FOR THE RADIO LISTENER

shortwave magazine

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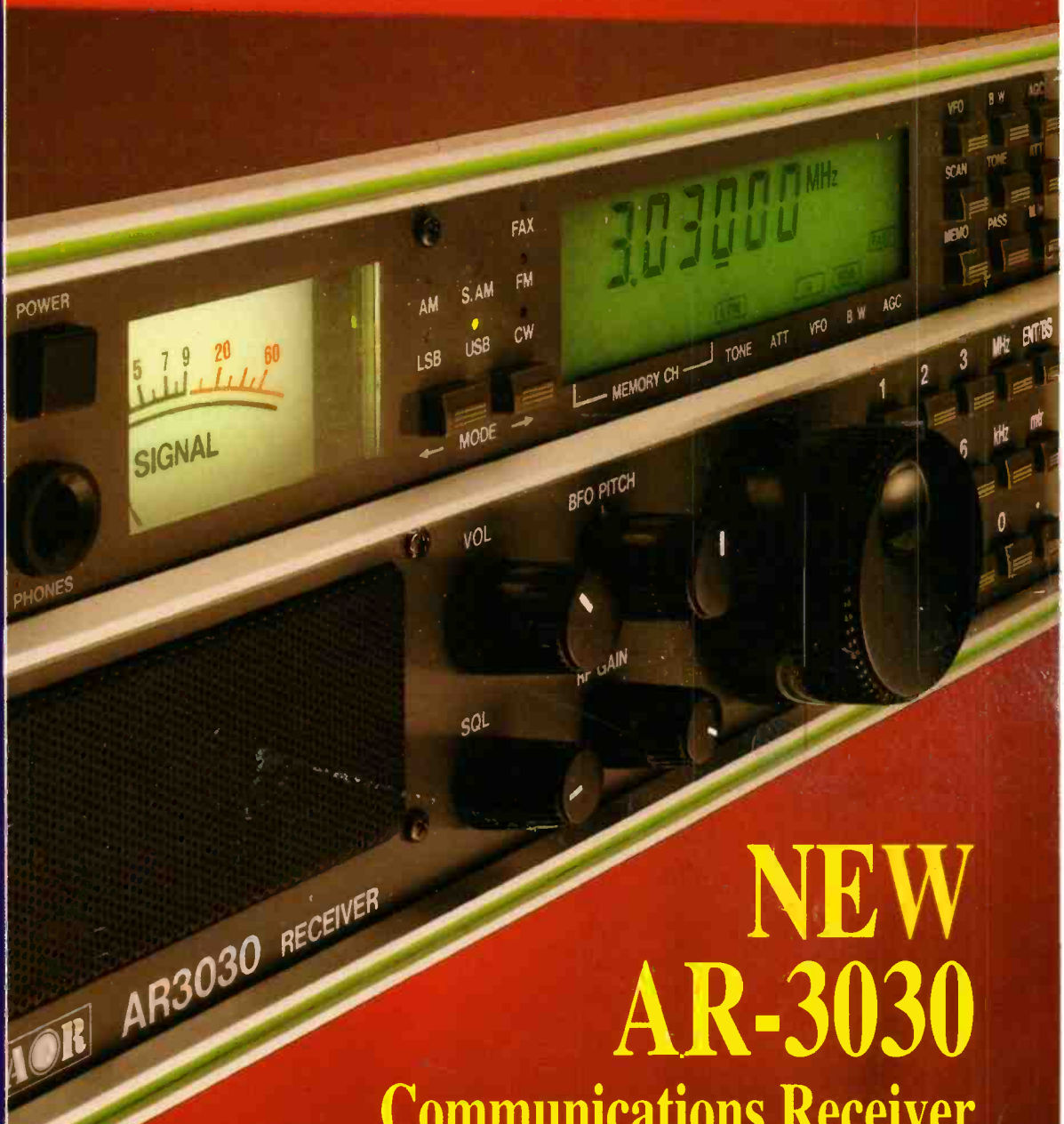
SCOOP PREVIEW



NEW AR-3030 Communications Receiver

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short wave magazine

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Our cover this month shows a striking view of the new AR3030 receiver from AOR, previewed in this issue.

Photo: Craig Dyball

features

regulars

good listening

editorial

SWM SERVICES

Subscriptions

Subscriptions are available at £22 per annum to UK addresses, £25 in Europe and £27 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 £39 (UK) £42 (Europe) and £45 (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, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past five years are available at £2.00 each including P&P to addresses at home and overseas (by surface mail).

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 (0202) 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 (0202) 659950.

Scoop

Every once in a while a manufacturer produces something radically different and surprises us all. *Short Wave Magazine* has been allowed to preview the 'beta' production model of the brand new AOR AR-3030 communications receiver and you can read all about it in this issue. I must stress that this is only a preview, not a full-blown review, as there was not enough time available to do otherwise. As the differences between 'beta' model and the first production models will be minimal and mainly cosmetic, I felt justified in previewing it. We will, however, be carrying out a full review later in the year.

The editor of any magazine is on the horns of a dilema at this time of the year. As I write this, Christmas is still over three weeks away and the magazine is due to go on sale on the Tuesday immediately before Christmas. Should I have wished you season's greetings last month, so that overseas readers might have stood a chance of getting them before Christmas, or have I made the right decision by waiting until this issue? Anyway, have a very merry Christmas and may 1994 be everything that you wish it to be.

Dick Ganderton G8VFH

letters

Dear Sir
As a scanning enthusiast, I must say how much I enjoyed the November issue of *SWM* with it s great devotion to scanning.

The *What Scanner* section has also inspired me to upgrade my present scanner. I will however, continue to resist the temptation of an external antenna. I would also urge other readers to resist, as a large Discone on the chimney is the perfect advert to the opportunist thief that your house contains expensive radio equipment, very much in demand.

Until antennas become more discreet, maybe more enthusiasts should consider experimenting with loft antennas or a well disguised external one.

Andrew Provins
Berkshire

Hiding antennas has been a problem since the early days of radio. Please let us know your solutions to this problem, we may devote a page or two to this if we get enough replies ***Ed***

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

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
In the November edition of *Short Wave Magazine,* 'Letters' section, you received a query from S. Malcom in Belgium regarding his apprehension in using new batteries for the computer back-up on his Sangean ATS-803A.

As an ex-ATS-803A user, I found that there were often a few quirks in the receiver when changing the AA back-up batteries. The answer to S. Malcom's problem of incorrect frequency displays, a static clock and inoperative buttons is that when he replaced his rechargeables with new Alkalines, the micro-processor failed to initialise. The solution to this problem is quite simple. Remove all batteries from the receiver and leave the battery compartment empty for at least ten minutes before inserting the new batteries. When the new batteries are inserted, the receiver should work correctly.

One other quirk I found with battery replacement was that if the external d.c. adapter is connected to the receiver without the two internal AA back-up batteries being installed the micro-processor crashes. On the occasions when this happens it is sometimes possible to tune frequencies as low as 20kHz, way below the sets standard operation of 150kHz. These low frequencies are obtained by checking the nine memories, as sometimes frequencies around 25kHz can be recalled. Once recalled, the user can tune upwards in frequency using the UP key or manual tuning knob. Should the user try to tune down in frequency from the recalled memory, the set automatically returns to 150kHz. I was able to check that the display was correct, as I was easily able to tune in the time signal station in Rugby MSF when the display reads 60kHz.

Graham Powell
South Wales

letters

Dear Sir
I agree wholeheartedly with the comments made by S. Bates in the December issue of *SWM* regarding portable equipment and protective cases.

During 1992 I purchased a Kenwood TH77E dual-band hand-held transceiver. To my surprise and disappointment I found that there was NO protective case supplied with the rig despite the rig costing over £400.

I later discovered that there were two different soft cases available to suit the unit depending on which type of battery you were using to power it. To add insult to the injury, neither case would fit the rig if the other battery was being used (fancy that!). It took several telephone calls to the various dealers before I actually managed to find the correct one, in fact I think the phone calls eventually cost more than the case.

I appreciate that the equipment manufacturers have to 'make a living' and I've no doubt that the prospect of selling as many soft cases, at around £15 a time, as actual rigs is an opportunity just too good to miss for them, but surely the new owner deserves some method of protecting their new purchase provided as standard with incurring even more costs to themselves.

Perhaps a simple protective cover supplied with the rig is the answer, with a more elaborate version being available at an extra charge if required. In this way, you could choose the appropriate case to suit your needs without paying out even more money if the unit is only rarely to be used outside.

Chris Carrington
Derby

Dear Sir
I am sure that many of your readers are aware of the excellent synchronisation achieved by the BBC between a.m. transmitters sharing the same frequency allocation. During daylight hours at this location, I can receive BBC Radio 5 from their Tywyn (Wales) outlet on 990kHz with Radio Devon being clearly heard in the background. However, no annoying 'rising and falling' of volume occurs, i.e. no beat frequency whatsoever from the two stations.

Contrast this by tuning into the longwave band any evening and hear the severe beats which exists from 'Atlantic 252' and Tipaza Algeria on 252kHz. It's the same story on numerous m.w. frequency allocations.

Surely synchronisation should be achieved on an international basis? All major European and North African broadcasters on m.w. and l.w. could exactly synchronise their co-channel transmitters using a single frequency reference source, supplied to all stations by satellite.

David Baker, Eire

Dear Sir
With reference to the letter from Mr Furness (November *SWM*, page 3). Mr Furness wrote for help in getting into ham radio despite his hearing defect.

Mr Furness will not be the only person with such a problem so I though this letter would be of wider benefit if I sent it to *SWM* as well as to Mr Furness.

My suggestion is that Mr Furness should consider data comms. So long as he can read a computer screen and use a keyboard, he can use data comms within ham radio.

Data comms on h.f. offers RTTY, c.w., AMTOR and Pactor as well as packet. Whilst finding and tuning these signals, it is easier with good hearing, tuning aids such as the l.e.d. display on the Kantronics KAM TNC, (which is the TNC. I use), would be of considerable help to Mr Furness. If he is not able to take the c.w. test then packet on v.h.f., where channelised operation obviates the need for tuning would be of interest to him.

There are several multimode TNCs and software packages on the market and I am sure that suppliers such as Siskin Electronics, ICS, Lowe Electronics and Grosvenor Software would be willing to help Mr Furness, (and others in a similar plight) in his choice of equipment.

Finally, BARTG, the national data comms group, would also be willing to help get Mr Furness into ham radio.

Ian Brothwell G4EAN
Secretary, British Amateur Radio Teledata Group
56, Arnot Hill Road, Arnold, Nottingham NG5 6LQ

Dear Sir
With regards to Michael Stott's letter about whinging, why is it classed as whinging if a station has an opinion for a Morse-free test for the A licence, but not classed as whinging, if you want to take the test with Morse.

He gives the impression that Morse is the be all and end all of amateur radio. Why should Morse be forced on the amateur, who thinks of it as just a mode, which is all it means to a lot of people?

I would have thought that Michael would be pleased that not every station sends Morse, it makes more room for him.

When I send DX, I don't worry if another person cannot work the same mode as me. If you are worried about over-crowding, then let's make part of each band c.w. only. If I ever pass a Morse test, I still won't be able to construct a low powered radio, not that I wish to!

Michael would like us all to believe that Morse is a common language, therefore, if Morse is sent from Japan or Russia or from any other English speaking country, then that must mean that if he writes down every letter, then he must also be able to speak their language? or is his QSO a report or only a locator.

Every QSO that I have had in c.w. has been in English and not just a report and locator, and could have been done by phone.

Why is Michael playing with his key, when you can use a computer that will send Morse as well as receive it. Both the Army and Commercial Radio say that it is a good idea, some say it's too easy, the send is too perfect!

So, just what is the point Michael, the loss of Morse as a mode, over-crowding, or the erosion of the h.f. band? Or, is the loss of Morse to some of our fellow amateurs then end of an ego trip. Don't you think that any real problems could be worked out to the good of the hobby.

I would just like to say to Michael, that I would defend his right to use Morse or any other mode. There should be a test for the A licence, but there should also be a period of time. The test could be the Morse code alphabet, not receive or send, including. band plans, correct use of radio and a five year wait upon B to A.

If you want to use h.f. sooner, then you have to take the Morse test. This would at least give some hope to stations who cannot send Morse, due to not being able to spell or read properly, doesn't mean that they are bad radio users.

I myself just want to use my radio without interference, or interfering with other stations and I ask you to have an open mind.

K. Brown G7EXO
Hants

Dear Sir
Having read the description of your test of an AN1 Sony wide range antenna, (page 13, December issue of *SWM*). I purchased this item months ago for £49.95 from a Sony agent to use mainly with my Sony SW7600 and general various radios.

I found it had no use whatsoever in my area and plugged it into the SW7600, in fact, it took away my existing signals from the built-in aerial.

Having tried to obtain a transformer from Sony to cut the cost of constantly buying 6 x AA batteries, I was told that a 9V transformer for the AN1 (exclusive to Sony only) was over £72. An expensive antenna wouldn't you say?

D. A. Grant
Worcestershire

This unit requires 9V d.c. at a very low current and can easily be powered from one of the many 'universal' small power units available at a fraction of the cost. The batteries should last for many months - if yours were being flattened quickly it would indicate a fault in the unit, perhaps explaining the poor performance. I suggest you return it to you dealer for a check. - ***Ed***

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.

rallies

February 13: 3rd Northern Cross Rally will be held at Rodillian School on the A61 between Leeds and Wakefield (near junction M1/M62). Doors open 11am (10.30am disabled visitors and Bring & Buy). Usual dealers, ample parking, bar and refreshments, Morse Tests. Talk-in on S22. **Dave Gray. Tel: (0532) 827883.**

***February 20**: The Great Northern Rally, G-MEX, City Centre, Manchester. All the usual attractions, including free tea and coffee until 10am, cafeteria for hot and cold refreshments, licensed bar, Bring & Buy, Talk-in on 144MHz via GB1GMEX. Admission £1.50, doors open at 10.30, close at 5pm with priority for the disabled. Further information on **061-748 9804.**

February 26: 9th Rainham Radio Rally, this year a new and larger venue at the Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent, easy to find from junction 4, M2 motorway, A278 or the A2 from Rainham, just follow the R R R arrows or send an s.a.e. for a map. More space, more traders, ample parking, Bring & Buy, refreshments and snacks area with tables and chairs, all on one level, easy access for disabled. Admission £1, children under 16, free. Talk-in by GB4RRR on S22. **G7JBO. Tel: (0634) 365980.**

March 27: The Bournemouth Radio Society is holding its 7th annual sale at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open at 10am, close of 4pm. Talk-in from G1BRS on 2m S22. Amateur radio and computer traders, clubs and specialised groups. Excellent refreshments. Admission £1.00 including free raffle ticket. **Ian G2BDV, QTHR. Tel: (0202) 886887.**

May 2: Dartmoor Radio Rally, Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Parking for 600 cars, access for disabled, playground for children. Trade stands, Bring & Buy etc., refreshments talk-in on S22. **Ron. Tel: (0822) 852586.**

May 29: The 18th Annual East Suffolk Wireless Revival, The Maidenhall Sports Centre, Stoke Park Drive, Ipswich, Suffolk. Bring & Buy, car boot, vintage radio display, novice stall, RAIBC, BYLARA, RAYNET stands, non- radio stalls and refreshments and lots more. Talk-in on S22 GB4SWR and lots more. Admission includes car parking. **Bob Baal. Tel: (0394) 271257.**

If you're travelling **long** distances to rallies, it could be worth 'phoning the contact number before setting off to check all is well.

* Short Wave Magazine & Practical Wireless in attendance

AVON

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. December 22 - Hair of the dog, 29th - Greetings to old friends on 2m/70cm, January 5 - c.w. night activity, 12th - Table sale, Bring & Sell % to club funds, 19th - Show off your QSL cards, 26th - Computer shareware, how about sharing! For more information ring 02758 32222 on a Wednesday evening.

DERBYSHIRE

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. December 22 - Christmas party, January 5 - New year surplus sale, 12th - Visit by SMC Chesterfield. Mrs Hayley Winfield, 2 Hilts Cottages, Crich, Matlock, Derbyshire DE4 5DD. (0773) 856904.

DEVON

Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. January 21 - Construction night. Peter G4UTO. (0803) 864528.

ESSEX

Vange ARS: Thursdays 8pm, Barnstable Community Centre, Long Riding, Basildon, Essex. January 6 - Junk sale, 13th - GUNS, Bob G3IUC, 20th - Film: The catch nobody wants, Roy G3ASH. Doris. (0268) 552606.

FIFE

Dundee ARC: Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. December 21 - Construction night, January 11 - Construction night, 18th - Members' mini lectures, 25th - Construction night. GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

GREATER LONDON

Acton, Brentford & Chiswick RC: 3rd Tuesdays, 7.30pm. Chiswick Town Hall, Heathfield Terrace, Chiswick, W4. January 18 - AGM. Colm. 081-749 9972.

Edgware & DRS:-Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. January 13 - AGM. Rod Bishop 081-204 1868.

HAMPSHIRE

Horndean & DARC: 1st Thursdays, 7.30pm. Horndean Community School, Barton Cross, Horndean. January 6 - Talk by Keith Ridley, Deputy Editor of the Portsmouth area local newspaper 'The News'. S. Swain (0705) 472846.

HERTFORDSHIRE

Dacorum AR & TS: 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. December 21 - Club Christmas dinner. Nicholas Camp, 48 Northfield Road, Harpenden, Herts AL5 5HZ.

Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. December 23 - Christmas social, January 20 - Talk 'Have fun with QRP' by Wayne G0JJQ. Peter G0KLU. (0992) 633036.

