause of which was verified by turning the computer off and back on a number of times. The main compasses on an airliner have electronic sensors (flux gates) in the wing-tips. The familiar magnetic compass is available to the pilots for emergency purposes and initial cross-checking only. I'm sure that readers of this magazine won't become an inadvertent menace themselves!

## ACARS

Under 'Hardware' in last month's column I mentioned how much interest there now is in this system. The facility allows aircraft to communicate with their operating companies by v.h.f. data link; some of the messages (e.g. time of take-off) being sent automatically. Heard on a normal receiver, ACARS messages sound like quick bursts of noise but computer software is available to decode the noise into readable characters.

I complained that the Lowe Airmaster decoder seemed to stop short, as the characters still didn't read as plain text. Further decoding would be necessary. **Ray Whiting** (Harefield) has been trying to do this, referring to a decoding book whilst watching a sales demonstration of the system. One problem is that each company adopts a different format for some of the messages; having encrypted them in the first place, they don't want their rival airlines to eavesdrop! It seems to me that there will be limited value in decoding ACARS and any potential purchasers should consider the cost-benefit equation before buying.

Ray says that Concorde will eventually be equipped with ACARS - once they prevent the antennas from breaking off! As it already has other reliable v.h.f. antennas I'll hazard a guess that this problem will only be short-lived.

**Roger Preston** (Rickmansworth), PPL holder, understands the marketing game and wonders if owners will be asked to upgrade (at a price!) when an enhanced ACARS decoder eventually comes out.

**Scotty** (Tonbridge) points out that 130.025 and 131.475MHz are available for ACARS mainly in North America. In addition to the usual 131.725 in the UK, I did read that British Airways were operating on 131.55MHz but I don't know if they continue to do so.

## Information Sources

Roger Preston invites you to the London Society of Air-Britain where there will be a talk about Northolt's 32 Squadron (Royal Flights) on Wednesday June 14 starting 1900, at The Victory Club, 63-79 Seymour Street, London W2. Admission is £4.

The Aviation Hobby Centre (1st Floor, Main Terminal, Birmingham International Airport B26 3QJ, Tel: 0121-782 6560) publish *The Airband Jargon Book* that contains simple descriptions of aeronautical equipment and facilities. The cover price is £6.95 and it weighs just less than 120g (for postage purposes). I regret that, due to pressure of time, I won't be able to review any books in the near future but I hope to report on it eventually.

If, like **Pat Bracken** (Glasgow) you have access to French publications then try *Megahertz* which (I translate) is the 'Monthly meeting place for the communications enthusiast'. Cover price is 27 Francs (*SWM* is better value!). There is some aeronautical coverage from which I learn that France is divided into five Flight Information Regions and Lower Airspace is defined as below FL195.

Those with a military bias (why is it always USAF?) you'll appreciate *Signet* and *Logbook* from the Black Cat Aviation Group (19 Crescent Road, Hunstanton, Norfolk PE36 5BU). *Logbook* costs £6 (with UK postage) for 12 issues.

Over to Ireland now and Aircom Communications (Broomfield, Malahide, Co. Dublin, Tel: 00-353-1-846-3349) produce the *Irish Airband Listening Guide* at IR£6.50 including (inland?) post. Beware that advice on listening to cellular telephones is inappropriate in countries such as the UK and the current update doesn't show the extended band (up to 137MHz). The v.h.f. marine distress channel is 156.8MHz (misprinted on P.27). A useful summary for residents in/visitors to the Republic.

Airtime Publishing (13 The Hollows, Long Eaton, Nottingham NG10 2ES) produce their summer timetables again. UK costs £11.95, Heathrow & Gatwick £5.20 and Frankfurt & Dusseldorf £5.95; all post free (inland).

Close to St. Mawgan, **W. Vincent** asks about information sources. Start by sending a stamped, self-addressed envelope to the Broadstone editorial office to request the *Airband Factsheet*. Use this to contact the regular suppliers of official information. For starters, I recommend the *Aerad En Route Supplement Europe & Middle East* as well as the charts EUR 1/2 and H201/202. These show reporting points such as MERLY out in the Bristol Channel half-way between Land's End and Pembroke. Note that I can't supply the Factsheet myself and that all replies are in this column, never direct.

Up-to-date frequency changes


**Jodel D.120** *Christine Mlynek*

## Abbreviations

| | |
|---|---|
| ACARS | Aircraft Communications Addressing & Reporting System |
| FL | flight level |
| g | grams |
| h.f. | high frequency |
| kHz | kilohertz |
| LATCC | London Area & Terminal Control Centre |
| MHz | megahertz |
| NOTAM | NOTice to AirMen (includes AirWomen) |
| PPL | Private Pilot's Licence |
| v.h.f. | very high frequency |
| v.o.r. | very high frequency omni-directional radio range |

are promulgated by *NOTAM*, an expensive facility that I can't afford but which might be on display at your local airfield or flying club. Do ask before inviting yourself in!

## Frequency and Operational News

W. Vincent is close to one of Concorde's fixed routes and supplies some of the applicable frequencies: LATCC 126.075 and 132.8MHz. The company frequency of 131.9MHz remains unchanged as far as I know. The Atlantic crossing is controlled on the same h.f. channels as other aircraft. On our side, Shanwick consists of controllers at Prestwick linked to radio operators at Shannon. My information is that the link is by land-line teleprinter so **Geoffrey Rees** (Neath) can forget about 'hacking' in to it! Besides, the information is exactly the same as sent/received by the Shannon operator.

Heathrow has had two ground movements frequencies available for some time, but now Ray Whiting notes that the northern parallel runway is controlled on 121.9 whilst the southern one is handled by 121.7MHz.

## In the Cockpit

Continuing from last month, here's more about the Automatic Direction Finder (ADF) that picks up signals from Non-Directional Beacons (NDBs). Two antennas are needed. The first has precise directional properties, conventionally consisting of a loop like a big coil of wire. This can be rotated until the minimum received signal (the null) is obtained and, from the direction in which the loop is now pointing, a line can be plotted along which both the aircraft and NDB lie.

Where's the catch? The loop is incapable of determining which way along the line the beacon lies. Say the loop gives a null when pointing roughly left-to-right at right-angles to the aircraft's path. Where's the beacon? Is it left of the aircraft, or is it to the right? An error here would result in the pilot flying in exactly the opposite direction to that required! A simple sense antenna (usually a straight wire) resolves the ambiguity when the phase of the signal on the two antennas is compared. That's how the pointer on the RMI instrument (see last month) can be driven in exactly the right direction.

These days, loops aren't mechanically rotated but two loops at right-angles are sensed electronically. They're often found above the fuselage, near the front, in quite discreet bumps. The sense wire is plainly visible on some aircraft types. Next time: how the ADF helps in flight.

The next three deadlines (for topical information) are May 12, June 16 and July 14. Replies always appear in this column and it is regretted that no direct correspondence is possible. Genuinely urgent information/enquiries: 0181-958 5113 (before 2130 local please).

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

# Info In Orbit

Recent announcements concerning the future of METEOSAT and the polar orbiting WXSATs provide both interest (in the design of the new equipment scheduled for launch), and concern (regarding the desirability of continued amateur reception). My own view remains positive - I am sure we will learn to cope!

## Current WXSATs

For the second time, the American WXSAT NOAA-10 remained transmitting a.p.t. on 137.50MHz during its v.h.f. clash with NOAA-12 in early March. It was belatedly switched off around March 10, but not before the strange effects of interfering transmissions were experienced for several days. NOAAs 9 and 14 continued routine a.p.t. transmissions on 137.62MHz and beacon telemetry on 137.77MHz. NOAA-9 is now effectively in a morning, descending orbit, providing us with well illuminated images around 1030UTC; NOAA-12 passes over around 0645UTC when solar illumination is relatively low. NOAA-14 is the official early afternoon ascending orbiter, providing well-illuminated images a little after midday.

METEOR 3-5 continued routine daylight-only transmissions on 137.85MHz during its north-bound passes. It is a long time since we have seen any METEOR infra-red transmissions!

The puzzle of the month came in a telephone call from **Brian Dudman** of Harrow, who told me that he had heard just two minutes of a.p.t. from a satellite on 137.30MHz - a frequency not heard for many a month. I missed that transmission, but reports elsewhere indicate that the old oceanographic satellite COSMOS 1766 may have briefly operated on February 6 at about 1000UTC.

OKEAN-4 appeared to remain dormant for some weeks after its initial burst of activity, following an autumn launch. I did not monitor any transmissions after early January, until a letter and picture arrived from **Les Hamilton** of Aberdeen. He witnessed a most unusual transmission sequence from OKEAN; on February 26 Les recorded a transmission at 0703UTC - see **Fig. 1** - showing the classic coastline features of Norway. The image shows the number sequence, that represents the operational state of equipment onboard the satellite, and the elapsed time since midnight in Moscow. The same image was re-transmitted on the following orbit, with greater clarity.

Les's Aberdeen home is favoured for OKEAN transmissions; living in the west country and having houses rising to the east, I can only receive OKEAN telemetry when the satellite rises above some 7-10° elevation.

The picture in **Fig. 2** is also from Les; an OKEAN image from March 5 showing microwave, radar and visible-light sections. Les points out that ice can be seen in the White Sea, and that major cities - such as Moscow - show up well in the radar image. Inland waterways can be followed, but unfortunately the visible section is almost completely clouded out. Les uses a crossed-dipole antenna, tilted about 20-30° to the horizontal, pointing virtually due north for OKEAN passes.

For those new to the WXSAT scene, I should explain that the crossed-dipole antenna, phased to receive right-circular polarisation, is one of the most suitable antenna designs for polar weather satellite reception, where picture decoding is planned. Such antennas have a characteristically wide angle of reception, but not quite omni-directional, so are normally pointed vertically, in which position they can receive signals over a significant section of the local sky. In the absence of interference, horizon-to-horizon reception will be achieved. For those living in a location where there is a good eastern horizon, the antenna can be optimised for easterly passes by tilting it, as Les has done. Les also reports having received excellent NOAA-10 images as the satellite passed near the North Pole. Living in Aberdeen obviously has its advantages! My thanks to Les for these and other interesting WXSAT images - held for a future edition.

## METEOSAT - The Future

The METEOSAT Operations Programme (MOP) officially ends on November 30. However, users should not notice anything unusual at one minute past midnight because the METEOSAT Transition Programme (MTP) follows immediately. This programme continues until the end of the year 2000, when METEOSAT Second Generation (MSG) operations commence. For beginners, it might be helpful for me to summarise the present situation.

METEOSAT-5 is a geostationary WXSAT (weather satellite) that transmits a considerable amount of varied data. If you buy or construct suitable equipment, you can receive WEFAX (weather facsimile) images. You need either a dish or Yagi for

**Fig. 1: OKEAN-4 February 26 from Les Hamilton.**

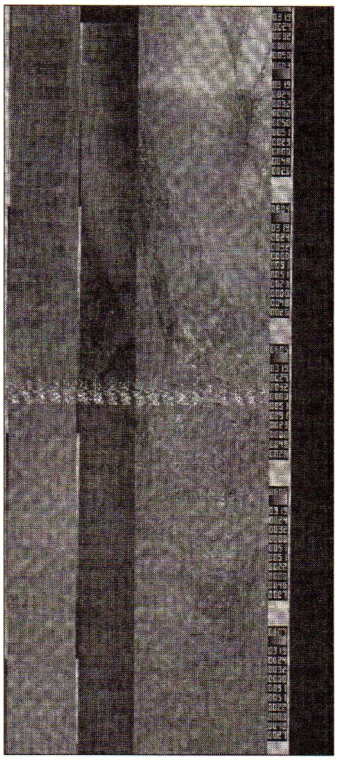

**Fig. 2: OKEAN-4 March 5 from Les Hamilton.**

reception of the 1691MHz (or 1694.5MHz) signal, a good pre-amp, a down-converter (to change the 1691MHz signal down to 137.50MHz for feeding a conventional WXSAT receiver), or a direct METEOSAT receiver, and finally a decoder and software. Suitable complete systems are advertised around the £800 mark - assuming you already have a suitable computer.

At this point I am ignoring Primary Data Systems (PDUS), for simplicity. The equipment mentioned should be capable of receiving virtually noise-free WEFAX images, every four minutes, from METEOSAT-5, currently positioned at 0° longitude. METEOSAT's neighbours include METEOSAT-6 (also known as MOP-3), which has an image anomaly still being examined.

Each image transmitted, originates from a high resolution image taken every 30 minutes. This is split into several sections, some of which are then transmitted as one of the four minute formats - called WEFAX images. The main channel for WEFAX is A1 on 1691MHz, but some very interesting WEFAX images are also transmitted on channel A2 on 1694.5MHz. For those who would like a copy of the METEOSAT transmission schedule, just send me an s.a.e., enclosing one extra stamp towards copying costs.

The METEOSAT Transition Programme includes the construction and launch of METEOSAT-7, currently scheduled for launch by EUMETSAT at some stage after mid-1996.

## METEOSAT Second Generation - 2000AD

The MOP satellites form the METEOSAT First Generation, and carry the standard 3-channel imaging radiometer, producing visible, infra-red and water vapour images. Each satellite carries enough fuel for five years of station keeping - the process in which thruster rockets are occasionally fired to keep each METEOSAT in its geostationary orbit - 35 800km above earth.

The MSG satellites are a generation ahead, compared to the MOP series. They are designed to carry a 12-channel enhanced radiometer, and enough fuel for 10 years of station keeping. The imaging specifications are enough to really whet the appetite! Eleven of the channels will produce images having an on-ground resolution of 3km (METEOSAT Primary Data currently provides down to 2.5km resolution in the visible-light image); the 12th channel will be dedicated to High Resolution Visible (HRV) imaging at 1km (better than NOAA). These images will be received every 15 minutes.

I will leave further detailed descriptions of the MSG satellites for a future column. This significant system upgrade for the new generation of METEOSATs will inevitably require a new generation of METEOSAT hardware and software for routine 'amateur' involvement. When you realise the enormous strides made by computer manufacturers during the last few

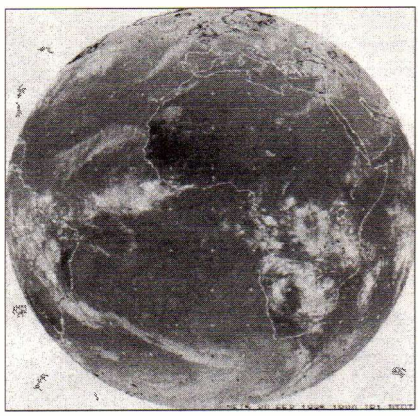

**Fig. 3: DTOT - METEOSAT image from Geoff Chance.**

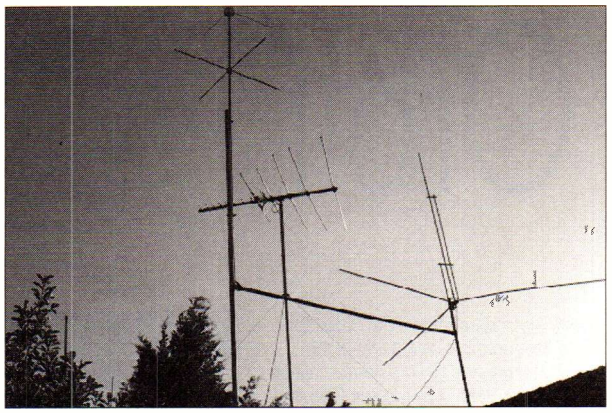

**Fig. 4: WXSAT antenna from Gordon Griffin.**

years, I take the view that 'amateur' priced hardware may well become available when it is wanted.

Meanwhile, during the next few years, newcomers to METEOSAT reception will increasingly need to appreciate what is just around the corner. This column will keep you informed. My grateful thanks to EUMETSAT for providing this information on the METEOSAT programme via their specialist publication Image.

## Birddog - New Version

As mentioned in a previous month, some problems were discovered after updating the Birddog satellite predictions program, using recent (1995) Kepler elements. The problem was two-fold. Some satellites displayed negative orbit numbers, then, during January, some new elements produced wrong positions for some satellites - they were shown about 100° longitude off their true positions.

The day after I noticed this effect, a letter came from **Geoffrey Chance** of Redruth reporting the same problem. Not all elements produced the problem but once a 'bug' is discovered the reliability of other calculations can be suspect.

Geoffrey examined the problem and found that a 'fix' could be done by reverting to 94 and adding 365 days to the epoch. However, the bugs appear to have been completely removed with the latest release - version 3.0 - of Birddog. Les Hamilton received this revision, apparently originating from the Internet, and kindly forwarded a copy to me. I have been running it - together with other programs currently under test - and it has behaved well. Anyone wanting a copy can write to me, enclosing a 3.5in disk with pre-paid return package, and one extra stamp.

## Letters

Correspondence for 'Info' comes from readers all over the world. **Gordon Griffin** now lives in Waitara, New South Wales, Australia, where he uses a 486 computer running PC GOES/WEFAX version 4 (I have yet to see that one). Gordon mentions using a scanner to tune into satellite beacons and a.p.t.

## Today's TIP

I also use a general purpose scanner to monitor NOAA beacons, as well as using a purpose-designed WXSAT receiver for monitoring a.p.t. As often mentioned in the frequency list at the end of the column each month, NOAAs use either 136.77 or 137.77MHz for beacon telemetry. NOAAs 10 and 12 use 136.77MHz, NOAAs 9, 11 and 14 use 137.77MHz.

The beacon contains a variety of both housekeeping data (measurements of a routine nature, such as temperatures), and from each of the onboard scientific monitoring experiments - HIRS, SSU, MSU, SBUV/2, SEM, DCS, spacecraft pointing data, and more - much of which I summarised in the February column. All this information is produced by the Tiros Information Processor - known as the TIP.

Technically, the signal baseband carries data at 8320 b.p.s. using split-phase, phase-shift keyed (PSK) modulation. Although it is possible to build hardware to decode this information, I have not heard of anyone who has done so; the most interesting data is normally the a.p.t. (picture) signal. For those (like me!) who are fascinated by the prospect of monitoring satellites which are 'off', try tuning into the beacons of NOAAs 9, 10 and 11 when they are not transmitting a.p.t. You should find that the NOAA 9 beacon remains detectable during the a.p.t. 'off' periods. As I wrote this, my scanner detected the NOAA-11 beacon (137.77MHz).

As Gordon mentions, it is possible to use a general purpose scanner in w.f.m. (wide-band f.m.) mode to hear WXSATs well enough to decode their a.p.t. The problem with this is that the antenna provided with such receivers is far from suitable - having poor characteristics for receiving right-circularly polarised radiation from a spinning satellite! In addition, the bandwidth in w.f.m. mode is far greater than needed for a.p.t. signals.

My Tandy PRO-2004 scanner has a quoted selectivity of ±150kHz (-6dB) in this mode - typical of similar units - and is therefore relatively insensitive to a.p.t. Allowing for Doppler effects, a.p.t. needs a receiver designed to have an i.f. spectrum bandwidth maximum of 50kHz.

To further clarify this point, remember that the a.p.t. signal from the WXSAT contains a spectrum some 30kHz wide. If the satellite was stationary with respect to the ground, then a receiver with this bandwidth could cope. The (Doppler) effect of the relative movement of the satellite adds another 20kHz to the signal, resulting in a final spectrum containing up to about 50kHz bandwidth. This is the reason for the need to use purpose-designed receivers.

Judging by the details in Gordon's letter, he has constructed his own antenna. It incorporates four welding rods as the main radials, fitted into an electrician's junction box. He drilled holes, then used a brass collar for soldering. Wiring was done using 72Ω 428mm coaxial cable, and the radials were fixed using epoxy cement. Such is the detail kindly provided by Gordon that I wondered whether it could make a separate article. From the various pictures that he sent me, I selected a picture that shows his other antennas as well.

## Those GMS Grids

Images from the geostationary WXSATs - METEOSAT, GMS and GOES - have grids showing major intersections of latitude and longitude, superimposed by the satellite image data processors. The use of software filters can sometimes minimise the obtrusiveness of these grids. A reader from Neath asked me whether I could use my 'influence' to persuade the authorities to remove the gridding from the images! Oh, that I had such power!

## New Products

I have just taken delivery of a METEOSAT Yagi, data decoding system and down-converter. I am particularly pleased with this opportunity to review these products following several requests from readers, so look out for this in a future edition.

## New Technology

A number of correspondents have written to me about their WXSAT equipment, mentioning that they are not able to produce good quality printed pictures from a 9 or 24-pin printer. I am pleased to mention that I can now take images on standard PC disks, in any of the well-known formats e.g., GIF, PCX, JPG, TIF, for possible inclusion in the column. Pictures should be of good quality, and I would appreciate an s.a.e. for the return of the disk. If you prefer to send printed copy, that is fine - I suspect that most pictures will continue to be provided in this manner.

## Computer Networks

Several years ago I worked on satellite projects at the Rutherford Appleton Laboratory (Oxfordshire), during which time various computer networks were being set up. One of these became known as Janet - the Joint Academic Network, allowing easy communications between universities and similar establishments. Other computer communications systems have been developed, particularly in America, and perhaps the most famous of these is the Internet.

Probably all of the official organisations involved in satellite planning and operations have involvement on the Internet, as, it seems, do a variety of non-scientific establishments. I am collecting lists of Internet sites/addresses that provide current WXSAT images, rather than those that keep archived images. If any readers find newly established sites I will be pleased to receive details for future inclusion. Meanwhile - happy surfing!

## Shuttle Info and Kepler Elements

1: For a print-out of the latest Shuttle schedule or WXSAT elements, send an s.a.e. and separate, extra stamp for each. All WXSATs plus MIR are included, together with transmission frequencies if operating. This data originates from NASA.
2: I now send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (plus four self-addressed, stamped envelopes or international reply coupons) for four editions. Foreign requests can forgo the £1!
3: You can have a computer file containing recent elements for the WXSATs, and a large ASCII file holding elements for many satellites. A print-out is included, identifying NASA catalogue numbers (for the WXSATs, Amateur Radio satellites, and others of general interest), in date and object format. Please enclose £2 with your PC-formatted disk and s.a.e.

## Frequencies

NOAAs 9, 14 a.p.t. on 137.62MHz;
NOAAs 10, 12 on 137.50MHz;
NOAA beacons (including N-11) on 136.77 and 137.77MHz;
METEOR 3-5 a.p.t. on 137.85MHz. and OKEAN-4 may use 137.40MHz occasionally.

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# SKY-NEWS

### SYNOP now available for most PC decoders

SkyComm have released a new version of the popular Skyview Systems SYNOP program aimed at users of third party decoders.

The 5 figure groups that many people decode from a RTTY signal can now be turned into impressive weather maps by using "Weather Chart", developed from their present SYNOP product.

So if you can decode RTTY and save it to disk using your PC, then you can now have ability to convert those 5 figure groups to intelligent data.

**Skyview WeatherChart Only £49.95**

### Icom Control Software with New Interface

Computer aided control of Icom receivers will now be a lot more affordable thanks to the latest version of ICRX from Skyview Systems.

The latest version is supplied complete with RS232 interface known as the IF-ICOM, which is contained within a 25 pin D-Type connector.

ICRX provides a host of features including signal meter, frequency control, large frequency display, squelch and a data base memory management system.

ICRX .....£44.95
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**Tel: 01206 823185 Fax: 01206 825328**

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5 varied flights giving nearly two hours of aviation video with full ATC chit-chat. Includes an overhead join and landing at WELSHPOOL in a C172, an approach and landing at PRAGUE in a CSA B737-500, LARNACA-PAPHOS-LARNACA from the right hand seat of a Grob 115a, LARNACA-BEIRUT-LARNACA, Great aerial footage of BEIRUT and its Airport in a Cherokee Archer 2. Back to PRAGUE this time in a CSA TU154m with a chatty crew.

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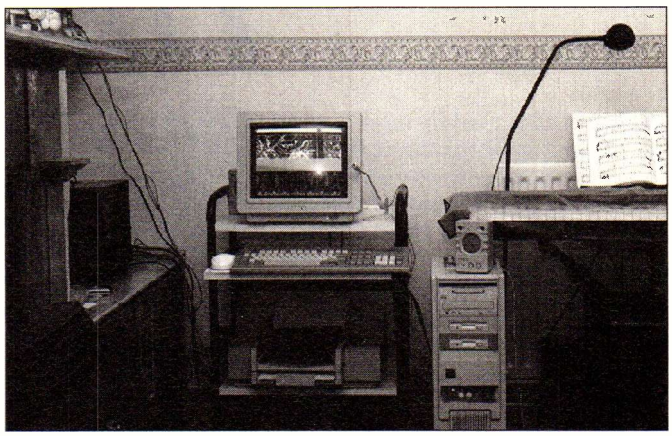
# Decode

## All the Data Modes



**Les Crossan's Decoding Station.**

After reading my review of the PRO-2035 and my comment about a mono-wired headphone socket, **Geoff Halligey** of *Confidential Frequency List* fame has dropped me a note pointing to the range of adapter systems available from Maplin Electronics. According to Geoff, Maplin list a wide range of adapters for mono to stereo use, 3.5 to 6.3mm and many others. If you'd like to know more you can usually find the catalogues on sale in W.H. Smith.

**Les Crossan** of Wallsend has sent in this month's shack photo. The picture shows Les's station hard at work decoding a FAX chart from USN Norfolk in the early hours of the morning on 3.357MHz. You will note that his HF-150 receiver is nowhere to be seen! This is a deliberate ploy to reduce interference - it's actually kept on the other side of the room.

In his latest letter, Les at last reports success in curing a particularly bad interference problem. Not only did the interference wipe out his h.f. listening but he was also suffering interference to his TV picture. After lots of investigating using his Sangean ATS-803A as a portable detector, the problem was traced to his neighbour's video recorder. The machine in question was a JVC all singing and dancing unit with Nicam stereo, etc. It was shipped off to the local dealer where he was told the problem was caused by the modulator and it was going to be expensive. Unconvinced, Les took on the problem himself and located it to a faulty internal shield in the chopper transformer (£10 to fix).

### What Decoder

Regular readers will know that I'm currently canvassing the views of Decode readers to help me compile my *What Decoder FactPack*. This will attempt to cover all the current decoders plus a good selection of those that are to be found on the second-hand market. So far I've had a very good response, but if you would like to contribute it's not too late. Just send as much detail as you can on your equipment and in particular your views on decoders that you've owned. I'm particularly interested in your view as an operator.

### FAX Definition

Once you've started receiving your first FAX images, most people start looking for ways to improve the quality of the received image. There are several factors to consider, so this month I'll run through some of the details.

If you're looking for good quality images the very first thing you need is a good clean signal. It's not so much the strength that counts as the lack of any interfering signals. Both intermittent bursts and continuous interference sources will have an adverse effect of the FAX image. Any interfering tones or heterodynes will tend to show-up as horizontal stripes. However, static crashes and other impulsive noise usually shows as extra dots on the image.

Perhaps more serious in terms of image corruption is the part played by the prevailing propagation conditions. You will no doubt have already noticed that propagation conditions are highly variable and have a dramatic effect on the received signal. This is precisely why most major FAX stations operate on a range of different frequencies. These frequencies have been chosen to provide reliable coverage to the target area under all normal propagation conditions.

The trick, of course, is selecting the right frequency as it's not always the strongest that's the best. So how do you select the right channel? Probably the simplest way is to use the strongest signal that produces clean copy. You should always monitor the frequency for a few minutes to make sure the frequency really is clear and stable. Points to watch out for are interference from adjacent stations, noise, fading and multi-path distortion. I've covered this latter point before in this column, but the effect shows itself as smearing of the image, in some cases a ghost image appearing next to the original. If you have any multi-path distortion the only solution is to change frequency.

Having selected the best frequency, there are some receiver adjustments that can be crucial to the image quality. The first is the selection of the receiver's intermediate frequency bandwidth. The facility to adjust this bandwidth is only available in a few receivers so you may just have to accept the default setting. However, where you have the choice of bandwidth it's important that you select this wisely. Whilst it's very tempting to wind in the bandwidth to cut out noise and interference there are drawbacks. The important point is the bandwidth required by the fine detail in the chart. If you think about the FAX transmission process you will remember that the chart is wrapped around a drum and spun at 120 r.p.m. A scanner then moves slowly along the drum to convert the chart into an electrical signal.

Let's now consider the information that has to be sent for a single line of the chart. To understand the problem I'm going to calculate the speed at which the chart passes under the scanner. We can then use this information to see just how tiny the signal would be for a thin line on the chart.

For this example, let's use a typical meteorological chart with a width 470mm. Now with this chart wrapped around a 152mm diameter drum and spun at 120 r.p.m., we can calculate the speed in mm per second that the chart must be passing under the scanner. First convert the drum speed to revs per second by dividing 120 by 60 = 2 revs per second. Now we can work out the chart speed in mm per second which is the chart width of 470mm x 2 revs per second. This gives a final speed of 940mm per second.

If we now use this basic information to look at our FAX signal you can see that a 1mm thick line on the chart would cause the FAX signal to swing from white to black for 1/940th of a second or 1.06 milliseconds (ms). A return to some basic maths will show that a signal with a period of 1ms is equivalent to a 1kHz . This is well within the capabilities of our s.s.b. receiver so this should be reproduced without problem. Now a 1mm line is really quite thick and the fine detail on some charts may only be 0.2mm wide. In this case the FAX signal will move from white to black for just 0.2 milliseconds. This equates to a 5kHz tone and is likely to be well outside the passband of most communications receivers. I hope you can now see that a narrow bandwidth in your receiver will effectively filter-out the fine detail of a FAX chart.

This effect is not only present when using tight i.f. filters but also when using external audio filters. In practice, you usually have to make a compromise between the reduction of noise through filtering and the loss of fine detail in the chart.

One other point to watch, particularly with external filters, is group delay and ringing. Group delay is where different frequencies pass through the filter at different speeds. The difference in speed is usually very slight but it can cause adverse effects on the FAX image. Ringing is exactly as the name implies and can cause an effect very similar to multipath propagation with smearing or ghosting of the image.

The best approach to take is to set your receiver and filter controls to give what appears to be the best image. Then try switching the filters in and out to check that the image really has been improved. As with most things in life you have to accept that FAX reception on the busy h.f. bands will always be a compromise.

### APT Modes

**Alastair McIntyre** of Glasgow has recently written asking what are the best APT modes to use for receiving Bracknell, Hamburg and Northwood. I often receive questions on this topic so let's just run through the details. So what is APT? The term relates to Automatic Picture Transmission (APT). This is a system that was developed for commercial FAX stations to enable unattended operation. The practicalities of FAX transmission using paper charts first requires the operator to load the chart and then start the FAX machine using the optimum drum speed and Index Of Co-operation (IOC). At the receiving end, the machine also needs all this information to ensure that the received picture is properly synchronised and proportioned. The answer lies in the controls signals transmitted as part of the APT process. Let's just run through a typical transmission to see how it works.

Once the chart has been loaded and is ready for transmission the start sequence begins. This starts with a start tone which is used to communicate the IOC of the signal. The two standard tones for this are 300Hz for IOC 576 and 675Hz for IOC 288.