HUMBERSIDE

Wirral & DARC: 1st & 2nd Wednesdays, 8pm. Irby Cricket Club, Mill Hill Road, Irby, Wirral. December 22 - Chairman's night, this year's Chairman's surprise talk, 29th - D&W The Ridger, Newton, January 5 - D&W, The 12th Man, Greasby, 12th - AGM, 8pm at Irby C.C., 19th - D&W The Black Horse, Lower Heswall, 26th - Surplus equipment & junk sale. Paul 051-648 5892. (D&W = drinks and waffle).

KENT

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. January 18 - 1994 AGM. A. Messenger. 081-777 0420.

Medway AR & TS: Fridays, 7.30pm. Tunbury Hall Catkin Close, Tunbury Avenue, Walderslade, Chatham. January 7 - The VIP quiz by John G6IVP, 21st - Icom amateur radio. Gloria. (0634) 710023.

NORFOLK

Norfolk ARC: Wednesdays, 7.30pm. Formal meetings: University Arms, South Park Avenue, Norwich, Informal meetings: Hewett School, Hall Road, Norwich. January 5 - (formal) Club quiz, chaired by Sheila G0KWP, 12th - (informal) Real radio evening, 19th - (formal) Operating packet by Roger G3LDI and Paul G4VLS, 26th - (informal) Committee meeting, night on air. Sheila Snelling G0KPW. (0603) 618810.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. January 10 - Talk by Rob Mannion G3XFD, Editor of *Practical Wireless*. Mary G0NZA. (0623) 755288.

South Notts ARC: Fridays, 7pm. Highbank Community Centre or Fairham Community College, Farnborough Road, Clifton Estate, Nottingham. December 26 - Talk in on S22 & on air - h.f. + v.h.f. + construction at Fairham College. Julie Brown G0SOU. (0602) 211069.

SCOTLAND

Milton of Campsie ARS: 2nd Wednesdays, 7.30pm. Milton of Campsie Community Hall. Alan Foulis GM7PGT. 041-779 1444.

SOMERSET

Wincanton ARC: 1st & 3rd Mondays, 7.30pm. The Community Lounge, King Arthur's Community School, Wincanton, Somerset BA9 9BX. January 10 - Packet radio, 24th - Open evening. Dave G3ZXX. (0963) 34360 Or Andy G1FPW. (0747) 51381.

SUFFOLK

Sudbury & DRA: 1st Tuesdays, Wells Hall, Old School, Great Cornard, 3rd Tuesday, Five Bells Public House, Bures Road, Great Cornard. January 4 - Talk with hardware by Nigel G0ORI - Computers, 18th - Natter and noggin at 5 Bells Public House. Tony Harman G8LTY (0787) 313212.

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. December 25 - Morning on the air, 11am, 145.275MHz, January 10 - New year social, 24th - European Space Agency by Tony Potter G3ESK. Mr A Beasley G0CXJ. (0608) 682495.

WEST MIDLANDS

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. January 12 - HQ talk/slides 'Holes in the ground' by Dudley Canal Trust. G1DKI. 021-474 3784.

WILTSHIRE

Trowbridge & DARC: 3rd Wednesday. The Southwick Village Hall, Southwick, Trowbridge. January 5 - Social, 19th - AGM. Ian G0GRI. (0225) 864698.

Jon Jones
PO Box 59
Fishponds
Bristol BS16 4LH

junior listener

The interest of **Basil Parylo** of Bingley in short wave listening has been kindled through using his International 977R receiver. This covers several v.h.f. bands and lets him listen to his favourite air band and CB signals. With his interest awakened, Basil is now looking to buy a more sophisticated receiver for his v.h.f. listening. His problem is that, having read the *What Scanner Supplement*, he's doesn't understand the difference between the various modes that the scanners cover. He also asks why there's such a big price difference between models with similar facilities. I'll try and provide a simplified answer!

Let's start with the different receive modes, what they mean and where they're used. By far the most common mode used on the v.h.f. and u.h.f. bands is **frequency modulation** or **f.m.** However, there are two main variants that are catered for by most receivers - wideband f.m. and narrowband f.m. These are commonly abbreviated to **w.f.m.** or **w.b.f.m.** and **n.b.f.m.** So, why do we need different types of f.m.? The answer lies in the information being carried by the transmission. Broadcast signals such as the stereo transmissions from the BBC need to be very high quality to satisfy all the hi-fi enthusiasts. The only way to achieve this is to use a larger proportion of the radio spectrum and so the signal is called wideband. The opposite of this is narrow band f.m., which is used to handle what is known as communication quality signals. These are transmissions that are used primarily for speech such as taxis, gas, electricity, etc. These signals are commonly known as Private Mobile Radio (PMR) and appear throughout the v.h.f./u.h.f. spectrum. If you're interested in amateur radio communications, they also use n.b.f.m. extensively.

Those of you with an interest in Civil Aviation will need to ensure that your scanner can receive **amplitude modulation** signals (**a.m.**) as this is the main mode used in the 108-136.8MHz air band.

A look through the specification of some of the more sophisticated scanners with wide frequency coverage will reveal a few modes not covered so far such as **s.s.b. (single sideband)**, **u.s.b. (upper sideband)**, **l.s.b. (lower sideband)** and **c.w. (continuous wave)**. The sideband modes are actually variations of a.m. and are mainly used on the h.f. bands for speech communications. The last one, c.w., is perhaps the simplest system of all and is used for Morse code transmissions. Although these modes can be very interesting, they are very much in a minority on the v.h.f. and u.h.f. bands.

Now we come onto the question of why the prices of receivers with similar modes and frequency coverage vary so widely. As you can probably guess, the answer lies in the quality of the receiver. When designing a receiver to cover a very wide frequency range such as that of a modern scanner, there are a number of difficult problems to deal with. Perhaps the most significant of these is keeping out all the unwanted signals.

You can visualise the problem by putting yourself in the position of someone trying to listen to a conversation on the far side of a crowded room. In order to do this, your brain has to filter out all the unwanted closer and louder signals between you and the conversation in question. This is exactly what the electronics in the scanner has to do, but in this case it's radio signals that have to be sorted out. It's when operating under difficult conditions that the better quality, and inevitable more expensive, receivers come into their own. You will often find that the cheaper models suffer from all manner of false signals breaking through on top of the signals you're trying to receive.

Spanish Lessons

Back in the November issue, I replied to Russell Cox telling him where he could find better quality Spanish language transmissions. This month I received a letter from **John Diggins** of Matching Tye (wonderful name!) in Essex. John points out that excellent Spanish transmissions can be obtained from satellite TV. If you're worried about the price, John managed to pick-up a second-hand Amstrad SRX-200 receiver and dish for just £80.

If you're lucky enough to have a system installed and set to the popular Astra satellites, try tuning to Galavision on Channel 44 as this station transmits Spanish programmes without encryption.

Auto-Vox

Radio Research, based in Whitmore, have recently sent me details of an interesting little device that may be of particular interest to those of you with scanning receivers. How many times have you had to sit on an interesting channel for ages just waiting for it to burst into life with a few gems of information. Judging from the information supplied, Radio Research may have this taped (literally) with their Auto-Vox unit. This ingenious device is connected between the output of your scanner and any tape recorder with a remote socket.

In use, all you have to do is tune to the required signal, set the squelch control so that the background noise is eliminated and start recording. The Auto-Vox contains a detector circuit that starts the recorder when the squelch is lifted and stops it again two seconds after the squelch closes. The end result is that all the activity on the required channel is compressed into a much more usable form. Like all the best ideas it's simple and very effective.

The Auto-Vox can be supplied as a kit at £12.50 or ready-built and tested at £25.00. For more details contact **Radio Research at 3 Pasture Close, Baldwin Gate, Newcastle, Staffs ST5 5DQ**.

That's all for this month, I've had to hang onto a few of your letters and I'll do my best to include them next month. I hope you all have a very good Christmas and New Year and keep your information and letters coming.

news

BBC World Service Achieves Record Audience

New audience figures recently published show that the BBC World service radio programmes are now listened to by 130 million people world wide. The true size of the audience for the Service's 39-language broadcasts could be much larger as the total excludes any estimate for countries such as China, Iran, Iraq and Vietnam. Recent increases in the size of the audience in Africa, the Middle East and parts of Asia have helped boost the total to more than twice that of the Service's nearest rival, Voice of America.

"These new figures show that since the ending of the Cold War, demand for our services is greater than ever. We have been adapting our broadcasting to changing audience needs in a different and in some ways more uncertain world," said Bob Phillis, Managing Director World Service and BBC Deputy Director-General. "It is a major success - a great British achievement - but it will not be easy to sustain this position as the world leader in our field on a lower level of funding".

BBC World Service,
Bush House,
Strand,
London WC2B 4PH.

International Radio: Times and Frequencies

The **Red Cross Broadcasting Service**, from the organisation's headquarters in Geneva, will be on the air on Sunday 26 December, Monday 27 December and Sunday 30 January and Monday 31 January with English on Sunday at 1100 on 7.21MHz, and on Monday at 1700, also on 7.21MHz.

The English service of **Radio Havana Cuba** has been changed to 2100 on 15.165MHz. The broadcast lasts an hour. Spanish is on the air at 2100 for two hours on 15.195 and 11.875MHz, and on an upper sideband frequency of 13.715MHz.

Radio New Zealand, using a 100kW transmitter at Rangitaiki, is on the air between 2137 and 0700 on 15.12MHz, from 0700 to 1205 on 9.70MHz 1650 to 2137 on 11.735MHz. The Radio New Zealand transmitter also carries half an hour of BBC World Service to the Pacific on 9.70MHz at 1100 UTC.

Channel Africa, broadcasting from Johannesburg to the African continent, has English at 0500 on 9.73 and 5.96MHz, 0500-0600 on 11.745 and 7.23MHz, 0600-0700 on 17.71 and 7.23MHz, 1000-1100 on 17.805MHz, 1100-1200 on 9.73MHz, 1500-1800 on 15.24 and 7.27MHz.

Radio Norway's weekly English language programmes are beamed to European audiences on Sunday at 1000 on 21.705 and 17.84MHz, 1800 on 11.86 and 9.59MHz and at 2000 on 9.59MHz.

Australia's newest short wave radio station - **Australian Armed Forces Radio** (AAFR) - welcomes reception reports. The station broadcasts four one-hour slots daily: 23.6785MHz at 0300UTC, 20.4185MHz at 0900UTC, 12.0705MHz at 1200UTC. In addition there are broadcasts on Mondays and Fridays only on 19.0375MHz at 0300UTC, 25.3225MHz at 0900UTC and 13.5085MHz at 1400UTC. Reports are welcome and all correct ones will be verified. Send you reports to: **Electronic Media Unit, Department of Defence, B1-B07 Anzac Park West, Reid, A.C.T. 2601, Australia.**

If you want to listen intently to the programmes of some international broadcasters, but do not want the snap, crackle and pop of short wave, then you'll need a satellite dish pointed towards Astra. Tune your satellite receiver to transponder 22 (MTV) and the audio subcarrier at 7.74MHz. Then you will be able to hear **Radio Netherlands** (0230 and 1730), **Radio Australia** (0800 and 1600), the **Voice of Israel** (1130) and **Radio Finland** (1500).

Also to be heard is the US public broadcaster, **National Public Radio**, on the air at 0600, 1900 and 2200. There is also a relay of **RTE** Radio 1 from Dublin at 1830.

RADIO AND TVDX NEWS

More TV channels for Doordashan in India. - five satellite channels are now to be terrestrially transmitted following a general thumbs down and lack of system carriage by cable operators. Satellite viewers are still tuned in to the Star TV service via AsiaSat and land based transmissions should encourage viewers away from Star's offerings. Low power transmitters will be installed in Bombay, Madras, Delhi and Calcutta, using a mix of Band 3 CHs. E5,7 and u.h.f. 23, 26 and 29. Meanwhile the Russian Ekran u.h.f. satellite is now transmitting across India for about 3 hours daily in the Malayalam language.

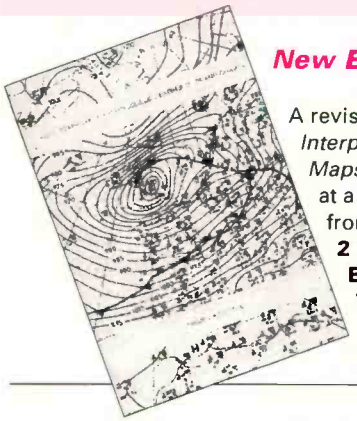
The French have backed the start-up of the new Palestinian TV service on the West Bank at Ramallah with a grant of over £2 million. The PTA (Palestinian Television Authority) is now testing and hopefully will be in full service in January '94. A radio service is also planned.

There are now five TV channels operating in Estonia, the latest being 'Kanal Kaks' which provides a general menu of entertainment interspersed with CNN news. The commercial channel intends to expand into Lithuania, Latvia and Finland. And in Russia 'NTV' has opened a commercial channel across Moscow concentrating initially on news and factual programming extending into general entertainment with bought-in Western programmes.

After the Russian Revolution-2 in early October, damage to the main Ostankino TV transmitter and studio centre in Moscow has been totalled to $8 million. Many communication systems and editing suites have been destroyed together with stored video tapes and films - mainly archive material.

Norway's new 24 hour commercial radio station 'P4' has gained audiences far over the anticipated numbers. Operating out of the Lillehammer and Oslo studios the system runs mainly on automation with minimal staff.

Finally in Eire the new Gaelic language channel 'Telefis na Gaeilge' is likely to start in 1994 with the government funding the start-up to nearly £Ir15m and annual costs of similar value.



New Edition

A revised edition of *The Interpretation of Facsimile Weather Maps and Charts* is now available, at a price of £7.50 (UK post paid) from the author **Philip Mitchell, 2 The Marlowes, Newbury, Berks RG14 7AW. Tel: (0635) 48633.**

Listeners' Group Formed

A new group dedicated to h.f. and airband listening has been formed and will be producing newsletters, frequency lists etc. An s.a.e. to **SWIG, 4 Markenfield, Swindon, Wilts SN5 8AA** will bring further information.

Last Chance for Software

After many years, Technical Software have decided to close down the radio software side of their business in order to concentrate on other things. Sales of radio software and the associated hardware will end on 4 March, but support will continue as usual.

This will be the last chance to buy their products, so get your orders in while things are still available. There are bound to be some last-minute bargains so a phone call or s.a.e. to **Technical Software, Fron, Upper Llandwrog, Caernarfon, Gwynedd LL54 7RF Tel: (0286) 881886** could be beneficial.

news

Major Changes at Lowe Electronics

On 1 January 1994 the team which designs and manufactures the Lowe range of receivers and accessories will be separated from Lowe Electronic's retail operation and stand alone as an independent manufacturing company.

The new company, **Lowe Production Ltd.**, will be headed by John Wilson as Managing Director who says, "I am obviously delighted that our efforts have been so successful and I wish to thank all who supported my dreams of establishing a British manufacturing presence in the tough world of electronics". John describes himself as the "dreamer" and John Thorpe, the designer of the receivers, as the "genius" behind the organisation.

The new company will be operating from a changed location at **Unit 23, Cromford Mill, Cromford, Matlock, Derbyshire DE4 3RQ Tel: (0629) 826157**, where they will be happy to receive calls and visits from well wishers.

Guide to Packet Radio

Several years ago the British Radio Teledata Group (BARTG) published its *Beginners Guide to Packet Radio* in response to the growing need for a book, suitable for the newcomer, about packet. Many hundreds of copies were sold.

Time has marched on and BARTG has produced a completely new book for the newcomer to packet, *The BARTG Guide to Packet Radio*. The aim of the author, Ian Wade G3NRW, was to provide a friendly and clear introduction to packet. The book is now available by post from BARTG's Publications Manager **Mark Ashby G6WRB, 47 Ryton Close, Luton, Beds LU1 5SR. Tel: (0582) 36094**, at a price of £1 including p&p.

New ISWL Guide

The *Guide to English Language Shortwave Broadcasts to Europe (Winter Schedules - 1993/1994)* has just been published. This 28-page booklet provides information, grouped by time period, of English language programmes including country, station names, frequencies, and programme details, e.g.. news, features, sport or religious. Of special interest to listeners is the listing of DX programmes. The booklet costs £1.30 (cheque, PO, postage stamps or 2 IRCs) post paid from **International Short Wave League, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.**

Alinco Open Day

Haydon Communications are holding an Alinco Open Day from 10am to 6pm on 29 January. Representatives from Alinco Distribution (UK) will be on hand to answer all your questions. If this isn't enough to tempt you there will be free food and drink available as well as huge savings (more than usual they say) on equipment.

Haydon Communications, 132 High Street, Edgware, London HA8 7EL Tel/Fax: 081-951 5782

ZD8 Callsigns

Ascension ARC records showing callsign allocations over the years have been destroyed. Chris Salmon ZD8X has informed us that they are holding a large number of QSL cards for various ZD8 calls, mostly issued to short-term visitors of whom they have no records. If anyone has any information (no matter how old as they have recently received a batch of cards for an operation in 1964!) please contact **Chris Salmon ZD8X, CSO, PO Box 2, Ascension Island, South Atlantic Ocean, Tel/Fax: (+247) 6440**

Listen With Grandad

by Leon Balen & David Leverett

Grandad is in one of his "waste not, wan't not" moods again.....

Lowe Electronics

YOUR FRIEND IN THE BUSINESS!

WE PROUDLY PRESENT....

THE ULTIMATE RECEIVER?