Next comes the drum speed synchronising sequence. This comprises a 30 second transmission

of alternate black and white signals that run at the precise drum speed. Common values are 1Hz for 60 r.p.m., 1.5Hz for 90 r.p.m. and 2Hz for 120 r.p.m. This start-up signal can either be equal durations on black/white or more commonly 5% white and 95% black. From this signal the receiving FAX machine not only knows the exact drum speed but also the location of the edge of the image. This latter point is vital for correct alignment of the chart.

Next comes the chart detail which can take up to 15 minutes to send. Once this is complete, a five second 450Hz stop tone is sent followed by ten seconds of continuous black.

As you can see, the APT process is really quite simple but remarkably effective. I frequently use APT for unattended reception of extended periods with great success. The only APT problems I've noticed tend to be caused by noise at the receive end. This is because some software based decoding systems are a little too keen to start and will falsely detect a start tone from noise!

Just to conclude, I've shown a sample chart that illustrates a range of propagation effects. Although the chart initially looks very poor, a close inspection will reveal that there are two vertical stripes where the quality is really very good. This variation in quality is caused by the changing propagation during the transition between day and night. The remainder of the chart shows the smearing caused by multipath propagation effects.

## Internet Update

Activity continues to grow and there is now quite a healthy range of services available to support the short wave listener. The only problem is that the information is constantly changing so it's quite a challenge to keep up-to-date. However, there are a number of shortcuts you can take to help you find new information quickly. One of these is to make use of the Internet's search facilities. One of my favourites is YAHOO at Stanford University in the USA. The site is accessed using a World Wide Web browser and connecting to http://akebono.stanford.edu/yahoo/. Once connected you can run a search on any phrase or word you choose. The results are then displayed with short summaries of the findings. To find short wave information sources just type short wave in the search field.

The other way to keep up-to-date is to seek out Usenet groups that cover your interests.

If you enjoy surfing around the Net looking for new software a good document to get hold of is ham-ftp.zip. This file maintains a list of all Internet sites that carry amateur radio information. The home site for this list ftp.netcom.com in directory /pub/VE3SUN/ham_ftp.zip. According to **Ken Michaelson**, a Usenet group worth a look is aus.radio. If you have any information on hot sites please let me know.

## Shifts

**Robert Mason** of Kilwininng in Ayrshire uses a Yaesu FT-747GX transceiver with a 15m wire antenna, Pervisell interface plus Hamcomm and JVFAX for decoding. All is working very well except he's not too sure about the use of shifts when receiving RTTY signals. Whilst HAMCOMM, like most other systems, is pre-set with 170, 425 and 850Hz, many signals seem to use 400Hz. He asks how important is setting the correct shift.

The reason HAMCOMM uses 170, 425 and 850Hz shifts is that this is the standard range of shifts used by amateurs (nowadays most use just 170Hz). Now, those of you with decoding systems that can calculate or measure the shift of live signals will know that most commercial stations use 170 or 400Hz shifts. The question is can you successfully receive 400Hz shift signals using a decoder that only has 425Hz available. You'll be pleased to hear that the answer is a firm yes. With most decoding systems, the filtering associated with setting the shift size shift settings have a comparatively wide bandwidth. This means that a 425Hz system is fine with 400Hz shifts and vice versa. You are only really likely to come unstuck if the shift settings are widely mismatched.

## New Modes

Back in February I reported on what could well be a new transmission mode on h.f. The signals had been noted by **Mike** of Bath. Well, it appears that the 250 baud 850Hz signals is not DUP-ARQ after all but an ASCII (ITA5) alphabet based FEC system.

I've also heard from a listener in Switzerland who has logged several occurrences of the 288 baud ARQ-E signals as follows:

13.0734MHz, 328Hz shift, 1034-1142UTC

13.4189MHz, 170Hz shift, 1034-1142UTC

10.7494MHz, 334Hz shift, 1625 & 1801UTC

10.348MHz, 170Hz shift, 1735UTC

16.3124MHz, 346Hz shift, 1428UTC

If you have any further information on these transmissions please write and let me know.

## Decode Special Offers

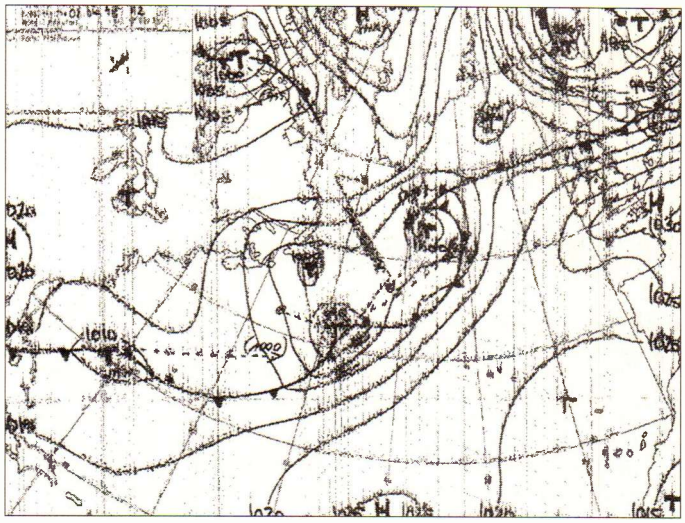
Here's a summary of the readers offers currently available.

IBM PC Software: JVFAX 7, HAMCOMM 3

Literature: *Day Watson Beginners List, Decode List, Complex Modes List, FactPack 1 - Interference, FactPack 2 - Decoding Accessories, FactPack 3 - Starting-Out, FactPack 4 - HAMCOMM/JVFAX Primer, FactPack 6 - Internet Starter.*

To receive any of these offers just send a self addressed sticky label plus 50p per item or £1.50 for 4, £2.50 for 6 or £3.00 for 8 items, £4.00 for 9 or 10 items. If you're ordering JVFAX or HAMCOMM you will also need to send a blank formatted 720kb disk for each program or just one 1.4Mb disk.

I've had a couple of un-named disks that have recently become separated from any letter. If you have been waiting more than three weeks, let me know. Finally, as we approach the summer months, please bear in mind we may have escaped for our annual holiday, all orders will be sent out as soon as possible once we return.



**Distorted fax image refered to in text.**

## Frequency List

This month's frequency list comes courtesy of **David Holman**, **Guy Denman**, Les Crossan and **Day Watson**. Frequencies in MHz.

| Freq (MHz) | Mode | Speed | Shift | Call | Time | Notes |
|---|---|---|---|---|---|---|
| 3.172 | RTTY | 50 | 850 | IMB1 | 1808 | Rome met |
| 3.280 | FAX | 90 | 576 | RBX 70 | 1914 | ashkent Meteo |
| 3.357 | FAX | 120 | 576 | NAM | 0834 | USN Norfolk |
| 3.360 | FAX | 90 | 576 | RPN 71 | 1955 | Kiev Meteo |
| 3.810 | FAX | 90 | 576 | RST 75 | 2000 | Minsk Meteo |
| 3.875 | FAX | 120 | 576 | RCI 72 | 1720 | Moscow Meteo |
| 4.2125 | FEC | 100 | 170 | WOO | 0130 | USA Ocean Gate |
| 4.525 | FAX | 120 | 576 | RPN 75 | 2002 | Kiev Meteo |
| 5.240 | RTTY | | 425 | 4OC 2 | 2124 | Belgrade Press (TANJUG) |
| 5.285 | FAX | 90 | 576 | RBX 71 | 0040 | Tashkent Meteo |
| 5.755 | FAX | 120 | 576 | AXI 32 | 2135 | Darwin Meteo |
| 5.850 | FAX | 120 | 576 | OXT | 0045 | Copenhagen Meteo |
| 6.4525 | FAX | 120 | 576 | GYA | 1148 | Royal Navy |
| 6.880 | FAX | 120 | 576 | RAN 77 | 1006 | Moscow Meteo |
| 6.950 | FAX | 90 | 576 | RJK 78 | 0838 | Kiev Meteo |
| 7.535 | FAX | 120 | 576 | AXI 33 | 140 | Darwin Meteo |
| 7.640 | FAX | 90 | 576 | RST 76 | 0844 | Minsk Meteo |
| 7.750 | FAX | 120 | 576 | RAW 78 | 0845 | Moscow Meteo |
| 7.806 | RTTY | 50 | 425 | YZD 7 | 2127 | Belgrade Press (TANJUG) |
| 7.880 | FAX | 120 | 576 | DDK 3 | 1724 | Hamburg Meteo |
| 8.028 | ROU-FEC | 164.5 | 400 | V5G | - | MFA Budapest |
| 8.040 | FAX | 120 | 576 | GFA 23 | 0846 | Met Office Weather Fax |
| 9.900 | FAX | 120 | 576 | NPG | 0847 | USN San Francisco |
| 11.132 | RTTY | 50 | 400 | BZG41 | 1450 | XINHUA Bejing |
| 11.536 | RTTY | 50 | 400 | HMF49 | 1820 | KCNA Pyongyang |
| 12.165 | FAX | 90 | 576 | RKB 78 | 0902 | Moscow Meteo |
| 12.185 | RTTY | 50 | 400 | - | 1812 | JANA Tripoli |
| 13.366 | RTTY | 50 | 400 | 5YD | 1736 | Nairobi flight data |
| 13.470 | FAX | 90 | 576 | RKU 71 | 0951 | Moscow Meteo |
| 13.876 | ARTRAC | 125 | 170 | HGX21 | 1502 | MFA Budapest |
| 13.947 | FAX | 90 | 576 | ROM 5 | 1119 | Tashkent Meteo |
| 14.436 | FAX | 120 | 576 | GFE 23 | 0954 | Met Office Weather Fax |
| 14.573 | RTTY | 50 | 400 | - | 1734 | JANA Tripoli (Arabic) |
| 14.982 | FAX | 90 | 576 | RBV 76 | 0954 | Tashkent Meteo |
| 15.950 | FAX | 120 | 576 | RBI 77 | 0955 | Moscow Meteo |
| 18.261 | FAX | 120 | 576 | GFE 24 | 0956 | Met Office Weather Fax |

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

# LM&S

## Long, Medium and Short Waves

The information here is based on reception by UK listeners and other countries during February. In view of the deteriorating conditions in the higher frequency bands, some international broadcasters may alter their short wave schedules at the end of March. Such changes will be in the LM&S data in the June *SWM*.

### Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless stated, all logs compiled in the four weeks ending February 28.

During the evening of February 5 the sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanissetta, Italy on 189 reached the UK. In Woking, **John Eaton** logged them as SINPO 33343 at 2240UTC.

After dark, **John Stevens** (Largs) found that the signals from Poland via Raszyn on 225 often suffer from co-channel interefence, so far he has been unable to identify it. It seems likely that he is hearing the sky waves from the 600kW transmitter at Van, Turkey that shares 225.

Listeners who search this band on a regular basis at night may have noticed that the broadcasts from Oslo, Norway on 216kHz have ceased. The 200kW transmitter was 40 years old and it was becoming both expensive and difficult to maintain, so NRK decided to stop using it from January 4.

### Medium Wave Reports

The reception at night of m.w. broadcasts over transatlantic paths was reported by several listeners in the UK. **David Edwardson** (Wallsend) searched the band each night during the early part of February. Sometimes he picked up very weak signals from VOCM in St.John's on 590 before 2200! Usually they improved later. He logged CJYQ in St.John's on 930 as 24432 at 2318 and WQEW in New York on 1560 as 24542 at 2325. WTOP in Washington on 1500 and WSSH Boston on 1510 were audible around dawn.

Over in Co.Fermanagh, **Paul Logan** (Lisnakea) was able to receive the broadcasts from several stations in C/S.America during some nights in the first half of the month. Among the entries in his log were the Caribbean Beacon, Anguilla on 1610 at 0151; Harbour Lt, Grenada 1400 at 0210; R.Taino, Cuba 1180 at 0228; R.Globo, Sao Paulo Brazil 1100 at 0231; R.Vibracion, Carupano Brazil 1470 at 0250; Caribbean Christian R and Grand Turk 1020 at 0300. On the 15th he logged CBG Gander on 1400 at 0315, but better reception from Canada and the USA was evident on the 20th, when he heard CHCM in Marystown on 740 at 0050; WINS New York 1010 at 0135 and WQEW New York at 0155.

Down in E.Worthing **Ron Damp** also found the conditions favourable on the 20th. He was able to receive CJYQ on 930, albeit faintly, while using his Sangean ATS-803A portable with internal ferrite rod! He then brought his large home-built spiral loop into play and logged their signal as 32222 at 0016.

Favourable conditions also occurred on the 21st. While using a Sangean ATS-803A portable, **Paul Bowery** (Burnham-on-Crouch) logged CFBC in St.John on 930 as 13211 at 0004; VOCM as 14432 0200; CJYQ as 13332 at 0217 and WBBR in New York on 1130 as 11321 at 0236. Up in Derby, **Roy Patrick** received a fairly good signal that night from WSSH at 0005.

On the 24th Roy listened to an all sports programme broadcast at 0015 by WLPZ in Portland on 1440. **Harry Richards** (Barton-on-Humber) found that CJYQ was clearly audible on 930 and by 0020 their signal was 23222. He then tuned to 1510 and heard a broadcast from WSSH in Boston. At first their signal was 24232, but by 0130 it was peaking 34332.

Following Paul Logan's reception in December of the sky waves from the Kenya BC 20kW outlet at Nakuru on 1386kHz, **Eddie McKeown** has kept a careful check on that frequency in Newry. He picked up their transmission at 0200 on one night in February, noting it as 25211. The sky waves from stations in the Middle East and N.Africa also reached the UK after dark, see chart.

Up in Lanarkshire **Arthur Grainger** (Carstairs Junction) compiled an extensive local radio DX log. He found reception unusually good in daylight and heard BBC R.Solent via Bournemouth on 1359 for the first time at 1328, when it peaked 22222.

### Short Wave Reports

The **25MHz (11m)** band is no longer being used by international broadcasters.

Conditions in the **21MHz (13m)** band have varied from day to day. When favourable, R.Australia's Darwin broadcast to Asia on 21.725 (Eng 0900-1100) could be heard here. It was 43323 at 0900 by **Norman Thompson** in Oadby and 33322 at 0950 by **Robert Connolly** in Kilkeel.

Sometimes, broadcasts from other areas could be heard here quite well. Among those noted in the morning were R.Japan via Moyabi 21.640 (Jap to Eu, M.East 0800-0900) 45444 at 0857 by **Tim Allison** in Middlesbrough; R.Pakistan Islamabad 21.475 (In to SE.Asia 0900-1000) 24322 at 0909 by **Rhoderick Illman** in Oxted; R.Nederlands via Flevo 21.505 (Eng to Far East, Pacific 0930-1025) 42432 at 0930 by **Gerry Haynes** in Bushey Heath; UAER, Dubai 21.605 (Eng to Eu 1030-1055) 55444 at 1040 by **Michael Griffin** in Ross-on-Wye; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 43333 at 1200 by **Bernard Curtis** in Stalbridge.

In the afternoon HCJB Quito 21.455 (Eng, u.s.b. + p.c.) was SIO244 at 1245 with **Kenneth Buck** in Edinburgh; UAER, Dubai 21.605 (Eng to Eu 1330-1355) as 54444 at 1330 by **Sheila Hughes** in Morden; BBC via Limassol 21.470 (Eng to E.Africa 1400-1615) as SIO111 at 1402 by **Julian Wood** in Elgin; Monitor R.Int via WSHB 21.640 (Eng to E.Africa 1600-2000?) 44344 at 1617 in Woking; WYFR via Okeechobee 21.745 (Eng to Eu 1600-1645) 35433 at 1635 by **Darren Beasley** in Bridgwater; R.Japan via Moyabi 21.700 (Jap to Eu, M.East, Africa 1600-1700) 32132 at 1646 in Newry.

In the **17MHz (16m)** band, conditions also varied from day to day. Sometimes R.Australia's Carnarvon signal to Asia 17.715 (Eng 0100-0900) could be heard here. In Wallsend it peaked 25532 at 0801. More often noted were Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) SIO322 at 0800 by **Bill Clark** in Rotherham; R.Pakistan, Islamabad 17.900 (Eng to Eu 0800-0845) 45243 at 0800 in Newry & (Eng to Eu 1100-1120) 33333 at 1100 by **Thomas Williams** in Truro; R.Slovakia Int via Rimavska Sobota 17.485 (Eng to Aust 0830-0857) SIO444 at 0830 by **John Slater** in Scalloway; Voice of Greece, Athens 17.725 (Gr, Eng to Aust, Eu 0800-0950) 55555 at 0942 by **Chris Shorten** in Norwich; R.Norway, Oslo 17.840 (Norw to M.East 0900-1000) 33343 at 0945 in Oxted; Channel Africa via Meyerton 17.810 (Eng to Africa 1000-1100) 22442 at 1010 in Bridgwater.

After mid-day VOA via Ascension Is 17.875 (Sp to S.Am 1200-1300) was logged as SIO333 at 1235 by **Philip Rambaut** in Macclesfield; R.Finland via Pori 17.740 (Eng to N.Am 1330-1400) 54333 at 1335 in Bushey Heath; HCJB Quito 17.490 (Eng, u.s.b. + p.c) 35333 at 1400 in Ross-on-Wye; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2030) 34343 at 1401 in Woking & via Antigua 17.840 (Eng to N/C.Am 1400-1615) 32222 at 1600 by **Howard Seddon** in Wigan; RCI via Sackville 17.820 (Eng [CBC progs] to USA, Caribbean 1300-1400 Mon-Fri, 1400-1700 Sun) SIO455 at 1415 in Edinburgh, (Eng, Fr to Eu, M.East, Africa 1430-1600, not Sun) SIO222 at 1430 in Elgin, (Eng to Eu, M.East 1745-1800) 54545 at 1745 by **George Tebbitts** in Penmaenmawr & (Fr, Eng to Eu, M.East, Africa 2000-2230) 33333 at 2015 in Kilkeel; WYFR Okeechobee 17.760 (Eng to Eu, Africa 1700-2000) 25332 at 1738 in Middlesbrough; WVHA via Scotts Corner 17.612 (Eng to Eu, Africa 1800-1900, Mon, Wed & Fri) 35333 at 1800 in Derby; R.Nederlands via Bonaire 17.605 (Eng to W.Africa 1830-2025) 45444 at 1835 in Burnham-on-Crouch.

### Long Wave Chart

| Freq kHz | Station | Country (kW) | Power | Listener |
|---|---|---|---|---|
| 153 | Bechar | Algeria | 1000 | J*,N* |
| 153 | Donebach | Germany | 500 | B,C,E,F,H*,I,J,K,L*,M*,O* |
| 162 | Allouis | Fance | 2000 | B,C,E,F,G*,H*,I,J,L*,M,N*,O* |
| 171 | Nador Medi-1 | Morocco | 2000 | J*,L* |
| 171 | Kaliningrad | Russia | 1000 | B*,C,E*,G*,H*,I,J,K,L*,O* |
| 177 | Oranienburg | Germany | 750 | B,C,H*,I,J,K,L*,O* |
| 183 | Saarlouis | German | 2000 | A,B,C,G*,H*,I,J,K,L*,O* |
| 189 | Caltanissetta | Italy | 10 | D* |
| 198 | BBC R-4 via ? | UK | ? | B,C,E*,G*,H*,I,K,L*,M,N,O |
| 207 | Munich | Germany | 500 | B*,C,E*,H*,I,J,K,L*,O* |
| 207 | Azilal | Morocco | 800 | E*,J* |
| 216 | Roumoules RMC | S.France | 1400 | B,C,E,H*,I,J,K,L*,O* |
| 225 | Raszyn Resv | Poland | ? | B*,C,E*,F,H*,I,J,K,L*,N*,O* |
| 234 | Beidweiler | Luxembourg | 2000 | B,C,E*,H*,I,J,K,L*,M,O* |
| 234 | St.Petersburg | Russia | 1000 | L* |
| 243 | Kalundborg | Denmark | 300 | B,C,E,F,H*,I,J,K,L*,O* |
| 252 | Tipaza | Algeria | 1500 | B*,C*,E*,I*,O* |
| 252 | Atlantic 252 | S.Ireland | 500 | A,B,C,E,H,I,J,K,L*,M,N,O* |
| 261 | Burg(R.Rope) | Germany | 200 | E*,I*,J,L*,O* |
| 261 | Taldom Moscow | Russia | 2000 | E*,H*,I*,J*,L* |
| 270 | Topolna | Czech Rep | 1500 | B*,C,E,H*,I,J*,L*,O* |
| 279 | Minsk | Belarus | 500 | B*,C,H*,I*,J*,L*,O* |

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

**Listeners:**

| | | | |
|---|---|---|---|
| A | Tim Allison, Middlesbrough. | I | George Millmore, Wootton, IoW. |
| B | Paul Bowery, Burnham-on-Crouch. | J | Fred Pallant, Storrington. |
| C | Martin Dale, Stockport. | K | Martin Price, Shrewsbury. |
| D | John Eaton, Woking. | L | Harry Richards, Barton-on-Humber. |
| E | Sheila Hughes, Morden. | M | Tom Smyth, Co.Fermanagh. |
| F | Rhoderick Illman, Oxted. | N | John Stevens, Largs. |
| G | Stephen Jones, Oswestry. | O | Andrew Stokes, Leicester. |
| H | Eddie McKeown, Newry. | | |

# Medium Wave Chart

| Freq kHz | Station | Country | Power (kW) | Listener |
|---|---|---|---|---|
| 520 | Hof-Saale (BR) | Germany | 0.2 | E* |
| 531 | Ain Beida | Algeria | 600 | E*,K*,R* |
| 531 | Leipzig | Germany | 100 | D,J*,K,R* |
| 531 | RNE5 via ? | Spain | ? | J*,K*,R* |
| 531 | Beromunster | Switzerland | 500 | N |
| 540 | Wavre | Belgium | 150/50 | D,J*,K,N,R* |
| 540 | Conamara | Ireland (S) | 2 | P |
| 540 | Sidi Bennour | Morocco | 600 | D*,J*,K* |
| 540 | Vitoria (EI) | Spain | 10 | K* |
| 549 | Les Trembles | Algeria | 600 | D*,E*,J*,K*,R* |
| 549 | Thurmau (DLF) | Germany | 200 | D,H,J*,K,N,R* |
| 558 | Espoo | Finland | 100 | K* |
| 558 | Rostock (NDR) | Germany | 20 | J* |
| 558 | RNE5 via ? | Spain | ? | D*,I*,J*,K*, N*,P*,R* |
| 567 | Berlin | Germany | 100 | I*,J*,K,R* |
| 567 | Tullamore (RTE1) | Ireland (S) | 500 | D,G,H,I*,K,N,P,R* |
| 567 | RNE5 via ? | Spain | ? | E*,J*,K* |
| 576 | Muhlacker (SDR) | Germany | 500 | D,J*,K,N,R* |
| 576 | Riga | Latvia | 500 | K* |
| 576 | Barcelona (RNE5) | Spain | 50 | J*,K* |
| 585 | Paris (FIP) | France | 8 | D,J*,K |
| 585 | Madrid (RNE1) | Spain | 200 | D,J*,K*,N,R* |
| 585 | Dumfries (BBCScot) | UK | 2 | N |
| 594 | Frankfurt (HR) | Germany | 1000/400 | H,J*,K,N*,R* |
| 594 | Oujda-1 | Morocco | 100 | K* |
| 594 | Muge | Portugal | 100 | J*,K* |
| 603 | Lyon | France | 300 | J* |
| 603 | Sevilla (RNE5) | Spain | 50 | D*,J*,K* |
| 603 | Newcastle (BBC) | UK | 2 | O,P*,R* |
| 612 | Athlone (RTE2) | Ireland (S) | 100 | D,K,N,P,R* |
| 612 | RNE1 via ? | Spain | 10 | J*,K*,R* |
| 621 | Wavre | Belgium | 80 | D,J*,K,N,R* |
| 621 | RNE1 via ? | Spain | 10 | R* |
| 621 | Barcelona (OCR) | Spain | 50 | J*,K* |
| 630 | Dannenberg (NDR) | Germany | 100 | D |
| 630 | Vigra | Norway | 100 | D*,J*,K*,N*,P*,R* |
| 630 | Tunis-Djedeida | Tunisia | 600 | D*,J*,K* |
| 639 | Praha (Liblice) | Czech | 1500 | D,J*,K |
| 639 | RNE1 via ? | Spain | ? | D*,J*,K,N,R* |
| 648 | RNE1 via ? | Spain | 10 | D*,J* |
| 648 | Orfordness (BBC) | UK | 500 | D*,K,N,R* |
| 657 | Neubrandenburg (NDR) | Germany | 250 | J*,K* |
| 657 | Napoli | Italy | 120 | K* |
| 657 | Madrid (RNE5) | Spain | 20 | J*,K*,P*,R* |
| 657 | Wrexham (BBC Wales) | UK | 2 | D,N,R |
| 666 | MesskirchRohrd (SWF) | Germany | 300/180 | J*,N*,R* |
| 666 | R.Vilnius | Lithuania | 500 | J*,P* |
| 666 | Lisboa | Portugal | 135 | J*,K* |
| 675 | Marseille | France | 600 | J*,K*,P* |
| 675 | Lopic (R10 Gold) | Holland | 120 | A*,D,H,J*,K,N,O,R* |
| 684 | Sevilla (RNE1) | Spain | 500 | D*,J*,K*,N,R* |
| 684 | Avala (Beograd-1) | Yugoslavia | 2000 | D*,J*,K*,R* |
| 693 | Droitwich (BBC5) | UK | 150 | D,K,N,P,R* |
| 702 | Flensburg (NDR) | Germany | 5 | D*,J*,K,R* |
| 702 | Zamora (RNE1) | Spain | 10 | D*,J*,K*,N |
| 711 | Rennes 1 | France | 300 | J*,K,N,R |
| 711 | Laayoune | Morocco | 600 | E*,J*,K*,R* |
| 711 | Murcia (COPE) | Spain | 5 | K*,R* |
| 720 | Langenberg | Germany | 200 | K,R* |
| 720 | Lisnagarvey (BBC4) | Ireland (N) | 10 | K,N |
| 720 | Norte | Portugal | 100 | J*,K*,N* |
| 720 | Sfax | Tunisia | 200 | K* |
| 720 | Lots Rd,Ldn (BBC4) | UK | 0.5 | D,K,R |
| 729 | Cork (RTE1) | Ireland (S) | 10 | K,N,R |
| 729 | RNE1 via ? | Spain | ? | D*,J*,K,N,R* |
| 738 | Paris | France | 4 | K,R* |
| 738 | Poznan | Poland | 300 | K* |
| 738 | Barcelona (RNE1) | Spain | 500 | D*,J*,K*,N*,P*,R |
| 747 | Flevo (Hilv2) | Holland | 400 | A,J*,K,N,R |
| 756 | Braunschweig (DLF) | Germany | 800/200 | D,I*,J*,K*,N,R |
| 756 | Bilbao (EI) | Spain | 5 | K* |
| 756 | Redruth (BBC) | UK | 2 | K*,P* |
| 765 | Sottens | Switzerland | 500 | D,J*,K,N,R* |
| 774 | Bonn (WOR2) | Germany | 5 | R* |
| 774 | RNE1 via ? | Spain | ? | D*,J*,K*,R* |
| 783 | Burg | Germany | 1000 | D*,J*,K,N*,R |
| 783 | Miramar (R.Porto) | Portugal | 100 | J*,K* |
| 792 | Limoges | France | 300 | D,K,N |
| 792 | Sevilla (SER) | Spain | 20 | D*,J*,K*,R* |
| 792 | Londonderry (BBC) | UK | 1 | P |
| 801 | Munchen-Ismaning | Germany | 300 | D,J*,N*,R |
| 801 | RNE1 via ? | Spain | ? | D*,J*,K* |
| 810 | Madrid (SER) | Spain | 20 | J*,K* |
| 810 | Westerglen (BBCScot) | UK | 100 | D,G,H,I*,K*,N,P,R |
| 819 | Toulouse | France | 50 | J*,R |
| 819 | Warsaw | Poland | 300 | D*,J*,N*,R* |
| 819 | S.Sebastian (EI) | Spain | 5 | R* |
| 828 | Hannover (NDR) | Germany | 100/5 | D*,J*,N*,R* |
| 828 | Barcelona (SER) | Spain | 50 | D*,J*,K*,R* |
| 831 | Alger | Algeria | 300 | K |
| 837 | Nancy | France | 200 | D,J*,K,P* |
| 837 | CDPE via ? | Spain | ? | D*,J*,K*,N* |
| 846 | Rome | Italy | 540 | D*,H,J*,K*,N*,R* |
| 855 | Berlin | Germany | 100 | D*,I*,K* |
| 855 | RNE1 via ? | Spain | ? | D*,I*,J*,K,P*,R* |
| 864 | Santah | Egypt | 500 | D*,E*,K*,N* |
| 864 | Paris | France | 300 | D,J*,K,N,P,R* |
| 864 | Socuellamos (RNE1) | Spain | 2 | E*,R* |
| 873 | Frankfurt (AFN) | Germany | 150 | A*,D*,G*,J*,K,O,R* |
| 873 | Zaragoza (SER) | Spain | 20 | J*,K*,N |
| 873 | Enniskillen (R.UI) | UK | 1 | P,R |
| 882 | COPE via ? | Spain | ? | J*,K*,R* |
| 882 | Washford (BBCWales) | UK | 100 | D,G,H,K,N,P,R* |
| 891 | Algiers | Algeria | 600/300 | D*,J*,K*,N*,R* |
| 891 | Huisberg | Netherlands | 20 | J*,K |
| 900 | Milan | Italy | 600 | D*,J*,K*,N,R* |
| 900 | COPE via ? | Spain | ? | J*,R* |
| 900 | Qurayyat | Saudi Arabia | 1000 | K*,R* |
| 909 | B'mans Pk (BBC5) | UK | 140 | K,R* |
| 909 | M'side Edge (BBC5) | UK | 200 | N |
| 918 | Plesivec (Sloven'nR) | Yugoslavia | 600/100 | D*,J*,K*,R* |
| 918 | Madrid (R.Int) | Spain | 20 | D*,K*,N |
| 927 | Wolvertem | Belgium | 300 | D,J*,K,N,R* |
| 936 | Bremen | Germany | 100 | J*,K*,N*,R* |
| 936 | Venezia | Italy | 20 | K* |
| 936 | RNE5 via ? | Spain | ? | J* |
| 945 | Toulouse | France | 300 | J*,K,P* |
| 954 | Brno (Dobrochov) | Czech Rep. | 200 | J* |
| 954 | Madrid (CI) | Spain | 20 | D*,J*,K*,N,P*,R* |
| 963 | Pori | Finland | 600 | A*,D*,H,J*,K*,N,R* |
| 963 | Paris | France | 8 | J*,K |
| 963 | Tir Chonaill | Ireland (S) | 10 | K*,P* |
| 972 | Hamburg (NDR) | Germany | 300 | D,H,J*,K*,N,R* |
| 972 | RNE1 via ? | Spain | ? | J*,K* |
| 981 | Alger | Algeria | 600/300 | J*,K*,N*,R* |
| 990 | Berlin | Germany | 300 | J* |
| 990 | R.Bilbao (SER) | Spain | 10 | D*,J*,K*,R* |
| 990 | Redmoss (BBC) | UK | 1 | N |
| 999 | Schwerin (RIAS) | Germany | 20 | J* |
| 999 | Madrid (COPE) | Spain | 50 | N*,R* |
| 1008 | El Arish | Egypt | 100 | N* |
| 1008 | Las Palmas (SER) | G. Canaria | ? | J*,K*,R* |
| 1008 | Flevo (Hilv-5) | Holland | 400 | D,J*,K,P,R* |
| 1017 | Rheinsender (SWF) | Germany | 600 | D,H,J*,K,R* |
| 1026 | SER via ? | Spain | ? | J*,R* |
| 1035 | Tallinn | Estonia | 500 | K* |
| 1035 | Lisbon (Prog3) | Portugal | 120 | D*,J*,R* |
| 1044 | Dresden | Germany | 250 | J*,K,P*,R* |
| 1044 | Sebaa-Aioun | Morocco | 300 | K* |
| 1044 | S.Sebastian (SER) | Spain | 10 | J*,K*,N,R* |
| 1053 | Iasi | Romania | 1000 | K |
| 1053 | Zarogoza (COPE) | Spain | 10 | D*,J* |
| 1053 | Talk Radio UK via ? | UK | ? | A,D,F,G*,K,N,P,Q,R |
| 1062 | Kalundborg | Denmark | 250 | J*,K,N*,P,R* |
| 1062 | Diyabakir | Turkey | 300 | E* |
| 1071 | Brest | France | 20 | K |
| 1071 | France-Inter via ? | France | ? | D* |
| 1071 | Lille | France | 40 | J*,N*,R* |
| 1071 | Riga | Latvia | 50 | K* |
| 1071 | Bilbao (EI) | Spain | 5 | K*,R* |
| 1071 | Talk R.UK (N'castle) | UK | ? | A |
| 1080 | Katowice | Poland | 1500 | J*,K*,N*,R* |
| 1080 | SER via ? | Spain | ? | J*,K,N |
| 1089 | Durres | Albania | 150 | P* |
| 1089 | Krasnodar | Russia | 300 | J* |
| 1089 | Talk Radio UK via ? | UK | ? | A,D,F,G*,K,N,P,Q,R |
| 1098 | Nitra (Jarok) | Slovakia | 1500 | D*,J*,K* |
| 1098 | RNE5 via ? | Spain | ? | J*,K*,N |
| 1107 | AFN via ? | Germany | 10 | A*,G*,J*,R* |
| 1107 | Sitkunai | Lithuania | 150 | K |
| 1107 | RNE5 via ? | Spain | ? | G*,J*,R* |
| 1107 | Talk R.UK via ? | UK | ? | D,K,N |
| 1116 | Bari | Italy | 150 | K* |
| 1116 | Pontevedra (SER) | Spain | 5 | J* |
| 1125 | La Louviere | Belgium | 20 | J*,K |
| 1125 | Deanovec | Croatia | 100 | K* |
| 1125 | RNE5 via ? | Spain | ? | K*,N,R* |
| 1134 | COPE via ? | Spain | 2 | D*,J*,K*,N,P*,R* |
| 1134 | Zadar (Croatian R) | Yugoslavia | 600/1200 | D*,J*,K,R* |
| 1143 | Stuttgart (AFN) | Germany | 10 | J*,K*,R* |
| 1143 | COPE via ? | Spain | 2 | J*,K*,N,R* |
| 1152 | RNE5 via ? | Spain | 10 | D*,J*,K*,R* |
| 1161 | Stara Zagora | Bulgaria | 500 | P* |
| 1161 | Strasbourg (Flnt) | France | 200 | D*,G*,J*,K*,N |
| 1179 | Solvesborg | Sweden | 600 | D,G*,H*,J*, K,N,O*,R* |
| 1188 | Kuurne | Belgium | 5 | H,J*,K*,N,R* |
| 1188 | Reichenbach (MDR) | Germany | 5 | R* |
| 1188 | Szolnok | Hungary | 135 | J* |
| 1197 | Munich (VOA) | Germany | 300 | D,J*,Q,R* |
| 1197 | Virgin via ? | UK | ? | D,K,N,P,R |
| 1206 | Bordeaux | France | 100 | J*,N,R |
| 1215 | COPE via ? | Spain | ? | J* |
| 1215 | Virgin via ? | UK | ? | D,K,N,O,P,Q,R |
| 1224 | Virgin via ? | UK | ? | K* |
| 1233 | Liege | Belgium | 5 | J*,K* |
| 1233 | Virgin via ? | UK | ? | D,K,N,R |
| 1242 | Marseille | France | 150 | J*,Q* |
| 1242 | Virgin via ? | UK | ? | D,N,P*,R |
| 1251 | Marcali | Hungary | 500 | J* |
| 1251 | Huisberg | Netherlands | 10 | D*,J*,K,R* |
| 1251 | Dubai | UAE | 600 | K* |
| 1260 | SER via ? | Spain | ? | D*,J*,K* |
| 1260 | Guildford (V) | UK | ? | K |
| 1269 | Neumunster (DLF) | Germany | 600 | A*,D,J*,K,N,R* |
| 1269 | COPE via ? | Spain | ? | K |
| 1278 | Strasbourg | France | 300 | K |
| 1278 | Dublin/Cork (RTE2) | Ireland (S) | 10 | D,H,K,N,P,R* |
| 1287 | RFE via ? | Czech Rep. | 400 | J*,K,R* |
| 1287 | Lerida (SER) | Spain | 10 | K*,N |
| 1296 | Valencia (COPE) | Spain | 10 | J*,K*,N,R* |
| 1305 | Rzeszow | Poland | 100 | K* |
| 1305 | RNE5 via ? | Spain | ? | J*,K*,N,R* |
| 1314 | Kvitsoy | Norway | 1200 | A,D,G*,J*,K, M*,N,P,R* |
| 1323 | Wachenbrunn (RMWS) | Germany | 1000/150 | J*,N,R* |
| 1332 | Rome | Italy | 300 | J*,K*,N* |
| 1341 | Lisnagarvey (BBC) | Ireland (N) | 100 | D,G,H,K,N,P,R* |
| 1341 | Tarrasa (SER) | Spain | 2 | K*,N* |
| 1350 | Nancy/Nice | France | 100 | J*,K*,N,R* |
| 1359 | Arganda (RNE-FS) | Spain | 600 | J*,K*,N,R* |
| 1368 | Foxdale (Manx R) | I.O.M. | 20 | D,G*,K*,M,N,P |
| 1377 | Lille | France | 300 | J*,K,N,R* |
| 1386 | Nakuru (KBC) | Kenya | 20 | J* |
| 1386 | Bolshakovo | Russia | 2500 | R* |
| 1386 | R.Ned via B'shakovo | Russia | 2500 | C*,D*,G*,J*, K*,N,R* |
| 1395 | Lushnje (Tirana) | Albania | 1000 | C*,G*,J*,K*,N,R* |
| 1395 | Ufa | Russia | ? | J* |
| 1404 | Brest | France | 20 | H,J*,K,N,R* |
| 1404 | Dnepropetrovsk | Ukraine | 30 | J* |
| 1413 | RNE5 via ? | Spain | ? | J*,K*,N*,R* |
| 1413 | Pristina | Yugosiavia | 1000 | P* |
| 1422 | Alger | Algeria | 50/25 | K* |
| 1422 | Heusweiler (DLF) | Germany | 1200/600 | D,J*,K,N*,R |
| 1431 | Nikolayev | Ukraine | 400 | J*,N*,R* |
| 1440 | Kyzylorda | Kazakhstan | ? | J* |
| 1440 | Marnach (RTL) | Luxembourg | 1200 | D,H,J*,K,N,O,P*,R* |
| 1440 | Damman | S. Arabia | 1600 | K*,N*,O* |
| 1449 | Squinzano | Italy | 50 | J*,K* |
| 1458 | Lushnje (Tirana) | Albania | 500 | R* |
| 1467 | Monte Carlo (TWR) | Monaco | 1000/400 | D*,G*,J*,K*,N,R* |
| 1476 | Wien-Bisamberg | Austria | 600 | K* |
| 1476 | Sanandaj | Iran | 200 | N* |
| 1481 | Dubai | UAE | 1500 | L* |
| 1485 | AFN via ? | Germany | 1 | R* |
| 1485 | SER via ? | Spain | ? | N* |
| 1494 | Clermont-Ferrand | France | 20 | K,R* |
| 1494 | St.Petersburg | Russia | 1000 | H*,J*,N |
| 1503 | RNE5 via ? | Spain | ? | K,R* |
| 1512 | Wolvertem | Belgium | 600 | B*,D,G*,J*,K, M*,N,R* |
| 1512 | Jeddah | S. Arabia | 1000 | E*,L* |
| 1521 | Kosice (Cizatice) | Slovakia | 600 | J*,N* |
| 1521 | Duba | S. Arabia | 2000 | K*,L*,R* |
| 1530 | Vatican R | Italy | 150/450 | C*,G*,H*,J*, K,N*,R* |
| 1539 | Mainflingen (DLF) | Germany | 700 | K*,N* |
| 1539 | Valladolid (SER) | Spain | 5 | J*,K,R* |
| 1557 | Nice | France | 300 | N |
| 1566 | Nagpur | India | 1000 | L* |
| 1566 | Sfax | Tunisia | 1200 | J*,N* |
| 1575 | Genova | Italy | 50 | J*,K* |
| 1575 | SER via ? | Spain | 5 | J*,K,N*,R* |
| 1584 | SER via ? | Spain | 2 | K,N |
| 1593 | Holzkirchen (RFE) | Germany | 150 | J*,N*,P* |
| 1602 | SER via ? | Spain | ? | R* |
| 1602 | Vitoria(EI) | Spain | 10 | J*,K*,N,P |
| 1611 | Vatican R | Italy | 15 | H*,J*,N,R* |