It was an honour to be chosen by Watkins-Johnson to represent them in the amateur market place in the UK. With almost thirty years in the business of selling short wave receivers and the last five of those building up an international reputation as a manufacturer in our own right, who better to provide the right kind of support and back-up that discerning hobbyists will need. Recognizing the needs of the semi-professional user, Watkins-Johnson have developed the HF1000, based on their WJ8711 model used in Government and Military establishments. Built with the same care and attention to detail as their more expensive receivers, the HF1000 is superbly engineered. They actually manufacture a lot of the hardware themselves, including the multilayer PCB, which ensures consistent quality throughout - something we ourselves understand only too well. Electrically, the HF1000 meets a very high specification, extracts of which are shown below. Operationally the HF1000 has everything the dedicated listener is ever likely to need and is made easy to operate thanks to the use of DSP technology, an uncluttered control panel and large, easy to read displays. Full details are contained in a comprehensive datasheet, which we'll be happy to provide on request.

Features:

- ***5kHz to 30MHz in 1Hz steps***
- ***High dynamic range - 110dB @ 300Hz bandwidth - +30dBm 3rd order intercept typical***
- ***Digital filtering provides 58 IF bandwidths from 56Hz to 8.0kHz with exceptional shape factors***
- ***AM, FM, CW, USB, LSB, and ISB***
- ***Synchronous AM detection modes as standard***
- ***Fast, flexible scanning with 100 memory channels***
- ***Operator selectable RS232 or CSMA remote control***
- ***Internal switchable pre-amplifier and attenuator***

HF1000
£4995.00

SEND US FOUR FIRST-CLASS STAMPS AND WE'LL SEND YOU OUR BUMPER SHORT-WAVE INFORMATION PACK, TOGETHER WITH A FREE COPY OF OUR FAMOUS LISTENERS' GUIDE

Head Office, Mail Order, Service and Spares Department:-

Lowe Electronics Ltd

Chesterfield Road, Matlock, Derbyshire, DE4 5LE

Tel. 0629 580800 Fax. 0629 580020 FaxInfo. 0629 580008

LOOK AT THESE GREAT NEW PRICES!

FRG100
Yes, Yaesu's flagship receiver is down in price, making it great value for the shortwave listener! It's even better value at Lowe's this month! During January, we're including the power supply, and free copies of the Shortwave International Frequency Handbook *AND* the latest Passport to World Band Radio.

All for just ***£529.00!***
Just add £10.00 for next day delivery

Our "First Eleven" of shortwave accessories!
If you've got a receiver, you need one (or more!) of these

AD370	Active receiving antenna; with stainless steel whips	**£79.95**
FL3	Mutimode audio filter with automatic notch	**£149.95**
AT1000	SWL Antenna Tuning Unit	**£96.95**
MULTISCAN	A computer control program for receivers from Kenwood; Icom; Yaesu; JRC and AOR	**£75.00**
MODE MASTER	Software and demodulator to decode FAX; RTTY; Morse; FEC; NAVTEX and AMTEX	**£159.95**
SYNOP	Decodes Synoptic data from RTTY signals and builds up weather maps on screen.	**£149.95**
MLB	Magnetic Longwire Balun	**£39.95**
MLBAMK1	MLB Antenna kit; 12.5m	**£66.95**
PWBR94	Passport to World Band Radio, 1994 edition	**£12.95**
MTA	Magnetic Transfer Antenna; Vertical antenna	**£179.00**
SWCF	Short Wave International Frequency Handbook	**£9.95**

MVT7100
Our most popular scanner is set to become even more popular! At its new lower price it's now even more affordable. During January, we'll be giving a free HB400 with every new MVT7100 and MVT7000. The HB400 is the mobile mounting bracket that has revolutionised mobile scanner operating. No scanner or car should be without one!

NOW ONLY £389.00!

There's a Lowe branch near you! Visit your local today for all that's good in shortwave radio!

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Newcastle Int'l Airport
Newcastle upon Tyne
Tel 0661 860418

All our branches have a great selection of used receivers and scanners just waiting for new owners!

YORKSHIRE
34, New Briggate
Leeds,
Tel 0532 452657

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Patchway,
Bristol,
Tel 0272 315263

SOUTH WEST
The Basement, Royal
Fleet Club Devonport,
Plymouth,
Tel 0752 607284

LONDON - HEATHROW
6, Cherwell Close
Langley, Slough
Berks,
Tel 0753 545255

SCOTLAND
Cumbernauld Airport
Cumbernauld
Strathclyde
Tel 0236 721004

SOUTH EAST
Communications House
Chatham Road
Sandling, Maidstone,
Tel 0622 692773

SOUTH COAST
27, Gillam Road,
Northbourne,
Bournemouth,
Tel 0202 577760

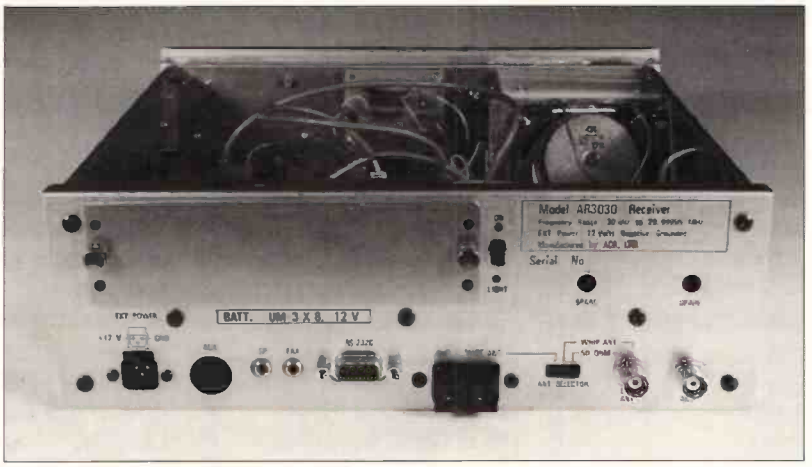
Most branches and Head Office open Mon - Fri, 9.00am until 5.30pm and on Sat from 9.00am until 5.00pm. See you soon!

AOR AR3030 Receiver

PREVIEW

A new receiver from AOR is always viewed with great interest and the new AR3030, previewed here by Mike Richards, is bound to turn a few heads.

OUTSIDE



Those of you who visited the *Short Wave Magazine/ Practical Wireless* stand at the Leicester Show at the end of October will no doubt have noticed the new AR3030 h.f. receiver occupying a prime position. Following the show I was given an opportunity to have a play with this brand new model for a few days. The receiver previewed here is what the manufacturers call a 'beta pre-production' unit. In effect it's the final prototype prior to starting the production run. Because of this there were a few very minor problems that AOR will be correcting for the final version.

New Styling

One of the first points that struck me about the AR3030 was its original styling. This appears to be a very welcome trend among receiver manufacturers. Examples of this are to be found with receivers from Lowe, Drake and now AOR. As you can see from the photographs, the result is a very functional looking receiver that cries out to be used. One particularly good feature of the layout was the provision of a front facing speaker grille. This is a feat that very few other manufacturers seem to be able to manage. The front facing speaker is important because I, like many listeners, always seem to end up putting things on top of the receiver, i.e. audio filters, reference books, etc. With a top mounted internal speaker this effectively kills the sound. In the AR3030 the speaker is actually mounted well inside the case and the sound is ducted to the front panel aperture. The audio quality from this set-up was fine for general communications use. To take full advantage of the AR3030's audio quality I would strongly recommend using a good external speaker or headphones. The usual 3.5mm speaker jack is provided on the rear panel whilst headphone reception is via the 6.3mm jack on the front panel.

Wide Coverage

For those of you who haven't twigged yet, the AR3030's name is derived from its frequency coverage, which is continuous from 30kHz to 30MHz. In practice, the upper limit is 5Hz less than 30MHz - but that's hardly worth worrying about! Like most modern systems the AR3030 operated using a digital synthesiser under microprocessor control. In this particular case a direct digital synthesiser is used to give the purest signal quality. Another important aspect of the AR3030 is the very fine, 5Hz, tuning steps. This is particularly important to the utility enthusiast where accurate tuning is essential when receiving some of the more complex modes. The tuning steps can be cycled through 100Hz and 1kHz simply by pressing the kHz button on the front panel. This gave very good control when using the manual tuning knob. The current frequency was displayed using a large liquid crystal display with a resolution of 10Hz, which was great for accurate frequency setting.

Keypad frequency entry was also provided, with a few new ideas to make life easier for the operator. The first of which was the backspace key. If you make a mistake while entering a frequency you just press this key to erase the last digit. I know this sounds obvious, but with most receivers you have to abandon the entry and start again. The AR3030's system is so very much quicker. The processor logic associated with the keypad also recognises short code entries for band selection. For example to select the bottom end of the 31m broadcast band you just type 31 and press the MTR key. Although this system is to be found on many short wave receivers AOR have taken this a step further and included the amateur bands. You can, therefore, type 80 MTR and switch straight to the 3.5MHz amateur band. This facility is further expanded as you store your last used settings against the particular band. This makes the metre band selection rather more powerful than some of the more conventional implementations.

Just to complete the frequency selection options were a set of one hundred user programmable memories. In addition to storing the frequency, these memories

held all the operational parameters right down to the attenuator setting. You could also set-up automatic scans of memory groups.

Perhaps the icing on the cake is the optional v.h.f. converter that extends the coverage to include 108 to 170MHz. Although only covering a portion of the v.h.f. spectrum, this is probably one of the most active sections. Included within this are the air band, marine band, amateur band and a selection of p.m.r. operators.

All Mode

The AR3030 is truly all mode as it includes a.m., synchronous a.m., n.b.f.m., l.s.b., u.s.b., c.w. and FAX all as standard. Each of these modes are selected using a pair of buttons of the front panel. These step the mode forwards or backwards as appropriate with a set of l.e.d. illuminating to indicate the selected mode. The provision of synchronous a.m. is becoming a feature of most of the more advanced receivers on the market. In this particular implementation the double sideband technique is used to help overcome the effects of fading on short wave signal. In use this proved to be very reliable and locked onto the required signal very quickly. There was also no need to fine tune the receiver to eliminate the l.f. beat notes that afflict some systems.

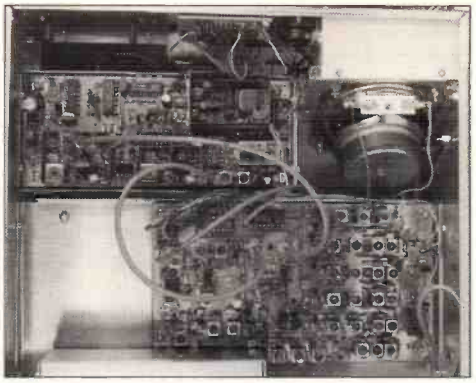
Broadcast a.m. reception was very well controlled thanks to the use of the Collins 6kHz eight resonator mechanical filter unit. This was particularly good for cutting through the bedlam on some of the busier broadcast bands.

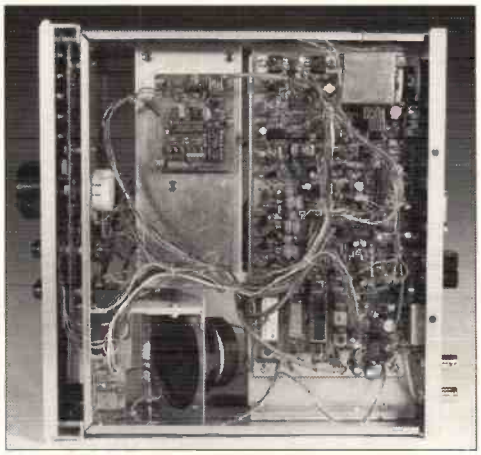
Reception of s.s.b. used a Murata ceramic filter that can be upgraded to a Collins unit as a factory-fitted option. This filter was also used to provide the narrow filter setting for a.m. reception. Those with an interest in c.w. will find the b.f.o. feature particularly interesting. This facility is enabled when c.w. is selected and gives the user the facility to alter the c.w. side tone frequency. This is particularly useful when using the optional Collins 500Hz narrow filter where you can centre the signal in the passband and alter the b.f.o. for the preferred side tone.

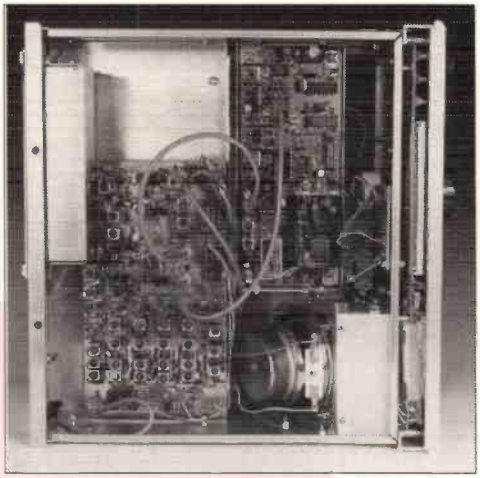
Computer Control

As with other AOR receivers, the AR3030 was capable of full computer control using a standard serial port on the rear panel. Not only could you send frequency and mode information to the receiver but you could also interrogate for a range of receive parameters. Having checked through the command set, it looks as though the AR3030 could be driven by programs designed for the AR3000 v.h.f./u.h.f. scanner with a few minor mods. ■

INSIDE







Specification

Coverage:	30kHz to 30MHz
Tuning Selection:	MHz, kHz, 100Hz, 10Hz (5Hz minimum step)
Receive Modes:	a.m., s.a.m., u.s.b., l.s.b., c.w., FAX & n.b.f.m.
Frequency Stability:	5 ppm -10 to +50°C
Memory Channels:	100 (00-99)
Receiver sensitivity:	
s.s.b., FAX, c.w. (10dB S+N/N):	1µV 30-50kHz 5µV 540-1800kHz 0.5µV 1.8-30MHz
a.m. (10dB S+N/N):	3µV 30-50kHz 15µV 540-1800kHz 1.5µV 1.8-30MHz
Narrow f.m.(12dB SINAD):	0.5µV 1.8-30MHz
Selectivity:	s.s.b./FAX 2.4kHz -6dB a.m. 6.0kHz -6dB a.m. narrow 2.4kHz -6dB c.w. 500Hz -6dB (with optional filter) f.m. 15kHz -6dB
Image/spurious rejection:	70dB
Dynamic Range:	100dB at 25kHz spacing
Antenna connection:	l.w. - h.f. 50Ω nominal BNC l.w. - h.f. 450Ω for wire terminals l.w. - h.f. High impedance whip on BNC (slide switch selection) v.h.f. 50Ω nominal BNC for optional v.h.f. adapter installation.
Audio Output:	1.8W, 8Ω load at 10% distortion
Power Requirements:	Internal dry batteries (8 x AA) External 12V d.c. at 800mA (nominal 13.8V) negative ground

Summary

The new AR3030 appears to be a well thought out no nonsense receiver that is very easy to use. The functional styling makes a pleasant change and adds to the wide appeal of the receiver. I was also very pleased to see that the fully range of receive modes were included as standard. At the time of this preview I don't have a firm price for the AR3030 but if you're interested I'm sure AOR will be only too pleased to put you on their mailing list.

My thanks to **AOR (UK)** for the chance to sample this new model - I'll look forward to a full performance review.

Restoring An R1155
Part 2

This month Chas. Miller finds the r.f. amplifier inoperative and modifies the output stage.

Whilst the decoupling capacitors were being replaced it was noticed that an extra small capacitor had been soldered between the switches handling the antenna and mixer grid tuning coils. This immediately aroused suspicions that the r.f. amplifier had not been functioning and had been by-passed. It is a curious thing, but the majority of R1155s I have repaired have exhibited this syndrome: invariably it is due to C38 having gone almost dead short and burning out R42, thus removing the anode voltage of the r.f. amplifier V3. R42 is mounted on a small tag panel on the left side of the coil can when viewed from the rear. In this set, evidently made by E.K. Cole Ltd, the resistors used were the type having the carbon element enclosed in a ceramic tube with the ends sealed by cement. It is possible for the carbon to disintegrate completely in these during severe overloading without undue discolouration of the tube, thus deceiving the unwary engineer. Other contractors, e.g. Philips and Mullard, used the ordinary painted carbon resistors which display unmistakable signs of overloading. On the other hand, this Ekco-built set was at least wired with durable rubber insulation on the cables. Some of the contractors' wiring had rubber of such poor quality that it soon hardened and became so brittle that the slightest touch causes it to crumble away; sets with this kind of insulation require virtually complete re-wiring, as many have found to their cost!

Modifying the Output Stage

The original output stage used the triode section of V8 to drive headphones via a small matching transformer. Because of its peculiar characteristics there is no exact equivalent to the VR101: anyone desperate might try the least unlikely candidate, which is the American 6R7G. However, when something more than headphone reception is required and a power output stage is added, the problem solves itself since the circuit modifications involved make it possible to use a conventional double-diode-triode, as will be seen.

The removal of the d.f. section had left a blank hole next to V8 which was ideally suited to accommodating the new output valve. The valve chosen for the job was the 6V6GT, which in this application will give an output in excess of 2W with anode and screen currents of only 30mA and 4mA respectively. The heater current is also modest at 0.45A, a useful point when long leads from the p.s.u. are employed and l.t. voltage drop has to be taken into account. A design feature of the 6V6GT is that the third and higher harmonic distortion is kept low by permitting the second harmonic distortion to be rather high. Reduction of the latter may be achieved by introducing negative feedback, obtained here by omitting a bypass capacitor from across the 270Ω cathode bias resistor.

The transformer in the anode of V8 was disconnected but left *in situ* and resistance-capacity coupling used to pass the a.f. signals on to the output valve, see **Fig. 2.1**. It was then possible to replace the VR101 by a DH63 which has a high-impedance triode section more suitable in this role. Note that the value of 470kΩ for the 6V6GT grid resistor should not be exceeded.