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

Listeners:
A Tim Allison, Middlesbrough.
B G. Carroll, Bournemouth.
C Bernard Curtis, Stalbridge.
D Martin Dale, Stockport.
E John Eaton, Woking.
F Francis Hearne, N.Bristol.
G Sheila Hughes, Morden.
H Rhoderick Illman, Oxted.
I Stephen Jones, Oswestry.
J Eddie McKeown, Newry.
K George Millmore, Wootton IoW.
L Roy Patrick, Derby.
M Clare Pinder, while in Appleby.
N Martin Price, Shrewsbury.
O Harry Richards, Barton-on-Humber.
P Tom Smyth, Co.Fermanagh
Q John Stevens, Largs.
R Andrew Stokes, Leicester.

More reliable conditions were seen in the **15MHz (19m)** band. In the morning R.Japan via Moyabi 15.335 (Eng, Jap to M.East, Eu, Africa 0700-0900) was 44444 at 0722 in Norwich; BBC via Ascension Is 15.400 (Eng to W/C.Africa 0730-1130) SIO433 at 0805 in Rotherham & via Limassol 15.575 (Eng to E/N.Africa, W.Asia, M.East 0330-1500) 34343 at 0904 in Middlesbrough; BSKSA Riyadh 15.060 (Ar to N.Africa 0900-1500) 34333 at 0913 in Oxted; R.Veritas Asia, Philippines 15.130 (Russ 1030-1125) heard at 1125 by **G.Carroll** in Bournemouth; Voice of Malaysia, Kajang 15.295 (Mand to S.Asia 1030-1230) SIO222 at 1030 in Scalloway; R.Pakistan, Islamabad 15.625 (Eng to Eu 1100-1120) heard at 1100 in Truro; Israel R, Jerusalem 15.640 (Eng to Eu, Asia 1100-1130) heard at 1100 by **Clare Pinder** in Appleby.

After mid-day R.Australia via Darwin 15.530 (Eng to S.Asia 1100-1300) was 44434 at 1203 in Penmaenmawr; HCJB Quito 15.115 (Eng to S.Am 1100-1430) SIO322 at 1230 in Edinburgh; R.Moldova Int via Galbeni 15.315 (Eng to Eu