Particular care must be taken to ensure that the cathode and grid resistors of the output valve return to h.t.- and not to chassis, to prevent the anode and screen currents from flowing through the bias resistors in the h.t.- circuit referred to earlier.

The output transformer (which should have a ratio of 43:1 for 3Ω speakers and 26:1 for 8Ω types) was mounted just in front of the coil box and under the tuning gang, where there is ample space available.

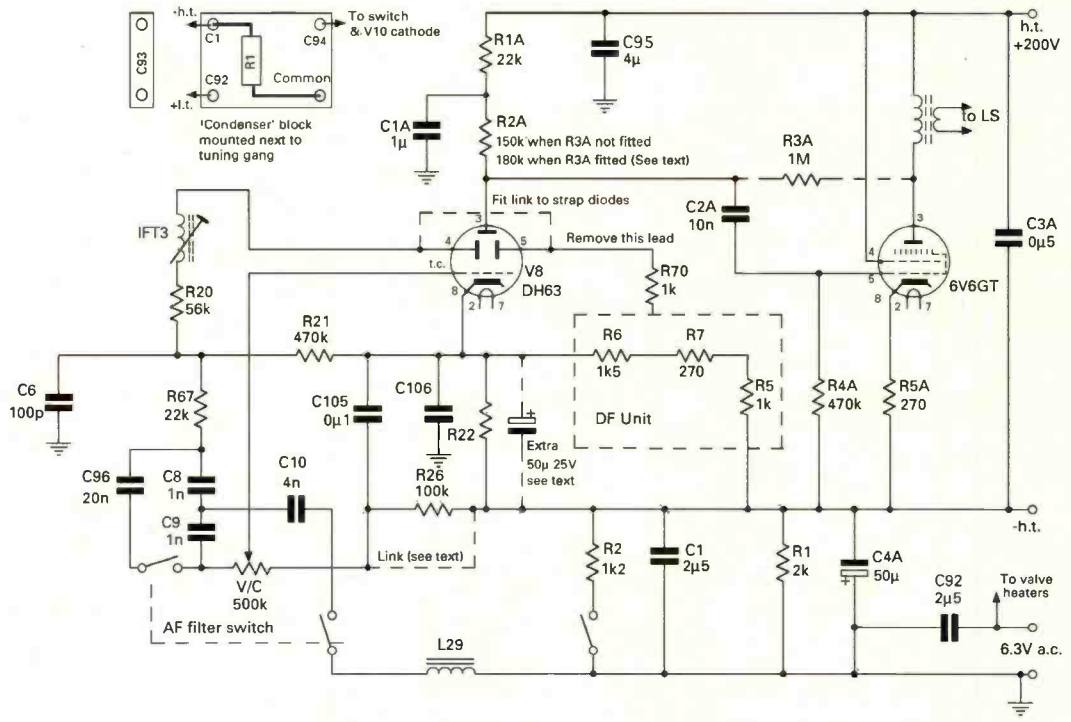


Fig. 2.1: R1155 modified for loudspeaker output. New components are suffixed 'A'.

A 'Monday Morning' Set?

Whilst the new wiring to V8 was being carried out something rather odd was noticed: the cathode pin of the holder was connected to chassis instead of h.t.-. Further investigation produced the

interesting discovery that R26 did not go to h.t.- either, as it should have done. It is normally connected to one end of R3 - see **Fig. 2.2** - by a wire on the chassis side and thus hidden from view. This wire was missing, and since it is hardly imaginable that anyone would go to the trouble deliberately to remove it, the only logical explanation is that it was omitted due to a boob at the factory. As the error would have been difficult to detect, presumably a hapless RAF mechanic had resorted to a bodge to get the set working!

First Tests

When the output stage had been fitted it was considered an appropriate time to carry out a test run with the aid of a power pack built especially for R1155 use. Early service manuals specify an h.t. of 200V, later increased to 220V; in practice the lower voltage is perfectly adequate and there appears to be no advantage in increasing it. The h.t. consumption with this input and using the valves mentioned is about 70mA, with the heater current just under 2.9A.

The set produced some kind of loudspeaker signals at once on the three lower frequency bands, but as they consisted of little more than interference noise, increasing at the l.f. end of the dial, it was clear that the local oscillator was not working. This proved to be due solely to dirty contacts on the band switch which were cured by being brushed over with trichlorethylene. Stations were then receivable on all bands and although the performance was fairly good on a very short antenna, comparative tests with a domestic receiver of 1938 vintage soon showed that it left a good deal to be desired. Particularly noticeable was the difference in reception of a distant s.w. station: whereas the domestic set held it at a steady loud volume the R1155 could manage only about half the output with a great deal of fading. Clearly both the sensitivity and the a.g.c. action were in need of attention.

AGC Problems

The first problem was tackled by thorough re-alignment of the i.f., mixer and r.f. stages. The unexpected freedom of the cores in the i.f. transformers suggested that they had been well and truly 'twiddled' by a previous owner who may have been unaware of the rather unusual i.f. of 560kHz. Fortunately the core slots were undamaged and a very significant increase in i.f. gain was rapidly obtained. Even more striking results were achieved in the mixer and r.f. stages, indicating that the specified sensitivity ought to be attainable.

In the next test, although the performance was very much enhanced, there was something not quite right when using the a.g.c. mode. This showed up as a 'squelch' effect that eliminated weaker stations and made the set seem almost dead on certain parts of each band. In the manual gain mode with the control advanced, performance was normal. Back in the a.v.c. mode it was noticeable that the 'magic eye' closed only on very strong stations with a very sudden jump from wide to narrow shadow, which prompted an examination of the a.g.c. circuitry. Since there was nothing visibly wrong - and the various decoupling capacitors had already been replaced - very careful voltage checks were made. Mention has already been made of the minimum bias voltages that occur on the a.g.c. feed resistors R10, R11 and R12: this also sets the delay voltage for the a.g.c. It was found that the negative voltage was completely absent, due to R3 having gone open circuit within its innocent-looking ceramic shell. Replacing this produced just over 1V negative to chassis. A further check showed that R1 had gone low, from 2kΩ to around 1kΩ and when this resistor had been replaced the a.g.c. action and sensitivity was restored to normal. This was confirmed with tests using the signal generator and then with various antennas.

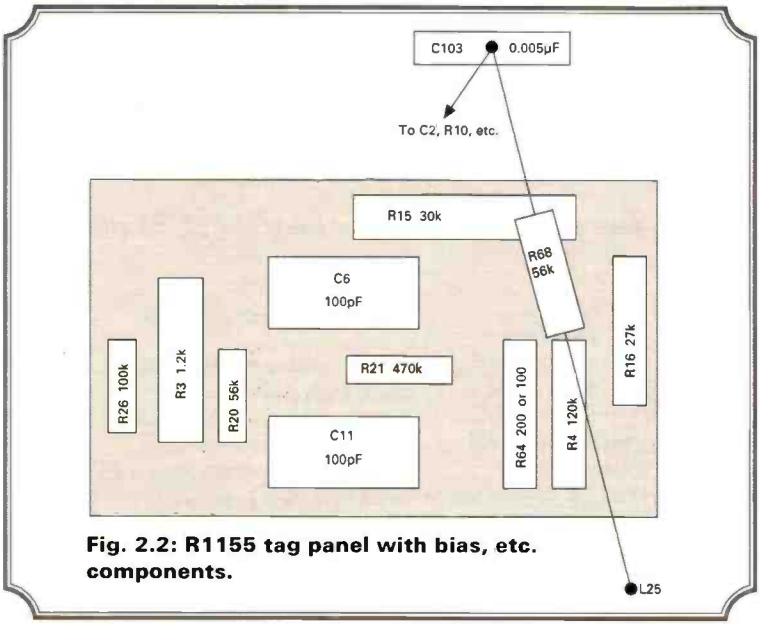


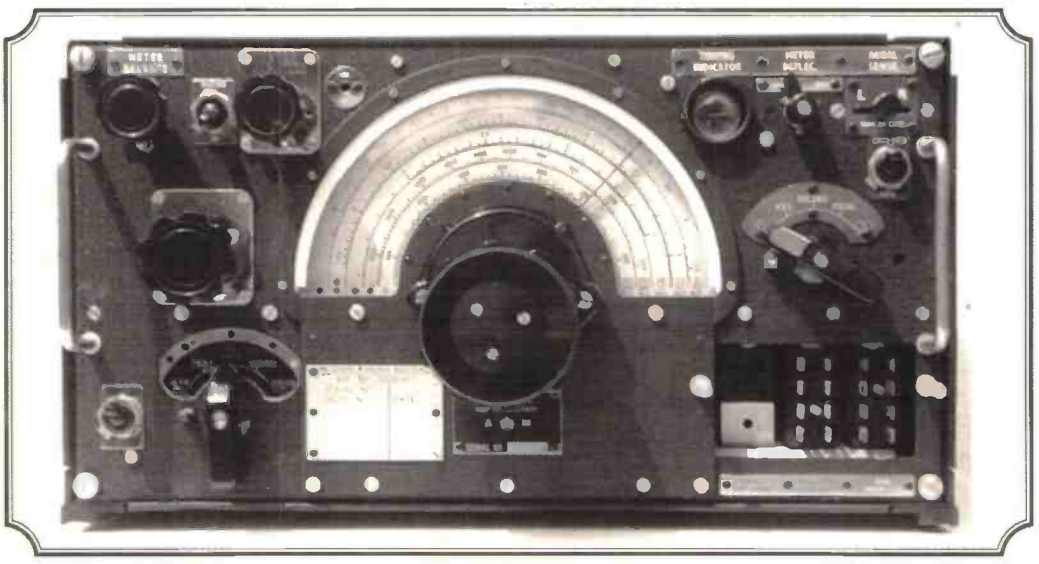
Fig. 2.2: R1155 tag panel with bias, etc. components.

Part 3 describes the final tests and considers the mechanical aspects of the restoration, completing the job.

The photographs for this article were supplied by Paul Allberry.

Abbreviations

A	ampere
a.f.	audio frequency
a.g.c.	automatic gain control
a.v.c.	automatic volume control
h.t.	high tension
h.t.-	high tension negative
i.f.	intermediate frequency
kHz	kilohertz
kΩ	kilohms
l.f.	low frequency
l.t.	low tension
mA	milliampere
p.s.u.	power supply unit
r.f.	radio frequency
s.w.	short wave
V	volt
W	watt
Ω	ohm



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One of the most important criteria when choosing a general coverage receiver is without doubt audio quality. With this in mind, a front mounted speaker has an obvious advantage over top or bottom mount speakers in terms of audio projection and readability (your Hi-Fi doesn't have speakers pointing towards the ceiling or floor). Most general coverage receivers on the market today unfortunately do not have front mounted speakers due to limited space on the front panel or simple production cost cutting. The AR3030 has a 66mm 3 WATT built-in front facing speaker thanks to clever chassis design which has succeeded in producing excellent clear audio through a deceptively small front speaker grille. High/Low audio tailoring is also selectable from a front panel key.

At one time, every general coverage receiver could be operated without referring to the handbook, such times have long gone and all modern receivers use micro-processors to drive the unit and provide facilities. The AR3030 microprocessor software has been developed with a wide variety of operators in mind.

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Bearcat 100XLT handheld scanner.	£89.95	f.o.c
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A Day In The Life Of A Radio Inspector

The Electric Fence

J. Edward Brown continues the tales of the Radio Inspector from New Zealand.

"Another day in the life of a radio inspector," Young Golly the trainee said.

Buccolic Kilocycle Ken observed. "It's nice to have a day in the country, get away from smog, suburban housewives eternally complaining of television interference, meet real people."

Young Golly breathed deeply, coughed. "Smells of cowshit."

"The wealth of the nation." Kilocycle Kent said.

Where was the electric fence they were seeking? It was causing radio interference. They had checked a lot of farms, climbing fences, using a small transistor radio. "It was different in the old days when we had to carry the old Type 444 interference detector receiver, weighed about 20lbs, the size of a 56lb butter box."

"Never seen a 56lb butter box," Young Golly said. "How many kilos is that?"

"Don't tune into music, listen for the electric fence."

"I hate cows."

"I should have brought a sack and got a load of cow manure for my garden. Nothing like it for strawberries."

Young Golly listened to the rasp of the interference. "We are very close."

"It could be this farm."

"You go in, I have been chased by a bull, three dogs and a ram so far today."

"It is our job to track interference to its source, and eliminate it."

The house on a knoll was new, all aluminium and ranchsliders. Back in behind a hedge of high macrocarpa trees was an old house, probably the original homestead.

At the new house was a large outboard boat in the garage, a Jaguar and a Range Rover. There was a swimming pool, a spa pool and a trampoline.

Mrs Farmer was a blonde, wearing a bikini.

"Wouldn't worry about radio interference with her around." Young Golly said.

The farmer declared passionately. "A sea of interference from electric fences will soon smoother the entire ionosphere, making radio reception impossible." He wore a hacking jacket and brogues.

Kilocycle Ken nodded. In the background the radio receiver burped at regular two-second intervals as the electric fence charged the wire.

"Cheap and easy temporary fencing," Kilocycle Ken said.

"Upsets radio reception," the farmer snarled.

"Only if not put up correctly, bad joints mostly, but we will find it."

"Every time I pick up the telephone it beeps at me."

"Electro-magnetic coupling," Kilocycle Ken said.

"They should be banned."

"Plenty of farmers in parliament," Kilocycle Ken observed.

"I'm an old fashioned farmer, believe in wire fences, barbed wire as far as that old cow in that old house is concerned. That's where the interference is coming from."

"There's a lot of wickedness in the world," Kilocycle Ken said.

The old woman in the old homestead met them with a cradled shotgun. "What do you want?"

"We are looking for an electric fence causing radio interference."

"You'll never take me alive," Young Golly whispered.

"He sent you, didn't he."

"Have you got an electric fence?"

"Yes, around my

CONTINUES ON PAGE 21

An electric fence is a bit like a heart I suppose, charging up and discharging, a regular pulse

AOR The New Classic

AR3030 General Coverage Receiver
*Collins mechanical filter inside

Collins Inside

When the AR3030 was first placed onto the drawing board about 15 months ago, the R&D team at AOR had the dream of producing a high quality DDS (Direct Digital Synthesizer) receiver with excellent filtering characteristics offered by the legendary ***Collins** mechanical filters. This dream has now come true, a feat rarely achieved by any manufacturer whether large or small. As a listener you too can join enjoy the experience of this very special marriage of high technology and classical styling.

Most receivers employ ceramic filters, such filters offer good performance and reasonable cost. However the "best" kind of filter is the mechanical resonator filter, pioneered and still manufactured by the ***Collins** Division of Rockwell International. In contrast to ceramic filters, ***Collins** mechanical I.F. filters are more expensive and rarely used in any but the very top of the range and professional equipment.

Our aim here at AOR has been to produce a general coverage receiver using the ***Collins** 6kHz AM mechanical filter fitted as standard yet at an affordable price for most shortwave listeners around the World. We believe that only the very best receiver design deserves the ***Collins** mechanical filter, and feel our R&D team have succeeded with this goal. It is very easy to appreciate the true effectiveness of the ***Collins** AM mechanical filter on todays' crowded medium and shortwave bands especially in Europe after dark. We also believe DDS is the best method available today to produce the cleanest signals, absolutely essential for high performance receive capability especially on crowded bands containing many strong signals. There are two other filters fitted as standard, these being 2.4kHz for SSB/FAX/CW and narrow AM/S.AM & 15kHz for NFM. Additional filter options include a ***Collins** 7 resonator mechanical 500Hz filter for narrow CW operation and a ***Collins** 8 resonator mechanical 2.5kHz filter for even better selectivity on SSB.

Our **"Collins inside"** logo and use of name has been fully approved by **Collins Rockwell** and we are proud of that fact. Our pride will be lifted even higher should other manufacturers be brave enough to follow our example in the near future.

The AR3030 boasts a wide frequency coverage from 30kHz to 30MHz and all mode reception 'as standard': AM, S.AM (synchronous), NFM, USB, LSB, CW & FAX. Tuning is via a silky smooth rotary tuning knob with a minimum step of 5Hz (selectable for faster / slower tuning), there are two VFOs and dial lock to prevent accidental loss of frequency while listening. We are so confident with the performance of the DDS that the same chip is planned for use in our new generation wide-band receiver which will tune in ultra smooth 1Hz increments.

The AR3030 has a number of unique facilities to offer. In particular the BFO (Beat Frequency Oscillator) is switchable on USB/LSB/CW and FAX modes. During 'normal' operation the AR3030 uses **true carrier re-insertion** techniques for SSB reception, this ensures ease of use and good audio quality. However should adjacent interference be encountered, the BFO may be switched On so that the main rotary tuning control can be used to tune away from interference and the BFO used to recover readable audio thus provide a simple but effective manual form of passband tuning. Another useful facility is the [mtr] key. As well as being able to enter frequencies in MHz or kHz, the [mtr] key allows easy access to popular Broadcast and Amateur bands. For example, to quickly access the 31m Broadcast band while in VFO mode type [3] [1] [mtr] and start listening / tuning... easy. For the 20m 14MHz Amateur band type [2] [0] [mtr].

One of the most important criteria when choosing a general coverage receiver is without doubt audio quality. The AR3030 has a 66mm 3 WATT built-in front facing speaker thanks to clever chassis design which has succeeded in producing crisp, clear audio through a deceptively small front speaker grille. High / Low audio tailoring is also selectable from a front panel key. There are 100 memory channels which allow data to be transferred into and out of memory for greatest flexibility (VFO/M.in). Memory channels retain frequency, mode, bandwidth, AGC, attenuator and tone etc. Memory channels may also be scanned in whole or part and unwanted channels may be locked out. Memory channel is indicated as a number (00 to 99) on the main LCD. A separate all mode squelch circuit is provided on the front panel to help with scanning and to increase listening pleasure when monitoring a noisy channel.

A large high contrast green backlit LCD presents frequency up to the nearest 10Hz (not 1kHz as some receivers) for accurate tuning. All relevant information is displayed on the LCD. A large colour coordinated backlit green analogue S-meter provides signal strength indication. A standard 6.3mm (1/4 inch) headphone socket is conveniently provided on the front panel with a separate 3.5mm jack socket on the rear case for external speaker connection. There are rear panel connections for low level audio output and tape recorder remote switching. I.F. output and AGC is also available through a rear panel connector. Computer control is possible through the standard factory fitted RS232 rear panel port.

Aerial input is via a high quality 50 OHM commercial standard BNC connector, this has been chosen in place of the cheaper SO239 socket. Of course a large range of coaxial adaptors are available so connection to any aerial setup should not present any problems. High and Low impedance wire aerial input is also possible via the terminal strip which includes an external earth point. Operation is from a nominal 13.8V DC input or from internally fitted dry batteries for short duration use to provide greatest flexibility while operating from a fixed or portable location. Two optional internally fitted VHF converters are also planned and a separate BNC aerial input connector is provided on the rear cabinet.

Preliminary Price structure:

AR3030 receiver with ***Collins** AM mechanical filter, includes mains power supply **£699.00 inc VAT**

Optional ***Collins** 500 Hz mechanical filter	£ 89.29
Optional ***Collins** 2.5 kHz mechanical filter	£ 89.29
DC3000 DC lead	£ 4.00
CR400 tape control lead	£ 13.99
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Optional LW / MW elements for LA320 (price each)	£ 29.90
VHF AM converter 108 -139.99999 MHz	£ T.B.A.
VHF NFM converter 140 - 169.99999 MHz	£ T.B.A.
Control software for PC	£ T.B.A.

Carriage on AR3030 free in the UK when ordered directly from AOR UK.

* **Collins** is a trade name of Rockwell International

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CONTINUED FROM PAGE 16

Feature

goldfish pond."

"Never heard of that before."

"He wants my goldfish," she shouted. "Only thing we didn't divide up under the Matrimonial Act. He got half the farm, built himself a new house for the new mistress, but I wasn't shifting. Hand reared my fish, biggest goldfish in the country."

They looked like large trout.

"Any good to eat?" Young Golly asked.

She swung the shotgun at him. "He abandoned me, the old cow out, taken up with a young heifer."

"You'll have to switch the electric fence off."

"Lots of cattle thieves, sheep rustlers and fish stealers around here."

"Nobody would steal gold fish."

"He would."

"An electric fence is a bit like a heart I suppose, charging up and discharging, a regular pulse," Kilocycle Ken said.

"He has an implanted pacemaker," the old woman said. "The pulsing of an electric fence makes him nervous.

"Ahhh," Kilocycle Kent said.

"Force fields," Young Golly said.

"I'm sorry, but it must be disconnected, meantime, who installed it?"

"An electrician."

"Get him back to check it."

The old woman suddenly looked weary. She looked down the hill to the new house, so new, its galvanished iron roof had not been painted, it glinted in the sun. The farmer was standing beside the new woman. They were drinking. Maybe it was Martinis.

"He had the pacemaker put in just before he married that woman."

"Thought his heart wouldn't stand it," Young Golly whispered.

"I hope his battery goes flat," she shouted

"Not a very kind thing to say," Young Golly said. "She must hate him a lot."

"Or love him a lot." ■

Book Review

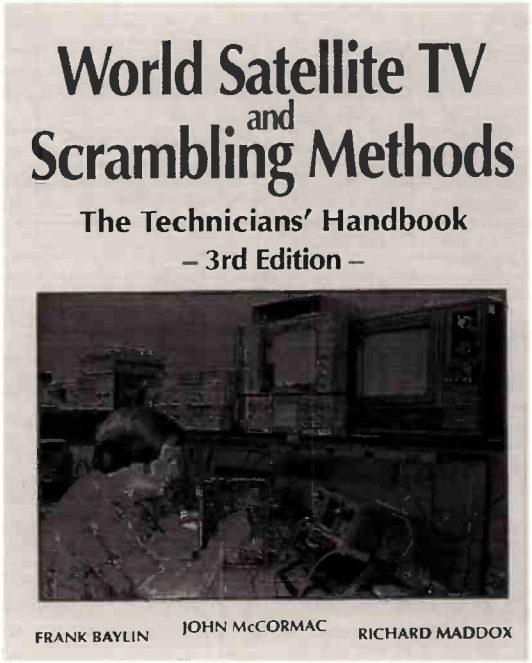
WORLD SATELLITE TV AND SCRAMBLING METHODS - THE TECHNICIANS' HANDBOOK - 3rd Edition
by Frank Baylin.
ISBN 0-917893-19-0
Published by Baylin Publications, Boulder, Colorado.
UK main distributor Julian Vincent Technical Books, 24 River Gardens, Purley, Reading RG8 8BX - Tel or Fax: (0734) 414468. 263 x 203mm, soft covered, 288 pages. UK price £29 including post - add 10% for European airmail and 20% for airmail Worldwide.

Another well presented and very useful from the Baylin Publications stable. Though Frank Baylin operates from Boulder, Colorado, he has for some years produced a series of satellite orientated publications that has proved extremely popular around the world.

Early satellite books from the 'States tended to concentrate on the American scene which, of course, is historically dominated by C Band satellite user. It was to that continent that the pioneer European enthusiast would look for 'his bits'. Europe exploded into satellite TV using Ku Band and, with the mass-produced technology by Amstrad and others, equipment was relatively cheap.

Gradually Frank Baylin expanded his products and now any satellite publication from the 'States covers both C and Ku bands and with application for all users around the World. The Americans tend to publish technical books on a much more informal basis than the Europeans with masses of pictures and preferring to illustrate actual systems in use - and in simpler terminology than often seen in Europe. One UK exception perhaps being John Breed's Swift TV Publications.

So much for the background to the style and presentation of imported American books. This latest offering is intended for the satellite installation and repair engineer though would offer valuable help and insight to any multi-satellite enthusiast seeking knowledge of general TVRO (TV receive only) techniques. Assuming a knowledge of basic satellite launch and orbital theory, the book, after a brief background to satellite transmission, covers thoroughly each section of the typical TVRO domestic system. Passing from the dish, head electronics, cables, actuator drive and control, Baylin discusses the sections of typical receivers with expansion of each distinct section into circuit theory and practice. It's a very practical orientated approach to the subject and most folk will follow the text easily.



About 30% of the book is devoted to scrambling theory and practice - and perhaps more pertinent the devious world of descrabling and the hacker. John McCormac, the well know personality in the encryption field, has produced an enlightening and detailed section of all current scrambling types encountered and the means of decoding them. A system-by-system check is provided with background notes to the hacker and the anti-piracy techniques adopted by the broadcasters. The final section of this tome goes into fault finding in some depth with a cross reference section onto faults on specific equipment. Various addresses and appendix complete the 288 page work. There are ample illustrations and photographs throughout.

I feel it important to stress that the book under review covers very adequately both C Band and Ku Band working and the contents are applicable to UK and European operation.

My personal thoughts on this latest book from Baylin is that at £29 it represents good value, particularly if received as a present for an enthusiast, there being much valuable information and insight into your own system - or if you, the reader, is employed in the satellite installation trade then it's an essential reference work.

My thanks to **Julian Vincent Technical Books** for providing the review book. They also publish a catalogue, available on receipt of an s.a.e.

Roger Bunney

A Single Transistor Reflex

Most readers have constructed a wireless set or receiver in their minds as they read the articles in Short Wave Magazine. *C. M. Lindars describes a simple receiver which will tempt us to assemble the necessary parts and reach for the soldering iron.*

The little receiver to be described embodies a novel feature in that reflexing and detection are done automatically. There have been circuits centred on a single transistor, but, as far as is known, none has the simplicity of this one. Tribute must be paid to the inventor, Sir Douglas Hall, who devised this unique circuit some 30 years ago. It was named the Spontaflex (Spontaneous Reflex) and often appeared in the numerous articles he wrote for the radio hobbyists over the years. Sir Douglas has kindly given his permission for this design principles to be used in the receiver described in this article.

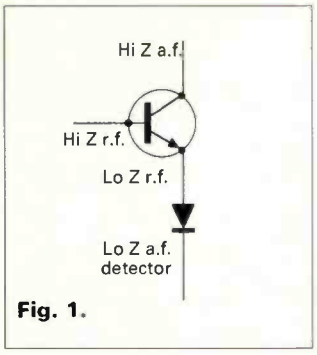
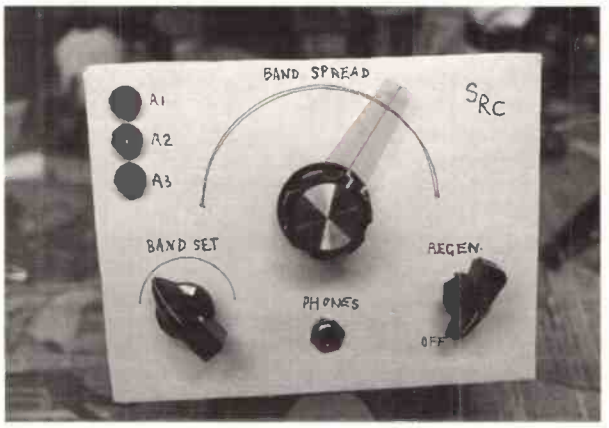


Fig. 1.

By referring to **Fig. 1**, it will be seen that the signal is applied to the base of the transistor, which, being in the common collector mode, is at high impedance. It will be noted that bias for the transistor is applied to the 'earthy' end of the coil to avoid damping.

The amplified signal is produced across the diode which forms the load and is demodulated at low impedance. The demodulated signal is now amplified by the transistor, this time in the common base mode, the a.f. output now appearing across the collector load at high impedance.



This load could be a resistor. However, the high value needed would starve the transistor of current unless a fairly high voltage battery were used. Thus a transformer is employed. The high impedance input allows good selectivity, and the high impedance output load gives good amplification.

The complete circuit is shown in **Fig. 2**. As the receiver consumes only approximately 300µA, it is very economical to run and can be powered from a single PP3 battery.

The various components will now be considered.

Tuning Circuit

The arrangement shown can be either a 'Band Set' or a main tuner and fine trim. Both arrangements obviate the need for a slow motion drive but if one is available, just the main tuning capacitor C4 is needed.

Fig. 3 gives details of suitable coils. These coils will just cover from 49m to 19m, provided that a single loop tuning capacitor with a low minimum capacity is used and all stray capacitances are kept to a minimum. However, due to the effects of antenna loading and to save any disappointment, it may be better to settle for an upper limit of 25m. The coil may consist of 23 turns of 'Solid Core' wire wound on a 22mm diameter polythene tube. Alternatively, 45 turns of the same wire wound on a 13mm tube will be equally suitable; in fact , due to less inherent capacity, it will probably enable tuning to a slightly higher frequency. This latter coil may be made on a former consisting of a few turns of thick paper wound on a 13mm diameter dowel, (remove dowel after winding).

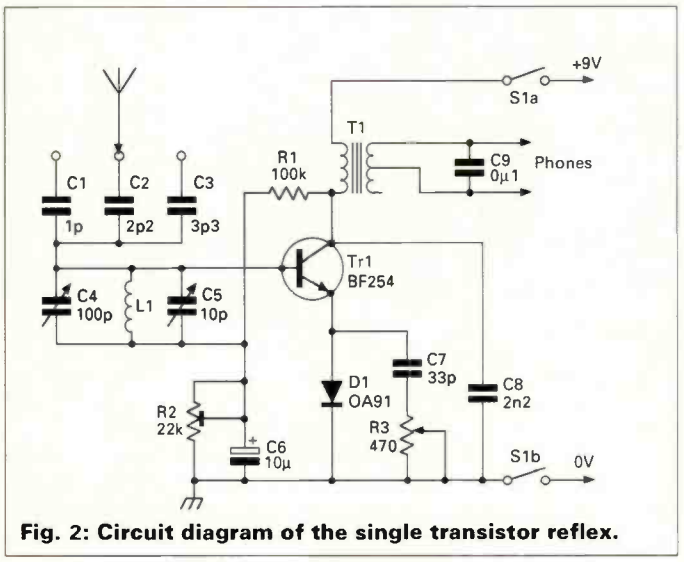


Fig. 2: Circuit diagram of the single transistor reflex.

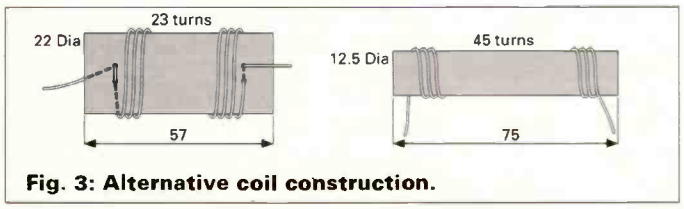


Fig. 3: Alternative coil construction.

Antenna Connection

To obviate the need for an ancillary winding on the coil, the antenna is connected to the top of the coil via small capacitor. A choice of three is available in the circuit given. At some times in the day it will be found that about 600mm of wire connected via the 3.3pF capacitor or even no antenna at all, will give results. There is no need for an 'Earth'.

Transistor

Here the choice has to be a compromise. An r.f. type with reasonably high gain is needed, having a suitable internal capacitance because this forms a necessary part of the circuit. The type shown in good and quite cheap. It is advised that three or four should be obtained so that the most suitable specimen can be selected.

Diode

A germanium diode is essential and types such as the OA81 and OA91 will be highly suitable. Others may be tried, but it is advisable to keep a particular specimen once a suitable one has been found, because the diode affects the current flowing in the circuit which has to be optimised for best results.

Reaction (Regeneration) Components

Reaction is very smooth with this circuit so one has to be careful in adjusting it. On most signals, the set will 'lock on' to a signal thus giving the 'Homodyne' effect. Either a 100pF capacitor may be used or a 33pF capacitor in series with a 470Ω pot, (it may be found that a 1kΩ pot is required). The capacitor across the diode does not shunt the r.f. from the diode, but, in association with the internal capacity of the transistor, forms a Colpitts oscillator.

Output load

It is advised that a small transistor type transformer is used. The LT 44 is very suitable for use with ex-services headphones. Of these, the DLR 5 are strongly recommended. They normally pass as medium impedance headphones. The Walkman type will not be found very suitable. 400Ω headphones may be connected in circuit without a transformer, provided they are the genuine sort and not the cheap modern variety. Crystal earplugs in series may be connected across the primary of the LT 44 or better, across the primary of a 'Z changer' which has a high primary inductance. 8Ω stereo headphones' may also be used by connecting to the tip and ring only - thus making them 16Ω mono headphones. These may then be connected to the secondary of the LT 44. Some results are possible if the DLR 5 headphones are connected in circuit without a transformer.

Construction

The 'chassis' consists of a base board of 10mm ply and a panel of 6mm ply glued to the base. It is advised not to use metal due to the possibility of unwanted coupling effects. 'Hand capacity' has not been a problem with the prototype, but kitchen foil may be glued to the front panel if trouble is experienced, isolating it from the tuning capacitors.

Mount the components on the tag board, the transistor last (see **Fig. 4**.) It is advised that a holder be used for the transistor so that several specimens may be tried as has already been suggested. Mount the remainder of the components as shown in **Fig. 5**.

Set the 22kΩ preset about halfway and make the remainder of the connections from tag board to panel. With a current meter in series with the + lead to the battery, switch on, set the reaction control to minimum and adjust the preset so that a total current of 300μA is flowing. Connect the antenna, advance the reaction control and tune in the stations.

Final matters

Different specimens of transistors or diodes will all require a careful setting of the current flowing. There is room for some experiment here, but the 300μA stated is generally about right. It is hoped to describe at a later date a simple amplifier to work a loud speaker with this set: also to suggest a 'variometer' tuning coil to take the place of the capacitor and coil described here.