## Local Radio Chart

| Freq kHz | Station | ILR BBC | e.m.r.p (kW) | Listener |
|---|---|---|---|---|
| 558 | Spectrum R | I | 7.50 | B,J,K,L,P |
| 585 | R.Solway | B | 2.00 | D,I*,K,L |
| 603 | Cheltenham (CD603) | I | 0.10 | B,J,K,N,O,P |
| 603 | Invicta SG (Coast) | I | 0.10 | J,L,P |
| 630 | R.Bedfordshire (3CR) | B | 0.20 | B,E,J,K,L,N,O,P |
| 630 | R.Cornwall | B | 2.00 | J |
| 657 | R.Clwyd | B | 2.00 | D,H*,J,K,L,O,P |
| 657 | R.Cornwall | B | 0.50 | G,J |
| 666 | Gemini AM | I | 0.34 | E,J,P |
| 666 | R.York | B | 0.80 | B,D,L,N,P |
| 729 | BBC Essex | B | 0.20 | F,J,K,L,M,N,O,P |
| 738 | Hereford/Worcester | B | 0.037 | J,K,N,O,P |
| 756 | R.Cumbria | B | 1.00 | A,D,I* |
| 756 | R.Maldwyn | I | 0.63 | B,H*,J,K,P |
| 765 | BBC Essex | B | 0.50 | B,D,F,I*,J,L,N,P |
| 774 | Gloucester (3CSG) | I | 0.14 | J,K,N |
| 774 | R.Kent | B | 0.70 | J,O,P |
| 774 | R.Leeds | B | 0.50 | B,L |
| 792 | Chiltern (S.Gold) | I | 0.27 | G,J,K,L,N,O,P |
| 792 | R.Foyle | B | 1.00 | D,I*,M |
| 801 | R.Devon & Dorset | B | 2.00 | G,I*,J,K,M*,N,P |
| 828 | Chiltern (S.Gold) | I | 0.20 | N,P |
| 828 | R.Aire (Magic828) | I | 0.12 | B,L |
| 828 | 2CR (Cl.Gold) | I | 0.27 | J |
| 837 | R.Cumbria/Furness | B | 1.50 | D,I*,K |
| 837 | R.Leicester | B | 0.45 | B,F,G,J,K,L,N,O,P |
| 855 | R.Devon & Dorset | B | 1.00 | J |
| 855 | R.Lancashire | B | 1.50 | A,B,D,L |
| 855 | R.Norfolk | B | 1.50 | D,F,J,L,O,P |
| 855 | Sunshine R | I | 0.15 | E,K,N,P |
| 873 | R.Norfolk | B | 0.30 | F,J,K,L,N,P |
| 936 | Brunel R (Cl.Gold) | I | 0.18 | G,J,K,O,P |
| 945 | R.Trent (Gem AM) | I | 0.20 | B,D,I,J,K,L,N,O,P |
| 954 | Gemini AM | I | 0.32 | G,J,P |
| 954 | R.Wyvern (WYVN) | I | 0.16 | D,E,J,K,L,N,O,P |
| 990 | WABC (Nice & Easy) | I | 0.09 | B,K,N,O |
| 990 | R.Devon & Dorset | B | 1.00 | J |
| 990 | Hallam R (Gt.Yks) | I | 0.25 | B,L,P |
| 999 | R.Solent | B | 1.00 | C,F,J,P |
| 999 | R.Trent (Gem AM) | I | 0.25 | K,L,N,P |
| 999 | Red Rose (Gold) | I | 0.80 | A,B,D,M |
| 1017 | Beacon R (WABC) | I | 0.70 | B,D,J,K,L,N,P |
| 1026 | Downtown R | I | 1.70 | D,M |
| 1026 | R.Cambridgeshire | B | 0.50 | B,F,L,N,O,P |
| 1026 | R.Jersey | B | 1.00 | F,J,P |
| 1035 | Country 1035 | I | ? | B,D*,J,K*,M*,P |
| 1035 | NorthSound Two | I | 0.78 | D,I*,O |
| 1035 | R.Sheffield | B | 1.00 | B,L,N |
| 1035 | West Sound AM | I | 0.32 | D,I*,K* |
| 1107 | Moray Firth R | I | 1.50 | D,F,I* |
| 1116 | R.Derby | B | 1.20 | B,D,F,I*,K,L,N,O,P |
| 1116 | R.Guernsey | B | 0.50 | F,J,P |
| 1152 | BRMB (Xtra-AM) | I | 3.00 | E,K,N,O |
| 1152 | LBC (LondonNewstalk) | I | 23.50 | G*,J,P |
| 1152 | Piccadilly R (Gold) | I | 1.50 | B,K |
| 1152 | R.Broadland | I | 0.83 | B,I*,P |
| 1152 | R.Clyde (Clyde 2) | I | 3.06 | D |
| 1161 | Brunel R (Cl.Gold) | I | 0.16 | J,K,P |
| 1161 | R.Bedfordshire (3CR) | B | 0.10 | N,O,P |
| 1161 | Southern Counties R | B | 1.00 | F,J,P |
| 1161 | Tay AM | I | 1.40 | D,I*,K |
| 1161 | Humberside (Gt.Yks) | I | 0.35 | B,K,L |
| 1170 | GNR Teeside | I | 0.32 | D,I* |
| 1170 | Hi Wycombe 1170AM | I | ? | O,P |
| 1170 | Portsmouth (SCR) | I | 0.12 | G,J,P |
| 1170 | Signal R (S.Gold) | I | 0.20 | B,K,N |
| 1170 | Swansea Sound | I | 0.58 | D* |
| 1242 | Invicta Snd (Coast) | I | 0.32 | P |
| 1242 | Isle of Wight R | I | 0.50 | J |
| 1251 | Saxon R (SGR) | I | 0.76 | I*,K,L,P |
| 1260 | Brunel R (Cl.Gold) | I | 1.60 | J,M* |
| 1260 | Marcher Snd (Gold) | I | 0.64 | B,D,I*,K,O |
| 1260 | Sunrise R, Midlands | I | 0.29 | I*,N,P |
| 1260 | R.York | B | 0.50 | L |
| 1278 | Bradford (Gt.Yks) | I | 0.43 | K,L |
| 1305 | Barnsley (Gt.Yks) | I | 0.15 | B,D,I*,K,L,N,O* |
| 1305 | Touch R | I | 0.20 | D,I*,J,P |
| 1323 | R.Bristol (Som.Snd) | B | 0.63 | P |
| 1323 | Brighton (SCR) | I | 0.50 | J,P |
| 1332 | Hereward R (WGMS) | I | 0.60 | D*,K,L,N,O,P |
| 1332 | Wiltshire Sound | B | 0.30 | J,K,P |
| 1359 | Essex R (BreezeAM) | I | 0.28 | P |
| 1359 | Mercia Snd (Xtra-AM) | I | 0.27 | D,K,N,O*,P |
| 1359 | Red Dragon (Touch R) | I | 0.20 | D |
| 1359 | R.Solent | B | 0.85 | D |
| 1368 | R.Lincolnshire | B | 2.00 | A,D*,L,N,O*,P |
| 1368 | Southern Counties R | B | 0.50 | F,P |
| 1368 | Wiltshire Sound | B | 0.10 | D* |
| 1431 | Essex R (BreezeAM) | I | 0.35 | J,P |
| 1431 | R 210 (Cl.Gold) | I | 0.14 | J,L,P |
| 1449 | R.Peterboro/Cambs | B | 0.15 | I*,J,K,L,N,O*,P |
| 1458 | Fortune | I | 5.00 | B,D,I*,K,M,O |
| 1458 | R.Cumbria | B | 0.50 | D |
| 1458 | R.Devon & Dorset | B | 2.00 | J |
| 1458 | R.Newcastle | B | 2.00 | D |
| 1458 | Radio WM | B | 5.00 | D |
| 1458 | Sunrise R | I | 50.00 | B,D,I*,J,L,N,P |
| 1476 | Guildford (M.Xtra) | I | 0.50 | D,I*,J,K,P |
| 1485 | R.Humberside (Hull) | B | 1.00 | A,F,I*,L,O* |
| 1485 | R.Merseyside | B | 1.20 | B,D,I*,K,M |
| 1485 | Southern Counties R | B | 1.00 | F,J,N,P |
| 1503 | R.Stoke-on-Trent | B | 1.00 | B,D,F,I*,J*,K,L,N,P |
| 1521 | Reigate (M.Xtra) | I | 0.64 | D,I*,J,K,P |
| 1530 | Huddersfld (Gt.Yks) | I | 0.74 | B,D,K,L |
| 1530 | R.Essex | B | 0.15 | F,J,*,P |
| 1530 | R.Wyvern (WYVN) | I | 0.52 | D,I*,J,K,N |
| 1548 | Capital R (Cap G) | I | 97.50 | J,M,P |
| 1548 | R.Bristol | B | 5.00 | J |
| 1548 | Liverpool (City G) | I | 4.40 | B,I*,K |
| 1548 | R.Forth (Max AM) | I | 2.20 | D,I* |
| 1548 | Sheffield (Gt.Yks) | I | 0.74 | L,N |
| 1557 | Northants R (S.Gold) | I | 0.76 | A,O*,L,N,O* |
| 1557 | Southampton (SCR) | I | 0.50 | J,P |
| 1557 | R.Lancashire | B | 0.25 | I*,K |
| 1557 | Tendring (Mellow) | I | 0.125 | P |
| 1584 | Kettering (KCBC) | I | 0.04 | F,N,O*,P |
| 1584 | R.Nottingham | B | 1.00 | B,D*,F,I*,L,M*,N,P |
| 1584 | R.Shropshire | B | 0.50 | F,K |
| 1584 | R.Tay | I | 0.21 | D,I*,K |
| 1602 | R.Kent | B | 0.25 | D,I*,J,K,O*,P |

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

**Listeners:**

A Tim Allison, Middlesbrough.
B Martin Dale, Stockport.
C John Eaton, Woking.
D Arthur Grainger, Carstairs Junction.
E Francis Hearne, N.Bristol.
F Sheila Hughes, Morden.
G Rhoderick Illman, Oxted.
H Stephen Jones, Oswestry.
I Eddie McKeown, Newry.
J George Millmore, Wootton, IoW.
K Martin Price, Shrewsbury.
L Harry Richards, Barton-on-Humber.
M Tom Smyth, Co.Fermanagh.
N Andrew Stokes, Leicester.
O Norman Thompson, Oadby.
P John Wells, East Grinstead.

1400-1455) SIO312 at 1235 in Macclesfield; AIR via Aligarh 15.120 (Eng to SE.Asia 1330-1500) 33222 at 1330 in Newry; Voice of Vietnam, Hanoi 15.010 (Fr, Eng to ? 1300-1400) 43344 at 1335 in Wigan; RCI via Sines 15.325 (Eng to Eu, M.East, Africa 1430-1500) SIO444 at 1430 by **Tom Smyth** in Co.Fermanagh; R.Japan via Moyabi 15.355 (Eng to S.Africa 1500-1600) 32323 at 1500 in Oadby; Channel Africa via Meyerton 15.240 (Eng to C/W Africa 1600-1700) 32442 at 1612 in Woking; WVHA via Scotts Corner 15.665 (Eng to Eu 1500-1655 Tues) 44544 at 1615 in Bridgwater.

In the evening RNB Brazil 15.265 (Port, Eng, Ger to Eu 1630-2020) was 21212 at 1800 by **John Sadler** in Bishops Stortford; WEWN Birmingham 15.695 (Eng to Eu 1900-2000) 43223 at 1930 in Stalbridge; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 32233 at 2000 by **Martin Dale** in Stockport; HCJB Quito 15.490 (Eng to Eu 1700-2000) 45323 at 1930 in Ross-on-Wye; RCI via Sackville 15.325 (Fr to Eu 2000-2100) 32322 at 2000 in Oadby; WRNO New Orleans 15.420 (Eng to E.USA, Eu 1500-2300) 25222 at 2033 in Burnham-on-Crouch; KTBN Salt Lake City 15.590 (Eng to N.Am 1600-0000) 32222 at 2045 in Kilkeel; R.New Zealand Int via Rangataiki 15.115 (Eng to Pacific areas 2051-0715) 34333 at 2121 in Bushey Heath; RAE Buenos Aires 15.345 (Sp, Eng, It, Fr, Ger to Eu, Africa 1800-2300) 25532 at 2158 in Wallsend.

Good reception was noted from some areas in the **13MHz (22m)** band. In the morning R.Nederlands via Irkutsk 13.700 (Eng to Pacific 0830-0925) was 35323 at 0830 in Newry; SRI via Sottens? 13.685 (It, Eng, Fr, Ger, Port to Aust, S.Pacific 0830-1100) heard at 0900 in Appleby; Monitor R.Int via KHBI 13.615 (Eng to Oceania 0800-1000) 34333 at 0909 in E.Worthing; BBC via Rampisham 13.745 (Russ to Eu 1030-1130) SIO444 at 1117 in Macclesfield; R.Tashkent, Uzbekistan 13.785 (Eng to S.Asia 1200-1228) 44333 at 1200 in Morden.

In the afternoon RFI via Fr.Guiana? 13.625 (Eng to C.Am 1200-1300) was 35222 at 1205 in Bridgwater; UAER, Dubai 13.675 (Eng to Eu 1330-1355) SIO444 at 1330 in Edinburgh & (Eng to Eur 1600-1640) 32323 at 1600 in Bishops Stortford; R.Tashkent, Uzbekistan 13.785 (Eng to S.Asia 1330-1358) 35553 at 1350 in Wallsend; R.Nederlands via Flevo 13.700 (Eng to S.Asia, M.East 1330-1525) 34443 at 1514 in Woking; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eu 0400-1800) 44444 at 1531 by **Peter Pollard** in Rugby.

Later, WHRI South Bend 13.760 (Eng to E.USA, Eu 1500-2200) 45334 at 1912 in Burnham-on-Crouch; VOA via Selebi-Phikwe 13.710 (Eng to Africa 1630-2200) 34433 at 1943 in Lisnaskea; RCI via Sackville 13.650 (Eng to Eu, M.East, Africa 2100-2230) 24231 at 2118 in Oxted; WYFR via Okeechobee 13.695 (Eng to Eu, Africa 2000-2300) 43343 at 2140 in Bushey Heath; R.Austria Int via Moosbrunn 13.730 (Ger, Sp, Eng to S.Am 2200-0400) 11221 at 2330 in Stockport; KAIJ Denton 13.740 (Eng to N/C.Am 2300-0200) 32332 at 0035 in Kilkeel.

In the **11MHz (25m)** band R.Australia was noted on 11.800 from Shepparton (Eng to Asia 1200-1630) as 21321 at 1200 in Newry, 11.695 (Eng to Pacific 1430-1700) 22432 at 1522 in Woking, 11.880 (Eng to Asia 1630-2100) 22222 at 1630 in Norwich; 11.660 from via Carnarvon (Eng to S.Asia 1430-1800) 33223 at 1510 in Rugby.

Also heard in the day were Slovak R.Int, via Velke Kostolany 11.990 Eng to Aust 0830-0857) SIO544 at 0830 in Scalloway; FEBC Philippines 11.690 (Eng to China 0930-1100) 32332 at 0945 in Kilkeel & 11.995 (Eng to India, SE.Asia 1300-1600) 34553 at 1410 by **John Parry** in Larnaca, Cyprus; ERA Thessaloniki 11.595 (Gr to Eu 1000-2255) SIO455 at 1100 in Edinburgh; R.Georgia, Dusheti 11.815 (Eng to Eu 1100-1130) SIO322 at 1110 in Macclesfield; Polish R, Warsaw 11.815 (Eng to Eu 1300-1355) SIO433 at 1300 by **Tony King** in Swindon; RCI via Sines 11.915 (Eng to Eu, M.East, Africa 1430-1500) 54454 at 1440 in Burnham-on-Crouch & via Skelton 11.935 (Eng, Fr to Eu, M.East 1430-1600) 44444 at 1452 in Penmaenmawr.

Later, AIR via Bangalore 11.620 (Eng, Hi to Eu 1745-2230) 44444 at 1745 in Morden; R.Pakistan, Islamabad 11.570 (Ur, Eng to Eu 1700-1855) 43333 at 1830 in Stalbridge; R.Nederlands via Talata Volon 11.655 (Eng to C/W.Africa 1930-2025) 34332 at 2025 in Middlesbrough; R.Japan via Moyabi 11.925 (Eng to Eu 2100-2155) 32323 at 2100 in Bishops Stortford; RCI via Sackville 11.945 (Eng to Eu, M.East, Africa 2100-2230) 44444 at 2100 by **Garry Crawford** in Kennoway; R.Havana, Cuba 11.720 (Eng to Eu 2100-2200) 33333 at 2130 in Appleby; also 11.740 (Sp? to Eu 2100-2200) 43343 at 2130 in Wigan; R.Nac da Amazonia, Brazil 11.780 (Port 0900-0200) 35543 at 2150 in Wallsend.

Sometimes R.New Zealand's signals in the **9MHz (31m)** band have reached here. During favourable conditions their 100kW signal on 9.700 (Eng to Pacific areas 0759-1300) was SIO433 at 0934 in Rotherham and SIO344 at 1200 in Edinburgh. Some R.Australia's signals have also been heard here - 9.510 from Carnarvon (Eng, Chin to Asia 0900-1200) was 42332 at 0900 in Bushey Heath & 9.770 (Eng to Asia 1430-1630) 43434 at 1410 in Penmaenmawr; 9.860 from Shepparton (Eng to Pacific, Asia 0630-1200) SIO222 at 1112 in Macclesfield and 9.615 from Darwin (Eng to S.Asia 1100-1428) 23322 at 1258 in Burnham-on-Crouch.