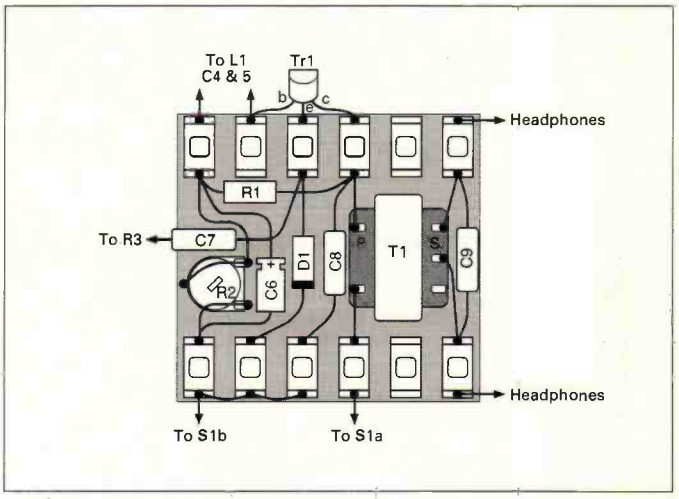
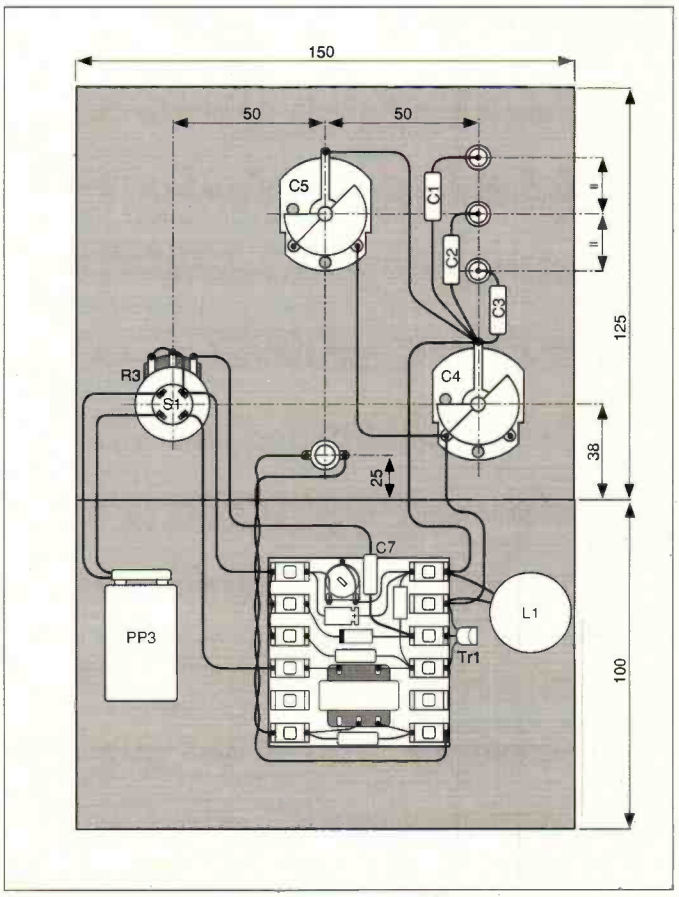


Fig. 4: The main component tag board sub-assembly. Shown full size.

Fig. 5: Complete assembly details of the receiver. The front panel is shown opened out from the chasis board.



You Will Need

Resistors

100kΩ, 0.25W	R1
22kΩ skeleton pot	R2
70 or 1kΩ pot	R3

Capacitors

1pF	C1
2.2pF	C2
3.3pF	C3
10pF Jackson 804	C5
33pF	C7
100pF Jackson 804	C4
2.2nF	C8
0.1μF	C9
10μF,10V	C6

Semiconductors

BF254	Tr1
OA91 or OA81	D1

Miscellaneous

LT 44	T1

Sockets for antenna connection (3)
1/4in jack for headphones
Socket for Tr1
Snap connector for battery
Length of polythene tube 22mm dia.
Hank of solid core wire 1/0.6mm, 1.2mm diameter over insulation
Pieces of 10mm and 6mm ply
Pointer knobs (2)
Knob with cursor
Medium impedance headphones (approx 100Ω)
Tag Board (2 rows of 6)

Most of these components may be obtained from Electrovalue or Maplin Electronics.

Building the Acorn One

Robert A. Wilson

Not all valved equipment needs to be large, or contain high voltages. Robert A. Wilson describes a neat circuit for a 'safe' valve circuit.

When I first became interested in radio in the mid 1950s, I was very much drawn to the physical construction of the older equipment. Everything was large and well spaced, whilst the wiring was of thick, shiny copper wire. Several months ago I decided to construct such a set for the short waves using a 955 acorn triode, a valve which had its origins over fifty years ago. Although there is nothing special about the circuit, it took more months experimenting, building and re-building, juggling of component values and layout before I got it right. The Acorn One is especially suitable for the beginner because, although a valve set, it does not use any dangerous voltages.

The theoretical diagram is shown in **Fig. 1** and appears relatively simple. A casual glance might give the impression that because of lack of an antenna coupling coil, the set will not be very selective, but this is far from true. I was quite surprised by the selectivity and performance when I finally got everything correct. Reaction is controlled by the potentiometer R2. I used a potentiometer rather than the usual variable capacitor in order to keep costs down. The Acorn One has three manual controls, the main tuning (C2), reaction (R2) and the antenna trimmer (C1). Each of these controls need careful adjustment for optimum performance. The coil is wound to produce an operating wavelength of about 50 - 100 metres (3 to 6MHz).

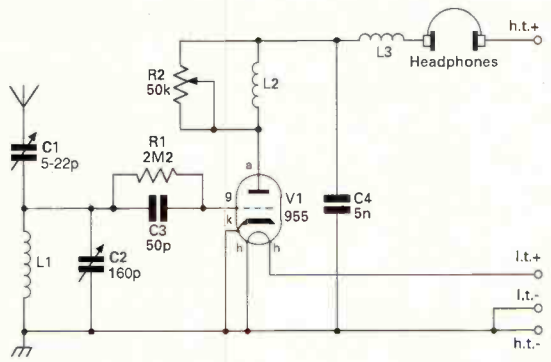


Fig. 1: Circuit diagram of the Acorn One.

Components

Before describing the construction, a few words on each of the components is necessary.

V1 - Acorn valve 955. This is an attractive little valve is about the size of a pound coin. The bottom end is pointed and the top flat with a vague acorn shape. The contacts are around the central rim, three pins on one side and two on the other. The 955 is not too difficult to obtain, but prices range from about 25 pence up to £5. P M Components, Selectron House, Springhead Enterprise Park, Springhead Road, Gravesend, Kent DA11 8HD advertise these valves at a very modest cost.

The holders are in the form of a ceramic ring with contacts around the edge into which the valve is pushed. They are very hard to obtain nowadays, but it is not too difficult to produce a home made one as shown in **Fig.2.** Take a square or round piece of wood about 12mm thick and drill a hole in the centre (to take the pointed end of the valve). Place the valve in the hole and screw double solder tags around the rim, the inner tags pressing down on top of the valve pins.

The electrical characteristics of the 955 are as follows:

Heater voltage 6.3V
Heater current 160mA
Anode voltage 180V

Although the anode voltage specification is 180 volts, I found that the performance was rather better with only 27 volts which, as well as being easier to obtain, is safe.

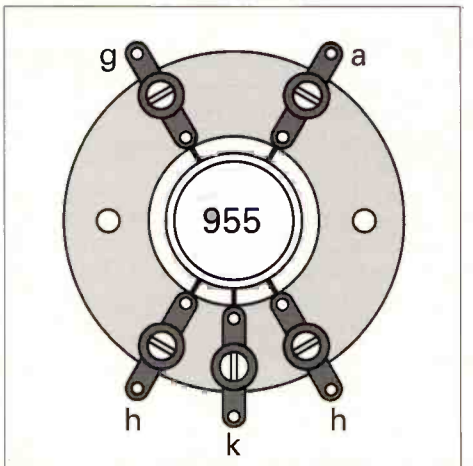


Fig. 2: Details of the home-made valve base shown full size.

C1 - Antenna trimming capacitor (5-22pF). This is a small air-spaced variable capacitor once quite common in valve equipment. They are often available at low cost from firms who deal with surplus electrical components. They are also still in production and can be obtained from the big components specialists, but at a greater cost. The value is not too critical and anything up to about 50pF is satisfactory.

C2 - Main tuning capacitor (0-160pF). A large and more substantial capacitor. The one I used was an ex-equipment transmitter tuning capacitor which was obtained from Bull Electrical at a very low cost. As with C3 a current production one could be used, but again this is far more expensive.

C3 - Grid capacitor (50pF). This is a vintage baseboard-

Continued on page 28

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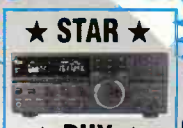

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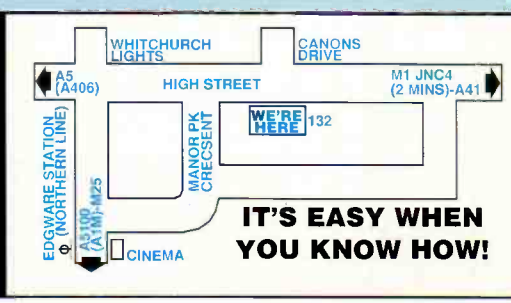

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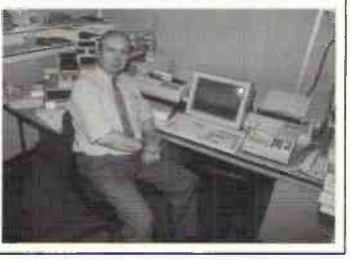

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Continued from page 24

mounting capacitor. A modern 47pF capacitor will work just as well and it is not too difficult to make a reproduction baseboard-mounted type by concealing a modern component inside a small wooden or plastics box.

C4 - Decoupling capacitor (5nF). As for C3, apart from the value of course.

R1 - Grid leak resistor (2.2MΩ). I used a modern one watt resistor for this. It is supported by its own wires across solder tags projecting from the grid capacitor terminals. The one watt type was used simply because it is physically large. A smaller wattage type will work just as well.

R2 - Reaction control (50kΩ linear potentiometer). A current production component

L1 - Grid coil. Home-made - See text.

L2 - Reaction coil. Home-made - See text

L3 - Reaction choke. Home-made - See text

Miscellaneous

Wooden baseboard	280 x 150mm
Plywood front panel	280 x 130mm
Aluminium sheet	280 x 150mm
Aluminium sheet	280 x 130mm
Sheet of veneer of your choice	280 x 130mm
One slow motion vernier dial	Main tuning control
Two control knobs	Reaction and antenna trimmer controls
Piece of wood or plastics	280 x 50mm
Piece of plastics tube	50mm long x 28mm diameter
Small quantity of aluminium sheet	For brackets, see text
Small piece of Paxolin or plastic	See text
One standard jack socket	For Headphones
Five rubber tap washers 25mm	See text
Four rubber tap washers 19mm	See text
Small quantity of testmeter lead wires	See text (Maplin Extra-Flexible Wire)
Quantity of thick/bare copper wire	For wiring, see text
Bobbin of 34 s.w.g. enamelled wire	See text
Nuts & Bolts, wood screws various	General construction
Quantity of solder tags	See text

The power supply requirements are covered in the text.

This list of components may seem quite a lot for a single valve receiver, but most of them are inexpensive. In fact, in the prototype the highest cost went to the vernier tuning dial. Everything else cost less than a pound, including the valve, which I picked up at a car boot sale for 25 pence.
In order to get good results from the receiver a pair of high impedance headphones is most suitable. Unfortunately they are neither cheap or common these days. A cheap, suitable adapter for low resistance headphones is suggested in the article.

Headphones. Ideally high resistance types of 2kΩ or 4kΩ impedance should be used. If you do not have them, you can make a simple matching transformer from an output transformer taken from an old radio. The low resistance windings go to the headphones and the high resistance windings to a jack socket which is plugged into the headphone jack on the set. A small 6.3 volt mains transformer could also be used in this rôle.

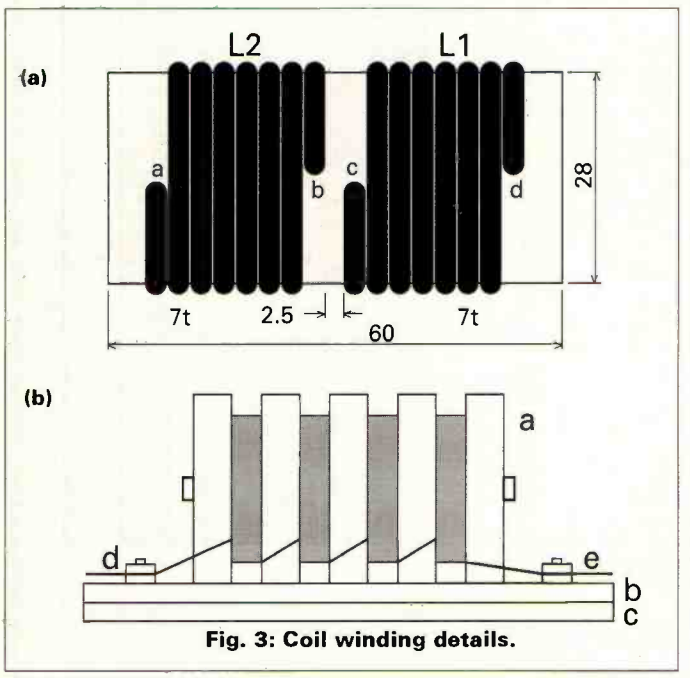

Fig. 3: Coil winding details.

Coil and Choke Construction

First I will deal with the grid and reaction coils shown in **Figs. 3a**. These are both wound on a 28mm diameter plastics tube about 60mm long. This tube was the centre of a telex paper roll, but any similar tube will do. Plastics pill bottles or lengths of plastics piping from DIY stores can also be used. The 28mm diameter is not critical, but any change will affect the frequency band slightly.

I made a break with tradition when choosing the type of wire with which to wind these two coils. I used insulated, standard testmeter wire, black for the grid coil and red for the reaction coil. First of all I drilled a small hole 'a' and bolted two small solder tags to the former, their tails pointed in opposite directions. To the back solder tag I soldered one end of the reaction coil and wound seven turns of wire onto the former winding the wire towards me as shown in **Fig. 3a.** At the seventh turn I marked where to drill the fixing hole and then unwound the coil and inserted a small nut and bolt with two more solder tags in position 'b'. I wound the coil on again, cut it off exactly the correct length and soldered it to tag 'b'. Next I drilled a hole in the former for the two tags at the start of the grid coil, 'c'. Although, in **Fig. 3a**, 'b' and 'c' are shown next to each other, I found it necessary in practice to have 'c' below 'b' in order to get the 2.5mm spacing between the coils. If the two

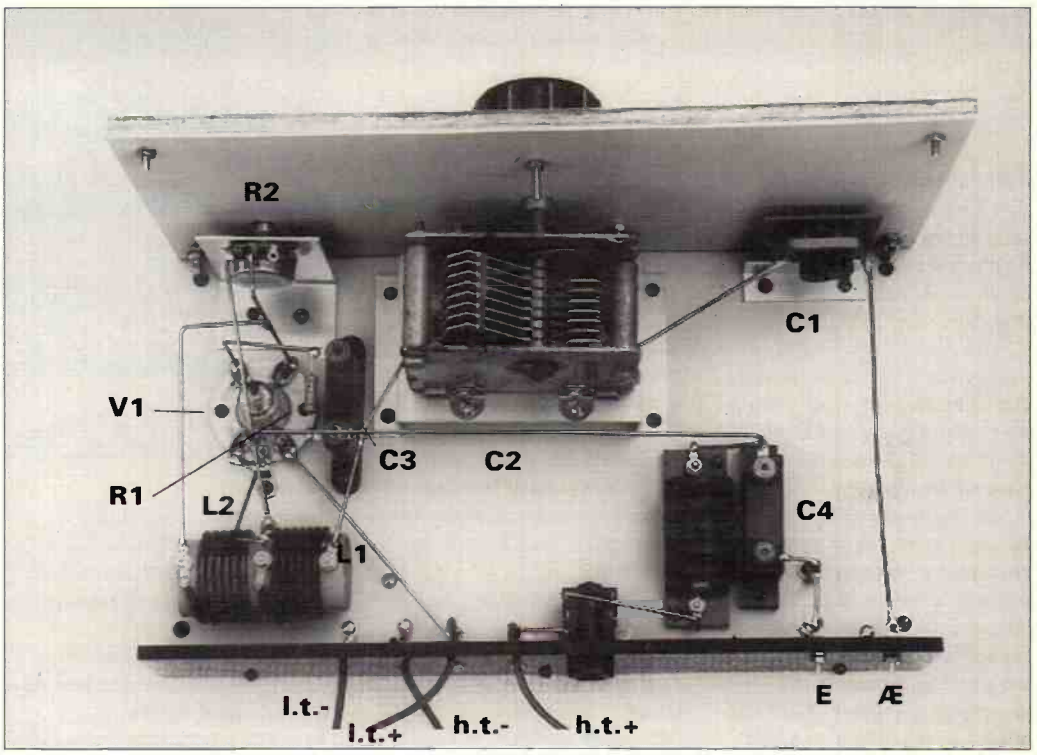

Fig. 4: General view of the Acorn One, showing wiring details.

coils are too far apart, feedback or reaction will not be obtained, so this is most important. The grid coil is also seven turns wound in the same direction and terminating at 'd'. It should be noted that the coils are wound exactly in the same manner shown and the terminals connected correctly. A reversal of either coil in the circuit would prevent reaction being obtained.

The coil is fixed down by two woodscrews driven through the ends of the former. Two nuts under the former act as spacing from the baseboard.

If you wish to receive a higher frequency band put less turns on the grid coil and for a lower frequency band more turns. The reaction coil and the spacing between them remains the same.

I wound the reaction choke on a ribbed former made up from tap washers. Four 19mm washers were glued between five 25mm washers using Superglue. This produced a former 35mm long as shown in **Fig. 3b** with four slots for the windings and the large washers 'a' on the ends. The actual winding was quite simple. Using 24 s.w.g. wire I wound 40 turns into each slot making a total of 160 turns on the choke. To get from one slot to the next I just carried the wire across the intervening washer. For a base I cut an oblong of Paxolin 'b' and countersunk nuts and bolts together with their solder tags 'd' and 'e' at the ends. Each end of the choke windings were then soldered to these tags. Because the baseboard of the receiver is sheathed in aluminium it was necessary to cover up the countersunk heads of the connections with another piece of Paxolin 'c' glued underneath. The choke itself is glued to the top of the base with epoxy resin. Two bolt heads can be seen at either end of the choke. These are merely to make it look better. They do not pass through the choke. They are sawn off bolt heads just stuck on. Two vertical fixing holes were then drilled through the base for fixing. It does not matter which way the choke is connected.