Although beamed to other areas, broadcasts from the Voice of Greece, Athens 9.425 (Gr to M.East 1100-1150) rated 44444 at 1130 in Rugby;

# Tropical Bands Chart

| Freq MHz | Station | Country | UTC | DXer |
|---|---|---|---|---|
| 2.310 | ABC Alice Springs | Australia | 2044 | F,G |
| 2.325 | ABC Tennant Creek | Australia | 1817 | F,G |
| 2.485 | ABC Katherine | Australia | 1916 | G |
| 2.850 | KCBS Pyongyang | N.Korea | 2037 | F |
| 3.200 | TWR Manzini | Swaziland | 1923 | G |
| 3.220 | R.HCJB Quito | Ecuador | 0340 | K |
| 3.223 | AIR Simla | India | 1730 | B,G |
| 3.230 | R.Sol de Los Andes | Peru | 0015 | B |
| 3.240 | TWR Shona | Swaziland | 1838 | G |
| 3.245 | AIR Lucknow | India | 0200 | B,G,P |
| 3.255 | BBC via Maseru | Lesotho | 1925 | G,K |
| 3.270 | SWABC 1, Namibia | S.W.Africa | 1957 | B,G,I,L |
| 3.277 | AIR Srinagar | India | 1732 | G |
| 3.290 | SWABC 2, Namibia | S.W.Africa | 1807 | B,G |
| 3.295 | AIR Ranchi? | India | 1457 | G,P |
| 3.300 | R.Cultural | Guatemala | 0253 | B,K |
| 3.306 | ZBC R-2? | Zimbabwe | 2034 | G,J,L,R |
| 3.315 | AIR Bhopal | India | 1458 | B,G,P |
| 3.316 | SLBS Goderich | Sierra Leone | 0117 | K |
| 3.325 | R.Liberal | Brazil | 0230 | B |
| 3.325 | FRCN Lagos | Nigeria | 0445 | F,K |
| 3.355 | AIR Kurseong | India | 1459 | G |
| 3.356 | R.Botswana | Gabarone | 1958 | L |
| 3.359 | RTV Malagasy | Madagascar | 1806 | G |
| 3.365 | R.Rebelde, La Julia | Cuba | 0220 | B |
| 3.365 | GBC R-2 | Ghana | 2144 | A,B,E,F,I,K,L,P |
| 3.365 | AIR Delhi | India | 1500 | G,P |
| 3.375 | R.Nacional S.Gabriel | Brazil | 1816 | B,G |
| 3.377 | R.Nacional, Mulenvos | Angola | 2240 | D |
| 3.380 | NBC Blantyre | Malawi | 1734 | G,L |
| 3.385 | RFO Cayenne | Guiana | 0010 | B |
| 3.395 | ZBC Gweru | Zimbabwe | 0315 | J |
| 3.915 | BBC via Kranji | Singapore | 1735 | C,E,H,K,L,P |
| 3.940 | PBS Hubei Wuhan | China | 2327 | E |
| 3.945 | AIR Gorakhpur | India | 1501 | G |
| 3.950 | Qinghai PBS, Xining | China | 0015 | B,E,P |
| 3.955 | BBC via Skelton | England | 2356 | B,D,E,F,H,K,S |
| 3.955 | R.Budapest | Hungary | 2200 | N,O |
| 3.960 | RFE/RL Biblis | Germany | 2154 | E,K |
| 3.965 | RFI Paris | France | 2256 | B,D,E,H,K |
| 3.970 | RFE Biblis | Germany | 2020 | B |
| 3.975 | R.Korea via Skelton | England | 2045 | K |
| 3.975 | R.Budapest | Hungary | 2020 | H |
| 3.980 | VOA via Munich | Germany | 2244 | B,H,K |
| 3.985 | China R via SRI | Switzerland | 2200 | H,N,S |
| 3.985 | SRI Beromunster | Switzerland | 2015 | B,H,I,K,N,Q |
| 3.990 | Xinjiang BS, Urumqi | China | 1434 | G |
| 3.990 | RFE via ? | Germany | 2243 | K |
| 3.995 | DW via Julich | Germany | 2046 | B,K |
| 4.330 | Xinjiang BS, Urumqi | China | 1401 | G |
| 4.500 | Xinjiang BS, Urumqi | China | 0013 | F,K |
| 4.735 | Xinjiang, Urumqi | China | 0015 | A,B,G,K |
| 4.755 | R.Educ CP Grande | Brazil | 0100 | B,K |
| 4.760 | AIR Port Blair | India | 1728 | G |
| 4.760 | ELWA Monrovia | Liberia | 2020 | A,G,K |
| 4.765 | R.Integracao | Brazil | 0030 | B,K |
| 4.770 | FRCN Kaduna | Nigeria | 1926 | A,F,K,L,M,P |
| 4.775 | AIR Guwahati | India | 0050 | B,G |
| 4.783 | RTM Bamako | Mali | 2030 | A,K |
| 4.786 | Ecos del Combeima | Colombia | 0256 | K |
| 4.790 | AIR Shillong | India | 1730 | M |
| 4.790 | Azad Kashmir R. | Pakistan | 1802 | B,G |
| 4.790 | TWR Manzini | Swaziland | 1706 | L |
| 4.800 | CPBS 2 Beijing | China | 2302 | E,F |
| 4.800 | AIR Hyderabad | India | 1706 | E,G,H,L,M |
| 4.800 | LNBS Lesotho | Maseru | 1812 | A,G,K |
| 4.805 | R.Nac.Amazonas | Brazil | 0010 | B,E,K |
| 4.810 | R.San Martin Tara | Peru | 0050 | B,E |
| 4.810 | SABC Meyerton | S.Africa | 2200 | A,P |
| 4.815 | R.Difusora, Londrina | Brazil | 0025 | B |
| 4.815 | R.diff TV Burkina | Ouagadougou | 2104 | A |
| 4.820 | La Voz Evangelica | Honduras | 0022 | B,K |
| 4.820 | AIR Calcutta | India | 1504 | G |
| 4.828 | ZBC R-4 | Zimbabwe | 1944 | G,L |
| 4.830 | R.Botswana, Gaborone | Botswana | 2111 | A,K |
| 4.830 | R.Tachira | Venezuela | 0005 | A,B,F,K,P |
| 4.832 | R.Reloj | Costa Rica | 0815 | F,R |
| 4.835 | ABC-Alice Springs | Australia | 2142 | L,P |
| 4.835 | R.Tezulutlan, Coban | Guatemala | 0033 | B,E,P |
| 4.835 | RTM Bamako | Mali | 1943 | A,B,H,K,L,P |
| 4.840 | R.Interoceanica | Ecuador | 0040 | B |
| 4.840 | AIR Bombay | India | 1505 | B,G,H,M |
| 4.845 | RTM Kuala Lumpur | Malaysia | 1631 | P |
| 4.845 | ORTM Nouakchott | Mauritania | 2000 | A,B,K,L |
| 4.850 | R.Yaounde | Cameroon | 2252 | A,B,K |
| 4.850 | AIR Kohima | India | 0050 | B |
| 4.850 | Ulan Bator 1 | Mongolia | 0115 | P |
| 4.860 | AIR Kingsway(Feeder) | India | 1708 | A,E,G,H,L,M |
| 4.865 | PBS Lanzhou | China | 2209 | A,F,P |
| 4.865 | L.V. del Cinaruco | Colombia | 0020 | B |
| 4.870 | R.Cotonou | Benin | 1923 | A,L |
| 4.875 | R.Roraima, Boa Vista | Brazil | 0012 | P |
| 4.879 | R.Bangladesh | Bangladesh | 1445 | G |
| 4.885 | R.Clube do Para | Brazil | 0035 | B,K |
| 4.885 | KBC East Sce Nairobi | Kenya | 1912 | A,K,L |
| 4.890 | RFI Paris | via Gabon | 0358 | K |
| 4.890 | R.Port Moresby | New Guinea | 2007 | F |
| 4.895 | Voz del Rio Arauca | Colombia | 0045 | B,K |
| 4.895 | Pakistan BC | Pakistan | 1709 | G,K,L,M |
| 4.900 | V. of the Strait 2 | China | 0000 | A |
| 4.900 | SLBC Colombo | Sri Lanka | 1524 | G |
| 4.905 | R.Nat.N'djamena | Chad | 1940 | A,F,K,L |
| 4.910 | Tennant Creek | Australia | 2134 | L,P |
| 4.910 | V. de la Mosquitia | Honduras | 0008 | P |
| 4.910 | R.Zambia, Lusaka | Zambia | 2130 | A,G |
| 4.915 | GBC-1, Accra | Ghana | 2132 | A,B,F,K,L,M,P |
| 4.920 | R.Quito | Ecuador | 0759 | F |
| 4.920 | AIR Madras | India | 1709 | G,K,L |
| 4.925 | R.Nacional, Bata | Eq.Guinea | 1911 | A,L,M |
| 4.927 | RRI Jambi | Indonesia | 2323 | F |
| 4.931 | R.Internacional | Honduras | 2358 | P |
| 4.935 | KBC Gen Sce Nairobi | Kenya | 2030 | A |
| 4.940 | AIR Guwahati | India | 1507 | G |
| 4.950 | R.Nacional, Mulenvos | Angola | 2151 | G,L |
| 4.955 | R.Cultura, Campos | Brazil | 0025 | B |
| 4.965 | R.Alvorada | Brazil | 0040 | B |
| 4.970 | PBS Xinjiang | China | 1402 | G,P |
| 4.970 | R.Rumbos, Caracas | Venezuela | 0045 | B |
| 4.975 | R.Uganda, Kampala | Uganda | 2050 | A,K,L,N,Q |
| 4.980 | PBS Xinjiang, Urumqi | China | 1424 | B,G |
| 4.980 | Ecos del Torbes | Venezuela | 2300 | A,B,F,H,K,M,P |
| 4.985 | R.Brazil Central | Brazil | 0050 | B,K |
| 4.990 | AIR Ext.Service | India | 0011 | B,K |
| 4.990 | FRCN Lagos | Nigeria | 1908 | A,K,L,O |
| 4.990 | R.Ancash, Huaraz | Peru | 0105 | B |
| 5.005 | R.Libertad, La Paz | Bolivia | 0349 | K |
| 5.005 | R.Nepal, Kathmandu | Nepal | 1641 | G,P |
| 5.010 | R.Garoua | Cameroon | 0027 | K |
| 5.010 | Guangxi 2, Nanning | China | 0055 | P |
| 5.010 | AIR Thiru'puram | India | 0105 | B,P |
| 5.020 | Voz del Upano, Macas | Ecuador | 0050 | B |
| 5.020 | La Voix du Sahel,Niamey | Niger | 1901 | A,B,L |
| 5.025 | R.Parakou | Benin | 1901 | A,L,P |
| 5.025 | R.Rebelde, Habana | Cuba | 0055 | B,K,P |
| 5.025 | R.Uganda, Kampala | Uganda | 2018 | K,Q |
| 5.030 | AWR Latin America | Costa Rica | 0830 | R |
| 5.030 | R.Continente Caracas | Venezuela | 0351 | K |
| 5.035 | R.Aparecida | Brazil | 0110 | B |
| 5.035 | R.Bangui | C.Africa | 2100 | A,B,K,P |
| 5.040 | Voz del Upano, Macas | Ecuador | 0025 | B |
| 5.045 | R.Cultura do Para | Brazil | 0125 | A,B,K |
| 5.047 | R.Togo, Lome | Togo | 1903 | A,B,F,K,L,P |
| 5.050 | Voz de Yopal, Yopal | Colombia | 0030 | A,P |
| 5.050 | R.Tanzania | Tanzania | 1942 | K,L |
| 5.055 | RFO Cayenne(Matoury) | Fr. Guiana | 2020 | B,K |
| 5.060 | PBS Xinjiang, Urumqi | China | 0055 | B,G,P |
| 5.060 | Sist d'Em Progreso | Ecuador | 0110 | B |
| 5.075 | Caracol Bogata | Colombia | 0015 | A,B,F,K,M,P |
| 5.083 | R.Mundo, Cusco | Peru | 0030 | B |

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

**DXers:**

A Darren Beasley, Bridgwater.
B Robert Connolly, Kilkeel.
C Bernard Curtis, Stalbridge.
D Ron Damp, Worthing.
E John Eaton, Woking.
F David Edwardson, Wallsend.
G P.Gordon Smith, Kingston, Moray.
H Sheila Hughes, Morden.
I Rhoderick Illman, Oxted.
J Paul Logan, Lisnaskea.
K Eddie McKeown, Newry.
L Fred Pallant, Storrington.
M Roy Patrick, Derby.
N Clare Pinder, while in Appleby.
O Peter Pollard, Rugby.
P Richard Reynolds, Guildford.
Q Chris Shorten, Norwich.
R John Slater, Scalloway.
S Tom Smyth, Co.Fermanagh.

Monitor R.Int, via KHBI 9.355 (Eng to NE.Asia 1300-1600) 34553 at 1500 in Larnaca; R.Nederlands via Talata Volon 9.605 (Eng to S/E/W.Africa 1730-1930, C/W.Africa 1930-2025) 43433 at 1819 in Ross-on-Wye; DW via Kigali? 9.615 (Eng to W.Africa 2100-2150) SIO323 at 2100 in Swindon; UAER, Abu Dhabi 9.605 (Eng to W.USA 2200-0000) 43433 at 2256 in Stockport; RFI via Montsinery 9.800 (Sp to N.Am 2300-0000) 43433 at 2300 in Wigan; R.Bulgaria via Plovdiv 9.700 (Eng to N.Am 0000-0100) SIO444 at 0045 by **Francis Hearne** in N.Bristol; R.Nac del Paraguay 9.735 (Sp 0800-0400) 33553 at 0127 in Wallsend.

Some intended for European listeners came from R.Jordan via Al Karanah 9.560 (Ar, Eng 1500-1730) SIO322 at 1500 in Co.Fermanagh; VOA via Gloria 9.760 (Eng 1700-2100, also to N.Africa, M.East) 44444 at 2016 in Morden; R.Thailand, Bangkok 9.655 (Eng 2030-2045) heard at 2035 in Bournemouth; Voice of Turkey, Ankara 9.400 (Eng 2100-2150) 35242 at 2105 in Bridgwater; Monitor R.Int via WSHB 9.355 (Eng 2000-2200) 44444 at 2128 in Oxted; R.Cairo via Abis 9.900 (Eng 2115-2245) 44431 at 2227 in E.Worthing; R.Vilnius, Lithuania 9.710 (Eng 2230-2259) SIO444 at 2230 in Scalloway.

Broadcasters using the **7MHz (41m)** band to reach Europe include R.Japan via Skelton 7.230 (Jap, Eng 0500-0800) 54444 at 0700 in Appleby; Croatian R. via Deanovec 7.370 (News in Eng 0803 Sun) 45554 at 0805 in Wallsend; R.Korea, Seoul 7.550 (Eng 0800-0900) SIO433 at 0830 in Scalloway; R.Prague, Czech Rep 7.345 (Eng 1130-1157) SIO322 at 1130 in Co.Fermanagh; R.Nederlands via Nauen 7.130 (Eng 1130-1325) 43333 at 1145 in Stalbridge; Polish R, Warsaw 7.145 (Eng 1300-1355) SIO433 at 1300 in Swindon; AIR via Aligarh? 7.412 (Hi, Eng 1745-2230) 55333 at 1847 in Ross-on-Wye; R.Romania Int, Bucharest 7.195 (Eng 1900-1956) 32333 at 1940 in Newry; R.Budapest, Hungary 7.220 (Eng 2000-2030) 32132 at 2000 in Bishops Stortford; DW via Sines 7.285 (Eng 2000-2050) 43333 at 2030 in Morden; Israel R, Jerusalem 7.490 (Heb [Home Sce relay] 1800-0400, also to USA) heard at 2100 in Bournemouth; China R.Int via Russia 7.170 (Eng 2200-2257) 54444 at 2204 in Bushey Heath; WYFR via Okeechobee 7.355 (Sp 2200-2300) 43444 at 2205 in Rugby; R.Ukraine Int, Kiev 7.240 (Eng 2200-2300) 44344 at 2248 in Woking.

Some of the many broadcasts to other areas came from the Voice of Nigeria via Ikorodu 7.255 (Eng to W.Africa 0455-0700) 34333 at 0624 in Burnham-on-Crouch; WHRI South Bend 7.315 (Eng to E.USA 2300-1300) SIO444 at 0745 in Rotherham; R.Australia via Carnarvon 7.260 (Eng to S.Asia 1430-2100) SIO433 at 1430 in Edinburgh; VOA via Selebi-Phikwe 7.415 (Eng to Africa 1900-2200) 34223 at 1929 in Middlesbrough; R.Nacional de Angola 7.245 (Port 2200-2300) 22222 at 2248 in E.Worthing; WRNO New Orleans 7.355 (Eng to E.USA 2300-0300) 35333 at 2300 in Derby; R.Bulgaria via Plovdiv 7.205 (Eng to N.Am 0000-0100) 54444 at 0007 in Norwich; KTBN via Salt Lake City 7.510 (Eng to N.Am 0000-1600) 33333 at 0130 in Kilkeel.