Because the three controls are mounted on the main board, there is no need to put the front panel on until the set is working.

The 280 x 50mm terminal panel was then prepared. At the left-hand side, four holes were drilled to take the four power leads, l.t -, h.t.-, l.t.+ and h.t.+. Below the l.t.+ and h.t.+ holes, two bent-over solder tags are bolted on. The power leads and the internal wiring are supported by these tags. As l.t.- and h.t.- go straight in through the holes and down to their own earthing tags on the baseboard, they have no need for supports on the terminal panel. A standard jack socket for the headphones and antenna and earth terminals (complete with solder tags on the back) are also fitted before the panel is screwed in position.

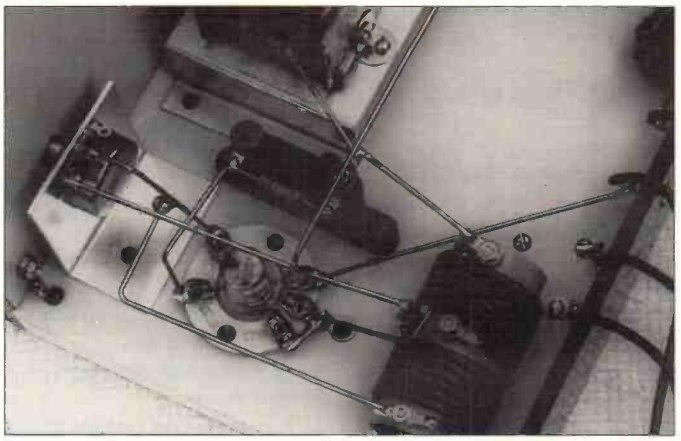

Fig. 5: Details of the valve and coil wiring.

Preparing the Baseboard

The 280 x 150 mm baseboard was cut first of all. I covered this with a piece of aluminium sheet exactly the same size. This was held down by a screw at each corner. The two screws at the front edge each have a solder tag. This is to link the aluminium-backed front panel to earth.

The three controls are supported by brackets clearly visible in **Fig. 4**. The reaction control bracket is a straightforward piece of bent aluminium. The main tuning capacitor C2 is mounted on a sub-chassis in order to have the control knob higher than the other two. It is important that the frame, which is connected to the moving vanes makes good electrical contact with the sub-chassis and the sub-chassis with the aluminium-covered baseboard.

The antenna trimmer bracket is slightly different.

The angle bracket is of aluminium, and to this is bolted an insulated front section. This insulation is essential as neither side of the antenna trimmer, C1, is connected to earth and the frames of most variable capacitors are usually connected to the moving vanes.

When the three brackets are complete, the three controls are bolted in position on the baseboard. Finally, the remaining components are screwed in position. Note that

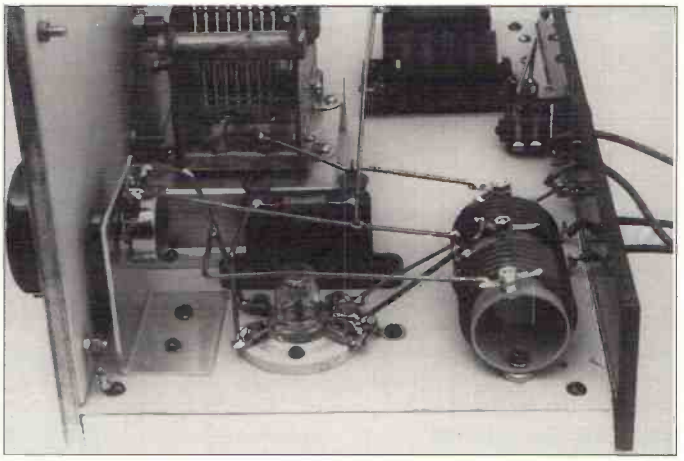

Fig. 6: Another view of the valve and coil wiring.

the lower glass 'pip' of the acorn valve projects below the level of the holder base, so a hole must be drilled in the baseboard to accommodate this 'pip'.

The solder tags on the screws holding the aluminium chassis down are earth points and must make good electrical contact with the aluminium covered baseboard.

All that remains is the wiring. I used heavy gauge bare copper wire for this. In order to obtain a neat appearance this wire had to be made perfectly straight. I cut several lengths about 600mm long from the spool of wire, placed one end in a vice and taking the other in a pair of heavy pliers gave a heave. This stretches the wire slightly and in doing so makes it perfectly straight. Lengths could then be cut off as required.

Figs. 4 to 6 show details of the wiring. The spacing is not very critical, as I discovered when sorting out the original design.

Many single-gang variable tuning capacitors such as C2 have four connections to the fixed vanes. These are for convenience and it is immaterial which one is used as they all go the same place in the end. I utilised the two back ones, leaving the other two unconnected.

Suggested Wiring Sequence

1. Centre pin of R2 down to the anode 'a' terminal on valve.
2. Grid pin 'g' on valve across to front terminal of C3.
3. Solder R1 across solder tags on C3.
4. Link heater 'h' and cathode 'k' on valve and link down to earth.
5. Terminal 'a' on L2 across to wire leading from centre pin of R2.
6. Terminal 'b' on L2 across to left hand pin on R2.
7. Terminal 'c' on L1 down to earth.
8. Terminal 'd' on L1 across to back terminal on C3.
9. Rear terminal of C3 across to fixed vanes C2.
10. Right-hand heater 'h' across to l.t.+ tag on back panel.
11. Rear pin on phone jack to h.t.+ tag on back panel.
12. Front pin on phone jack to back terminal on L3.
13. Connect front terminal L3 across to centre of wire joining terminal 'b' on L2 to left hand pin on R2.
14. Front terminal of L3 to front terminal of C4.
15. Rear terminal of C4 across to the earth terminal on back panel.
16. Earth terminal on back panel down to earth.
17. Right-hand fixed vanes of C2 to left side of C1.
18. Right side of C1 to antenna terminal on back panel.

The wiring is now complete, but the flexible power leads must be connected through the holes on the back panel and down to the appropriate support tag.

Power Supplies

l.t.- and l.t.+ Low voltage supply for valve heater. 6.3V a.c. or d.c. If a battery is used, 6V will be sufficient. A small mains transformer with a 6.3V secondary winding also provides a satisfactory supply. If this method is used be careful to insulate the 250V input terminal as this mains voltage can be lethal!

h.t.- and h.t.+ High tension supply 27V obtained from three small PP3-type 9V batteries connected in series. The drain on the h.t. battery is only in the region of 1mA, so the set is quite economical to run.

Testing

Connect up the antenna and earth. I found that a wire antenna a few metres long would work OK, but a longer one produced much better results. The earth was taken to a 300mm copper tube knocked into he ground under the window.

Plug in the headphones. Connect the l.t. supply and the valve should light up immediately. Connect the 27V h.t. supply.

With the reaction control at mid setting, move the tuning control around until you find a station. Advancing the reaction control should increase the volume and improve the selectivity until such a point is reached that the set oscillates. The reaction should then be backed off slightly. Careful adjustment of the antenna trimmer will help separate stations and increase performance. It is important to realise that all three controls should be used in conjunction with each other to get the best results. All three are very critical and the set is at its most sensitive just below the oscillation point. The strength of the signals is of a comfortable magnitude for headphones.

Listening in at various times of the day and night I have picked up broadcast stations in Europe, Russia, Spain and America. Morse and telex signals have been picked up from UK, Mediterranean, Norwegian and Spanish stations.

Completion

The front panel of the receiver is three-ply wood backed with an aluminium sheet. The aluminium is bolted to the plywood with countersunk screws. The front of the panel is covered in wood veneer. When drilling the holes for the control spindles it is essential that they are large enough for the spindles to pass through without touching the aluminium.

The front panel is screwed on to the baseboard with countersunk woodscrews. Screw the control knobs on. Finally link the aluminium backed front panel to the aluminium faced baseboard via solder tags at either side.

Final Comments

Despite the simplicity of the circuit, the building of a set like this gives the builder a very real sense of achievement. The physical engineering of it makes a welcome change from soldering tiny components into a small p.c.b. and the construction of major components such as the coils gives a great satisfaction. Whilst bringing back to useful life valves and components which may be more than half a century old is very commendable in itself.

There are two fairly large gaps in the physical layout. Behind the main tuning capacitor and behind the antenna trimmer. These were left on purpose for the time when I add further valve stages turning the Acorn One into an Acorn Two and finally an Acorn Three. ■

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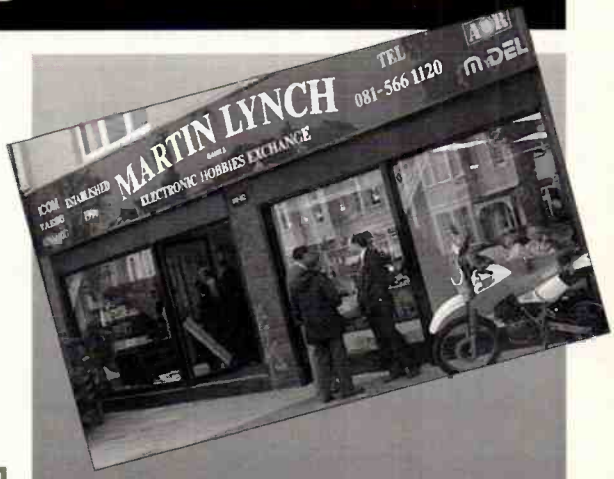

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300 Countries Not Out On 40 Metres SSB

What has England's cricket performance to do with 40m s.s.b.? David A. Whitaker explains how a childhood obsession mutated into an adult interest.

As a young lad I was always cricket made (and still am!) and used to follow the fortunes of my county and country. My dreams used to be of a player hitting a triple century and how he would feel after doing so; that is 300 runs in a single innings. Somehow, when I got interested in amateur radio these same cricketing thoughts transferred themselves to my new hobby. I wonder why!

As an active s.w.l. I started 'collecting' all the countries I heard on the amateur bands. Soon, I had heard 100 countries. I then dreamed of hearing 300 countries on the amateur bands just like a cricketer dreaming of scoring 300 runs! Hearing 300 countries was going to be a challenge and I knew it would take time. In fact, it took some 20 years but that was on all amateur bands.

I then set my sights on getting 300 countries on 40 metres s.s.b. I have always enjoyed the challenge of this band. Conditions can be very variable from day to day so to me this is interesting and in turn a challenge to hear those 300 countries.

I said to myself, "If the great Sir Leonard Hutton can get 300 runs from England, I can get 300 countries on 40 metres s.s.b.!" So the hard slog started in earnest. It must be said that it is easier to hear DX stations on 40m than it used to be. Some five years ago that was a lot of interference from broadcasting station on this band now it is mostly free of this QRM. Long may it reign!

So, what is needed to hear all these countries? Well, initially you need lots of patience! Obviously a good receiver is a must which must be selective. By that I mean some good filtering as the noise level on this band can sometimes be horrendous. Then a keen pair of ears of course! Knowledge of the band is useful as you will know when and where the DX stations operate. So, by picking the right times I gradually heard the new countries and up went my country score.

Two hundred countries was not really too difficult as I was fortunate to hear 200 countries in one year quite recently. But 300 countries was going to be much harder. Much dedication and a certain amount of luck gradually got me the countries I needed. So, by the year 1992 and after 30 years of monitoring 40 metres s.s.b., I finally made it.

I said luck sometimes comes into is and this happened when I heard country 300. I had been entertaining that evening and it was well past midnight when our last guest departed. After tidying up before bed, I decided to take one quick listen on 40m. It was about 2345UTC and someone was talking about the Bangladesh operation by the Hungarian team. That was a country I needed and it was as if by magic they appeared on the band just then. It was only a short session and they only operated for 20 minutes or so. But in that time I had them logged and that was it.

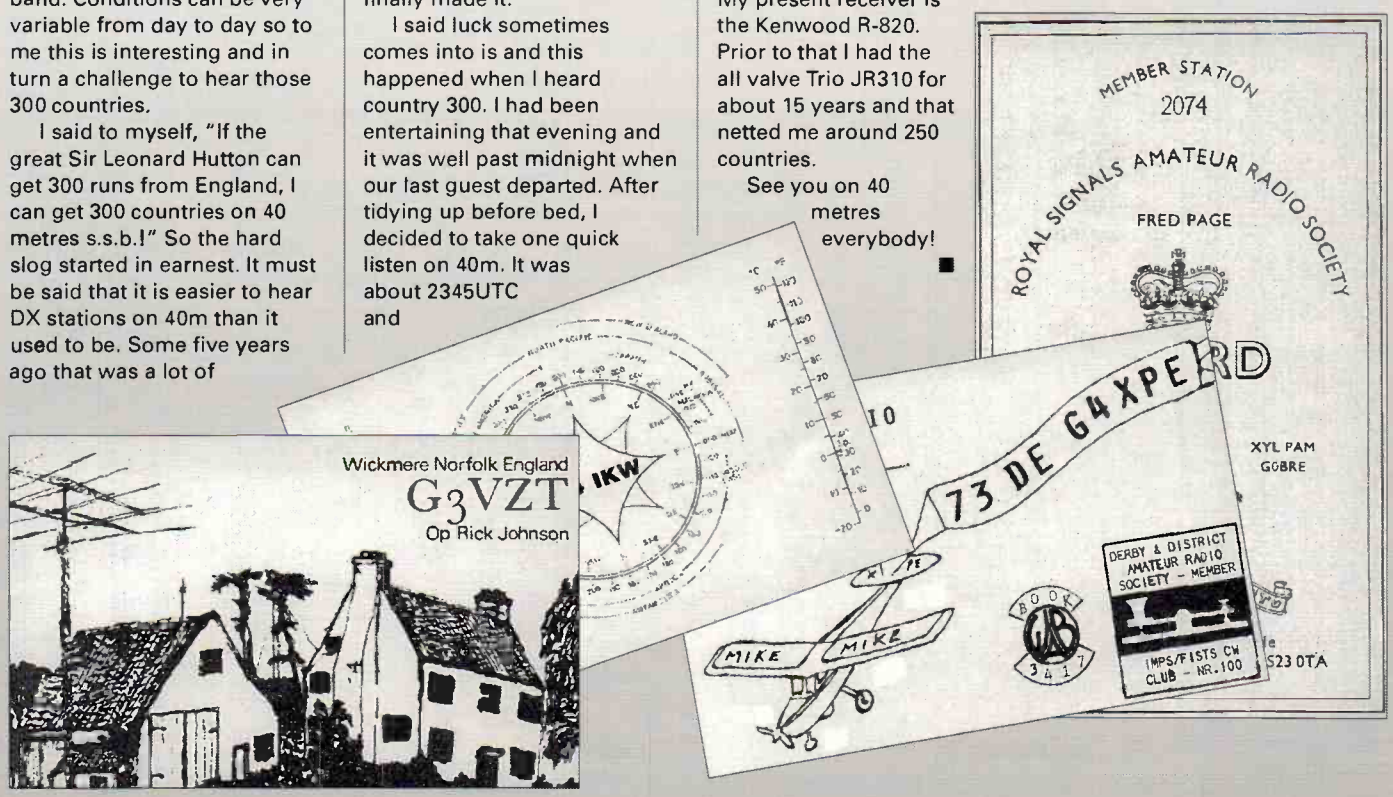
As a matter of interest I would like to know of any s.w.l. or even any amateurs who have heard/worked 300 countries or more on 40 metres s.s.b.

So what do I do now? Well, there is always 80 metres to tackle. Who knows, in a few years time we might be getting the good conditions on that band again.

Presently, I am just waiting for three more countries on 40m to get the 300 confirmed. Hopefully, that won't be too long.

I hope that these few lines have been of some interest to s.w.l.s as well as radio amateurs. For antennas I have always used wire arrangement usually of the dipole variety. My present receiver is the Kenwood R-820. Prior to that I had the all valve Trio JR310 for about 15 years and that netted me around 250 countries.

See you on 40 metres everybody! ■



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My life in the RTTY scene

John Worthington GW3COI reminisces of the days when the smell of the equipment was just as important as its performance.

When I was in the RAF, just after the balloons were made obsolete, I used to go into the teleprinter room to watch the antics of the great machines. I was fascinated with the mode but never though that one day I would be able to operate my own. The machines were an outstanding example of engineering in that they seldom gave trouble in spite of their enormous complexity and they did an exceptional amount of traffic handling on account of their freedom from interception by the enemy. The W/T cabin was acting as back up in case of failure but I cannot recall if it was ever used in this mode and probably coded messages were actually telephoned as being the quickest alternative.