In the **6MHz (49m)** band R.Japan via Skelton 5.975 (Jap, Eng to Eu 0500-0800) was SIO323 at 0700 in Co.Fermanagh; Polish R. Warsaw 6.135 (Eng to Eu 1300-1355) SIO222 at 1300 in Swindon; VOA via Philippines? 6.110 (Eng to S.Asia 1400-1800) 23552 at 1435 in Larnaca; R.Sultanate of Oman via Seeb 6.085 (Ar to M.East 1700-2200) was 'just audible' at 1920 in Oxted; R.Pyongyang, Korea 6.576 (Eng, Fr to Eu, M.East, Africa 2000-2150) 24122 at 2150 in Rugby; R.Vlaanderen Int, Belgium 5.910 (Eng to Eu 2200-2255) heard at 2210 in Bournemouth; VOFC Taiwan via WYFR? 5.810 (Eng to Eu 2200-2300) SIO222 at 2240 in Rotherham; RCI via Sackville 5.960 (Eng to USA 2200-0000) SIO222 at 2327 in Elgin & via Sines 6.150 (Eng to M.East 0400-0430) 44344 at 0405 in Norwich; R.Nederlands via Bonaire 6.165 (Eng to N.Am 2330-0125) 53433 at 0043 in Ross-on-Wye; BBC via Antigua 5.975 (Eng to C/S.Am 2100-0600) 44433 at 0046 in E.Worthing; DW via Antigua 6.040 (Eng to N.Am 0100-0150) SIO433 at 0115 in N.Bristol.

## Station Addresses

**BBC Southern Counties Radio**, Broadcasting Centre, Guildford, Surrey. GU2 5AP.

**ILR Radio City (Gold)**, P.O.Box 967, Liverpool L69 1TQ.

**Radiodiffusion Algerienne,** 21 Boulevard des Martyrs, Alger, Algeria.

**Radio Dniester International**, ul. 25 Oktyabrya 45, 278000 Tiraspol, Moldova.

**Radio Free Europe,** Oettingenstrasse 67, 80538 Munich, Germany.

**Etablissement de la Radiodiffusion TV Tunisienne (ERTT),** 71, Avenue de la Liberte, Tunis, Tunisia.

Andy Emmerson G8PTH, 71 Falcutt Way, Northampton NN2 8PH

# Watching Brief

## Our Quarterly Look at Amateur Television

Technology is the subject of this quarter's article, clearing up a couple of FAQs or Frequently Asked Questions.

What's the difference between a sync stabiliser and a time-base corrector? Will one do the job of the other and where can I get them?

There seems to be a bit of confusion over these two devices, that perform very different functions, so let's look first at the problem and then how we can solve it. Technical experts who think these explanations are a bit simplified are correct - they are, deliberately.

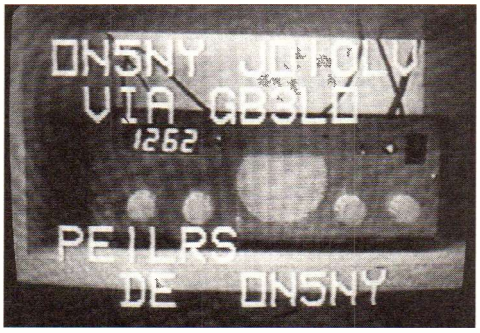
To display a video signal reliably, you need both picture information and synchronising information. This applies equally to over-the-air signals (amateur and broadcast), cable TV, satellite TV and the video signal coming off tape, and if the sync signals are weak or distorted, you cannot expect to see a proper signal. In amateur television, the sync's are often weak or defective because the signal has come a long way (propagation loss) or because the signal was not transmitted in a linear fashion in the first place! Hands up all licensed amateurs who monitor their transmitted signal with an off-air probe - not as many as I'd like to see!

DX television reception can suffer in the same way, whilst some satellite and cable TV signals have the syncs suppressed intentionally, so that only authorised viewers can see them (with a special decoder that reconstructs the sync signals).

Finally, in the case of video recordings, people sometimes have difficulty making stable copies from existing tapes, either because the first tape is a multiple generation copy (copy of a copy of a copy) or because the master tape has been 'nobbled' with Macrovision or some similar technique to prevent copying.

In most of these situations a sync restorer will help. The sync' restoration circuit takes the video signal, strips out the old syncs that are weak or distorted and inserts brand new syncs. It may perform other processing as well to ensure the video signal has the proper 70:30 sync-to-video ratio. A circuit for a sync restorer was published in the BATC magazine *CQ-TV* many issues ago, but it required a lot of patience in setting up to make it work well.

Commercial devices for the same purpose can be found among the small ads of satellite television and home video magazines The first type costs about £100 and is a proper professional device (and at that price you'd expect it to be). The second type go under the 'Bug Blaster' name (or something similar) and costs about £40 or £50. You can recognise them by the advertisements that rattle on about not using them to duplicate copyright films.




**Remarkably good pictures can be received on amateur television, especially when conditions are good. Here ON5NY in Belgium, shows his 24cm receiver to PE1LRS in the Netherlands - going via the Lowestoft (UK) repeater. Photo Paul Godfrey G8JBO.**

I haven't bought one of these, but another amateur who did said the product he bought was rubbish and not of merchantable quality; I suppose people are unlikely to complain that the pirate device they have just bought doesn't work!

Finally, I am told that the Panasonic video mixers have an effective sync regenerator circuit built-in (but you might not feel very keen about spending £700 or more just to get this facility).

What do time-base correctors do, then? Don't they also clean up video recordings with rolling pictures and wonky syncs? Well, yes and no. With all analogue video recordings a bit of instability is introduced by the recording process and a perfectly stable signal going in may not come out quite as good when replayed, particularly in a different machine. This is because the head drums are not always 100% round and in effect the tape speed is not absolutely constant.

The aberrations are trifling to begin with, but when a tape is copied, particularly on a machine with different characteristics, the errors are compounded. You can prove this to yourself by examining what's known as horizontal jitter. Look at vertical lines on a VHS recording (e.g. telegraph poles or lamp posts) and see how they look fuzzy. Now copy that tape several times and note how the vertical edges look far more indistinct. This is down to minute timing errors and the syncs are affected in the same way.

A time-base correct minimises this by playing the signal off tape through a framestore buffer. The best way I can describe this is as a kind of mangle that smoothes out minor 'crinkles' in the picture. Several of the better Panasonic video recorders have a time-base corrector (TBC) built-in nowadays and the improvement in picture quality is remarkable, particularly if you intend to re-record the programmed. You can get stand-alone time-base correctors but there are no consumer price models on the market. Professional models will be close to broadcast standard and way outside your budget, but if you check out the rally bargains and the second-hand lists of the pro video dealers, you can sometimes pick up a five-to-ten year old TBC for around £250. Don't expect any guarantee or paperwork with it at that price, though.

I use the little VHS-C cassettes in my camcorder. When I come to edit them to full-size VHS, will I get better results by playing them back in the camcorder or using an adapter in a normal VHS deck?

Good question: there's no easy answer. Camcorders are optimised for recording, not for playing back, so in theory you should get better results (with better picture processing) in a full-size deck, particularly if it uses a larger head drum size (for better speed regulation) and has an on-board TBC. That's the theory.

In practice, there's always the time-base error that I mentioned before between different machines, particularly when recorder and player use different size video head cylinders and tape wrap methods. Your best policy is to make a test and see which procedure gives better results.

Incidentally, the same applies with 8mm tapes, although more people use the camcorder to play back, simply because bench playback machines for 8mm are rather expensive and less common, relatively speaking.

If you have some pressing question about amateur television or video, do send it in. If it's of general interest, I'll answer it here in this column (but no personal replies unless accompanied by £50 notes - hi!).

**Air Supply,**
83b High Street,
Yeadon, Leeds LS19 7TA

**Holdings Amateur Electronics,**
45 Johnston Street,
Blackburn BB2 1EF

**Amateur Radio Communications Ltd,**
38 Bridge Street,
Newton-le-Willows,
Merseyside WA12 9BA

**AMDAT,**
4 Northville Road,
Northville,
Bristol BS7 0RG

**BBC World Service Bookshop,**
Bush House,
Strand,
London WC2 4PH

**Bredhurst Electronics Ltd,**
High Street,
Handcross,
Haywards Heath,
West Sussex RH17 6BW

**Cirkit Distribution Ltd,**
Park Lane,
Broxbourne,
Herts EN10 7NQ

**Electronics Equipment Bank,**
323 Mill Street NE,
Vienna,
VA 22180, USA

**Flightdeck,**
192 Wilmslow Road,
Heald Green,
Cheadle, Cheshire SK8 3BH

**Haydon Communications,**
132 High Street,
Edgware,
London HA8 7EL

**Lowe Electronics Ltd,**
Chesterfield Road,
Matlock,
Derbyshire DE4 5LE

**Lowe Electronics ,**
**Retail Branches:**
79/81 Gloucester Road,
Patchway,
Bristol BS12 5JW

152 High Street,
Chesterton,
Cambridge CB4 1NL

34 New Briggate,
Leeds LS1 6NU

Communications House,
Chatham Road,
Sandling, Maidstone ME14 3AY

Mitford House,
Newcastle International Airport,
Woolsington,
Newcastle-upon-Tyne NE20 9DF

117 Beaumont Road,
St Judes, Plymouth PL4 9EF

3 Weavers Walk,
Northbrook Street,
Newbury,
Berkshire

**Martin Lynch,**
140-142 Northfield Avenue,
Ealing, London W13 9SB

**QSL Communications,**
Unit 6,
Worle Industrial Centre,
Corker Road,
Worle, Western-Super-Mare BS22 0B

**The Radio Place,**
5675-A Power Inn Road,
Sacramento, CA95824, USA

**Tucker Electronics,**
1801 Reserve Street,
Gasland, TX 75042,
USA

**Ward Electronics,**
422 Bromford Lane,
Ward End,
Birmingham B8 2RX

**Waters & Stanton,**
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Essex,
SS5 4QS

12 North Street,
Hornchurch,
Essex

# TRADING POST

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**Alinco DJX1D** scanner, 200kHz to 1300MHz, comes with NiCad, charger, case and three aerials. All boxed, absolute mint condition, the very best you will find anywhere, used only twice, £250 o.n.o. Tel: Crawley (01293) 883356 evenings or anytime on Wednesdays.

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**AOR AR2000** hand-held scanner, 500kHz to 1300MHz continuous, no gaps, a.m., n.b.f.m., w.b.f.m., 1000 memories, complete with v.h.f./u.h.f. whip, NiCads, charger, soft case and operating manual, perfect, £200. Graeme G3GGL, Worcs. Tel: (01299) 403372.

**AOR AR2002** scanning receiver, p.s.u., instruction booklet, excellent condition, £200. ERA Microreader, version 4.2, as new, £95. ERA display unit RS232, as new, £90. Tel: Liverpool 0151-259 2456 after 6pm.

**AOR AR3000A** multi-mode scanner, as new, inc. manual, £550. Datong FL3 a.f. filter inc. manual, £70. ERA Microreader MkII inc. manual, £80. Postage extra. Tel: Lincs (01754) 611472 anytime.

**AOR2002** scanner, good condition, may be able to deliver, only, £250 o.n.o. Tel: Cardiff (01222) 712397 or (0585) 900124.

**AOR3000** and AOR900 hand-held, both boxed with instructions, no reasonable offer refused. Tel: Ipswich (01473) 241551.

**Bausch and Lomb** 8 x 40 legacy binoculars, unused with box and case, ideal aircraft spotting, cost £115, will accept £60. Also discone aerial for scanners or base set, unused, boxed, £25. Tel: Wigan (01942) 728531.

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**Drake R8E**, mint condition with Datong 370 active antenna, offered for sale at excellent price for this outstanding radio, owner non-smoker. Please no time wasters. Paul, West Yorkshire. Tel: (01924) 267509 after 1800 hours and before 2100 hours.

**Dressler ARA30** active short wave antenna, 50kHz to 40MHz, including cable, connectors, pole, clips. Good value for just, £35. Collect. Tel: N. London 0171-700 1540.

**Early transistor radios**, Hacker NORP37, RP37A, RR35, Roberts, Bush, Marconi, all excellent condition. Akai reel to reel, model 1721W, lots of tapes, Mozart box of valves, about 150. Exchange for communications receiver or sell. Tel: Bradford (01274) 573370.

**Eddystone 880 MkII**, £180. 940, £150. 680X, £140. 730, £100. 640, £80. EC10, £60. Marconi TF144H sig. gen., 72MHz, £45. 606B sig. gen. 50kHz to 65MHz, £45. R107, £65. Advance scope 35MHz, £90. Alan, Berks. Tel: (01344) 27869 ('phone or fax).

**Fairmate HP200E** scanner 500kHz - 1300MHz, 1000ck memory, a.m., f.m., w.f.m., boxed, as new, complete with all accessories inc. three antennas, charger, carrying case, etc., a fine example of this highly rated hand-held, £200. Tel: Harrogate (01423) 770860.

**Flight disk**, latest World Airways Guide on disk for Microsoft Windows 386 computer onwards. Requires Windows 3.1, 4Mb RAM world-wide data on airlines, flights, airports, etc., £45 inc P&P. Tel: Oxford. Tel: (01865) 749374.

**Frequency calibrator**, 50MHz to 11GHz, £100. Wayne Kerr waveform analyser, £60. Guided missile monitor, £50. Radio compass (direction finding) receiver, £30. Buyer collects. R. Hayward, Kent. Tel: (01304) 853375.

**Grundig Satellit 650**, still in box, as new with 'joystick' aerial, £200. Tel: West London 0181-578 2774.

**Grundig Satellit 700** world receiver, immaculate condition, purchased on 28.10.94, hardly used, still under guarantee, boxed with manual, £200. No offers and buyer collects. John, Glasgow. Tel: 0141-558 6345.

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**Icom SP20** speaker with filters, as new, will utilise two radios at once, £80. Tel: Lincs (01754) 762359 anytime.

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**Internal 500Mb SCS1** 5.25in tape back-up unit with PC-15A adapter card (1510) and connecting cables, mint condition, £300, price includes delivery. Stephen, London. Tel: (01956) 544202 evenings/weekends.

**JRC NRD535**, mint condition, £950 o.n.o. Computers 386 SX20 with printer, modem, sound card, £400. Toshiba T1000SE lap top, £200. Peter GM7JFR, Glasgow. Tel: 0141-942 2432.

**Kenwood R2000**, 0-30MHz plus VC10 converter, 118-174MHz with a.t.u. and manuals, all as new, £360. J. Green, Kent. Tel: (01303) 241452.

**Kenwood R5000** with SP23 speaker, ERA Mkl Microreader, Global a.t.u. AT1000, Datong AD370, Morse tutor, all v.g.c., £750 o.n.o. Tel: Totnes (01803) 864661.

**Lowe HF225 Europa**, six months old, as new, £500. Cash only and buyer to inspect and collect. Martin G3NGC, Cheltenham. Tel: (01242) 519281.

**M8000 universal decoder** with VGA video monitor and manual, all leads and original box, cost £1300, accept £600. B. M. Davies, Dyfed. Tel: (01267) 267649.

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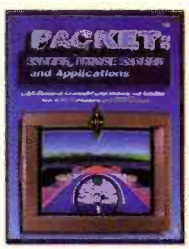


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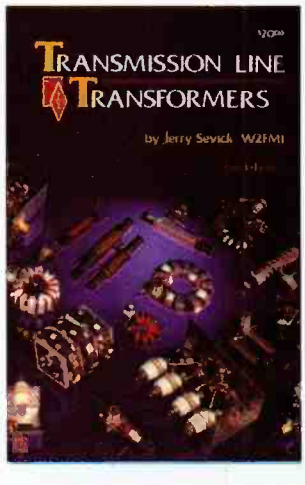

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