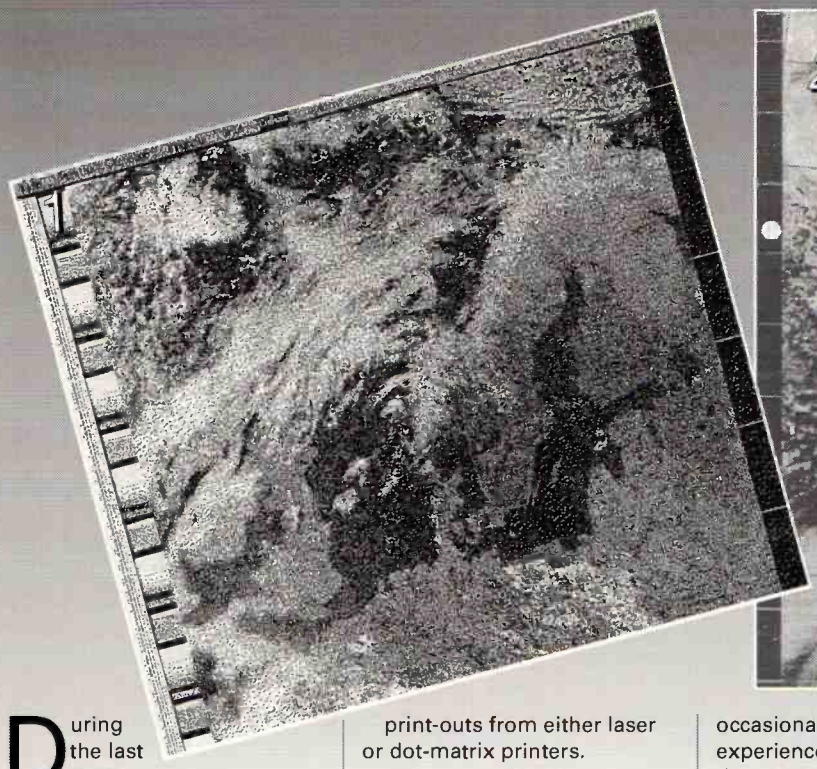
I duly obtained my ham ticket in '47 and spent the early years happily enough among the surplus gear and wasn't really aware of the RTTY fraternity until it started to grow and advertise in the magazines. I soon found out that there were ex-RAF teleprinters on the market, but by this time I had become a family man in a small house and a large overdraft. Time passed and the possibility of having my own machine arrived so I waded into the job of building a terminal unit - this is the thing needed to connect your teleprinter to the rig. It was a slow job in view of the other attractions which were being pursued at the time, namely s.s.b., mobile operation and v.h.f. working and... I could go on. Before I knew what had happened, amateur radio reached the point where solid state design had rendered the clattering machines of the 40s so much scrap metal. It was absolutely cataclysmic and something like telling a man who had just sunk his savings into a private aeroplane that he could fit a brand new gadget to his feet and fly to Blackpool just for a look at the 'lights'.

After due consideration (although I'd decided anyway) I acquired a new RTTY black box and was soon calling CQ in the approved band segment. I have to say that I wasn't as excited as I though I would be and think I know why. It wasn't the fact that RTTY is so prone to QRM or the fact that I'm a lousy typist, no, it's because the banging and thumping of the old machines is missing. The eerie way that they spring into life, quietly at first with a tick tick tick and then the paper roller shifts up and the callsigns start to come through. It is something like one of those elaborate train sets. You bend over the opening where the paper is starting to jerk out and you stare at the printing head hammering its message. Every now and then it halts as the operator at the other end consults his notes or whatever, then the machine sort of stands clicking its heels patiently. With a rumble, it's off again until the message is finished and you can tear it out for a close read leaving the monster to hum sinisterly to itself.

Yes, that's what's wrong with modern RTTY, it's just too quiet and it's no good saying you can add a simulated RTTY noise box because its not just the noise, its the smell of oil and paper and the sight of that great heap of working metal with its spindles, bell cranks, half shafts, ferris tangs, banjo cleats, jumper wheels, harp thrusts, etc., to all obeying your every whim.

Come to think of it, isn't this philosophy behind the chaps who are mad about Morse pump handle keys? Anyway, after a very short acquaintance I got rid without regrets and now I'm trying to figure out a way of reviving my interest in DX - perhaps with a pedal-operated generator. ■

Info in Orbit S



During the last year or two, I have received an increasing number of pictures, submitted for inclusion in 'Info in Orbit', many being of very good quality. The column regularly includes three or four pictures taken by correspondents, which are often used to illustrate points in the text. Some are photographs of the computer screen, taken after image enhancement. Others are print-outs from either laser or dot-matrix printers.

So many pictures have been received that, after bending the Editor's arm a little, I have prepared this extra article to accompany a special batch of images. Some names here are from regular correspondents, but the absence of a name does not imply that pictures received were not considered good enough! This is just a sample of many that have been waiting for possible space in *SWM*! Do send in your contributions - who knows - this might happen again!

Mike Robinson of Accrington has used his RIG Proscan receiver and software to monitor the polar orbiters, and has sent some large format pictures for the column. **Fig. 1** is from NOAA 12 and shows a thunderstorm over the northern Pennines. Mike comments on the occasional problems experienced when converting the highly detailed screen image to a final hard copy.

Direct reading of an image file cannot always be accomplished by editing software - for example, PROsatII files cannot be read by the Windows Paintbrush program! Fortunately there are other options. Within PROsatII one can first convert the image to PCX format; this is readable by several image processing programs.

Micheal Smith of Sherborne, uses a Martelec MSR 20 WXSAT receiver feeding a 286 PC running PROsatII under DRDOS-6. Micheal sent me a NOAA 10 image - see **Fig. 2** - obtained at 0835UTC on 27 July 1993. He used the gridding facility, and points out two features: a dust storm is visible near the Sahara, but does not show up on the infra-red image, and secondly, sun glint in which the reflection of the sun, and cloud shadows can be seen around Italy, caught by the sensors.

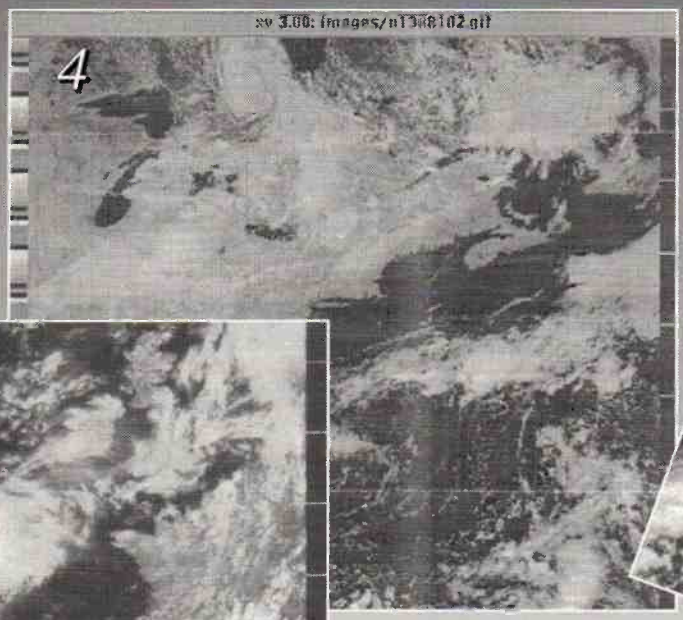
Stephen Lowe of Billingshurst set up his WXSAT station using his Proscan receiver and MegaNOAA software. Stephen recorded this image of NOAA 13 (which has since apparently failed) on 15 August during the approach of yet another fast moving depression - see **Fig. 3**. This print-out, like several others shown here, was done on a laser printer in large format.

Quentin Hordle of Poole was one of the first WXSAT monitors to spot the transmissions from NOAA 13, and he is one of several people who sent me an image or two. His is rather different! **Fig. 4** is a NOAA 13 picture taken on 11 August 1993, showing the east coast of America! I am fairly certain that direct pictures from NOAA 13 cannot be received in Poole whilst the WXSAT is over America, yet this image does not look like a FAX image that might have been transmitted in the h.f. band.

Mark Pepper of Camberley uses a combination of hardware - a RIG down-converter, a TH2 loop Yagi, and Timestep or JVFAX software to produce some of his METEOSAT images. By manipulating his pictures with proprietary image processing software he has enhanced his results and regularly sends me

Special Edition

by Lawrence Harris



some extremely impressive print-outs.

Fig. 5 is a D2 (thermal) METEOSAT-4 image, showing the Mediterranean Sea in mid-March 1993. Whether from the NOAAs, METEORs or METEOSAT, thermal images reveal temperature profiles, normally using the format where black is warm and white is cold. CIS METEORs use the reverse format. In this picture, the darker sea is seen to be warmer than the lighter land, as one would expect at 0630UTC. Britain is seen facing an approaching weather front, a feature that typified summer 1993.

Mark also recorded the new METEOSAT GMS images that are obtained by the Japanese geostationary WXSAT GMS-4, then re-transmitted by METEOSAT-4, four times per day. Mark edited them to create a composite image - see **Fig. 6** dated 16 August 1993.

GMS is positioned near Australia. These images resolve fewer details than normal METEOSAT images due to transmission time restrictions which limit the picture resolution. This composite image shows much storm activity.

Jim and **Hilda Richardson** of Fife, have been enjoying collecting images from the different WXSATs, using a loft-mounted antenna, and the PC-GOES program. From several prints I have selected a METEOR 3-4 image timed at 1140UTC on 10 February 1993 - see **Fig. 7**. It illustrates the different spectral sensitivities of the image sensors on-board METEOR and NOAA WXSATs. NOAA sensors show land very well, but the METEORs need image enhancement to reveal all the data that is present. When suitably enhanced, they actually show greater land detail than the NOAAs as they only transmit one spectral band while the NOAAs transmit two (in the a.p.t. format).

Brian Dudman of Harrow has been a regular contributor of pictures and monitoring notes and sent me, amongst several others, a picture from METEOR 2-19 taken at the end of winter 1991 - see **Fig. 8**. It shows the WXSAT descending over North Cape (top of Lapland).

Roger Ray of Telford has sent several batches of photographs taken with his extensive WXSAT receiving system. Selecting one or two images from a dozen impressive photographs is not easy! **Fig. 9** shows the METEOSAT-4 whole-disc, visible-light image recorded on 12 April 1993. Roger has also used an image enhancing and editing program to add captions.

Fig. 10 is a NOAA 11 image from 18 July 1993, showing both Italy and Greece, with surrounding countries. It shows the amount of detail revealed by the NOAAs - Mount Etna in Sicily being unusually clear from cloud. ■

This has been a small selection of many pictures received from correspondents to 'Info in Orbit'; many more await an opportunity for publication. My thanks to all correspondents.

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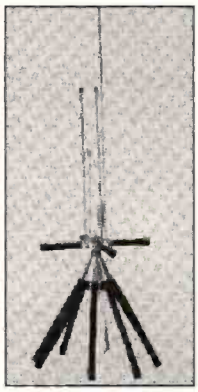

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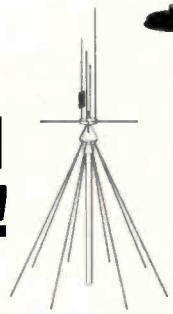

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VISA Access

Propagation

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

When I first became interested in short wave, I was fascinated with the idea that propagation was effected by the 11-year sunspot cycle," wrote **David Edwardson** (Wallsend). He wonders if sunspot activity has any influence over the earth's weather.

This is a big subject David and requires a great deal of research from many sources of archive material. However, in my opinion, they do and I base this on the period from 1968 to 1984 when my solar radio telescope made daily observations of the sun. I noted many times that when there was a violent solar storm, associated with a large sunspot group, somewhere on this planet a major weather event was reported by the media. When you think about it, if some of the complex rays from a solar disturbance can upset the ionosphere and the earth's magnetic field, why can't others, perhaps still unknown, create havoc in the troposphere? Something for you to think about after your Christmas pud, hi! Season's greetings to you all.

Solar

During September, **Ron Livesey** (Edinburgh) using a 2.5in refractor and a 4.0in projection screen found two active areas on the sun's disc on the 25th, 26th and 28th and three on the 27th. From their respective observatories in Selsey and Bristol, **Patrick Moore** and **Ted Waring**, both using the projection method, located about 7 sunspots on October 21/22. Patrick kindly sent the drawings, **Figs. 1** and **2**, of the sunspots that he observed at 1305 on the 7th and 0905 on the 21st.

Auroral

Ron Livesey, the auroral co-ordinator for the British Astronomical Association received reports of 'glow' during the overnight period of September 16/17 and 27/28, 'arc' on 7/8, 15/16, 17/18, 21/22 and 29/30, 'rayed arc or band' on 30/01, 'rays' on 9/10 and 24/25, 'active' on 2/3, 13/14, 14/15 and 20/21 and 'corona' on 12/13 and 23/24, spread among observers in America, Canada, Iceland and Scotland. **Ford White** (Portland) heard the German beacon DK0WCY, on 10.144MHz, giving strong auroral warnings on October 22 and 27.

Magnetic

The various magnetometers used by **John Fletcher** (Tuffley), **Tony Hopwood** (Upton-on Severn), Ron Livesey, **Karl Lewis** (Saltash), **Tom Rackham** (Goostrey) and **David Pettitt** (Carlisle), between them reported strong magnetic disturbances on September 3, 11-13 & 20.

Propagation Beacons

First my thanks to **Gordon Foote** (Didcot), **Henry Hatfield**, **Ian McDermid** (Comrie), **Ted Owen** (Maldon), Ted Waring, **Ern Warwick** (Plymouth) and Ford White, for their 28MHz beacon logs from which I compiled the chart seen in **Fig. 3**. "Signals seem to emerge from the mush and a quarter of an hour later submerge for the rest of the day!," remarked Ian. Ern told me that he found the South African beacons ZS6PW and ZS1J on 28.186MHz and 28.202MHz respectively. Ern and Henry reported strong signals from EA3JA on October 11 and 15. Judging from the chart (**Fig. 3**) there was a marked increase in 'local' beacon activity from October 7 onwards.

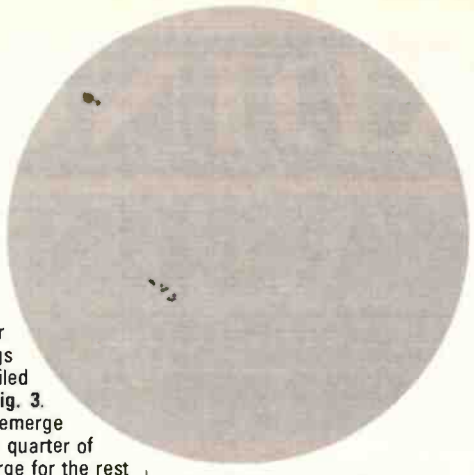


Fig. 1: Sunspot drawing from Patrick Moore, 1305 on 7 October 1993.

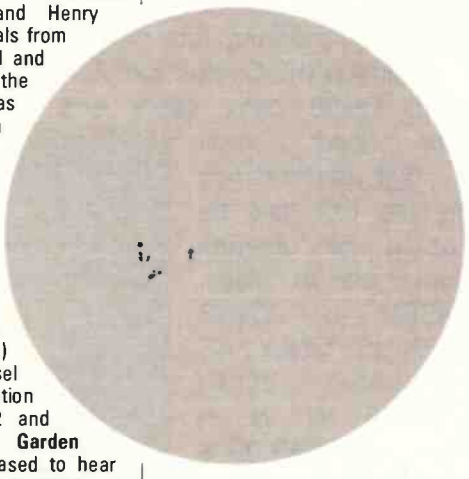


Fig. 2: Sunspot drawing from Patrick Moore, 0905 on 21 October 1993.

Band II

During the tropospheric opening on October 28, **Andrew Jackson** (Birkenhead) logged Studio Brussel and the German station WDR1 between 102 and 107MHz. **George Garden** (Edinburgh) was pleased to hear the test-transmissions from the new Classic FM transmitter in Angus, near Dundee. Although George lives beyond its predicted range, all the signal l.e.d.s on his receiver were illuminated just using the set's own rod antenna. He tells me that the station is due to open on November 10. *(It did - Ed.)*

More detailed information about the atmospheric pressure for the period September 26 to October 25 and the tropo-opening, referred to by Andrew Jackson, can be seen in my television column elsewhere in this issue.

Fig. 3: 14MHz beacon chart.

	September					October																						
Beacon	**26**	**27**	**28**	**29**	**30**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
CT0APO	X			X								X	X	X	X	X		X	X	X		X								
DF0AAB				X					X												X	X	X		X	X				
DF0THD						X						X							X	X	X			X						
DK0TEN												X						X	X	X	X	X		X				X		
DL0IGI	X			X	X	X			X			X	X	X	X	X	X	X	X	X	X	X	X	X						X
EA3JA						X			X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HG5GEW				X				X	X		X	X	X	X	X	X			X	X	X	X		X			X			X
IK1PCB				X	X	X						X	X	X	X	X	X	X	X	X		X		X		X			X	X
IY4M	X					X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
KA1NSV																X				X										X
KB9DJA																			X			X								X
KD4EC													X			X							X			X				X
LA5TEN									X			X											X	X						
LU1FHH											X					X							X			X				X
NX20																					X									
OH2TEN				X				X		X		X	X	X	X					X		X		X	X	X	X	X	X	X
OH9TEN													X											X	X			X	X	X
PI7BQC																								X						
PI7ETE																								X						
SK5TEN				X					X		X	X	X	X		X							X	X	X	X	X	X	X	
SV3AQR			X					X				X	X	X	X						X	X	X	X	X	X	X	X	X	X
S55ZRS	X			X	X	X	X				X		X		X	X	X	X	X	X	X	X	X	X	X					X
VK6RWA																									X					
VK8VF													X									X		X		X	X	X		
W3VD																X	X			X	X									X
ZS1J				X				X	X		X	X	X	X	X						X	X	X	X	X	X	X		X	X
ZS1LA			X	X	X			X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
ZS6PW	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5B4CY	X		X					X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Satellite TV

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

The sad royal rehearsal was the newspaper caption for an item concerning an ITN rehearsal for the Queen Mother's death back in the summer that I reported several columns ago, the BBC having carried out their dry run for her death some weeks prior to the ITN event.

Late October a 'phone call from a 'media contact' advised that another royal obituary rehearsal was to take place on or about 7 November. The rehearsal did take place and involved satellite hook-ups, live links and interviews and was extremely realistic. An Australian VTR engineer at Sky (untold of the rehearsal) happened across the programme, thinking the QM had, in fact, deceased rang the folks back home who in turn contacted the local radio station with 'scoop news' that it, and others, broadcast. The networks picked up the story, though checked through to the UK and eventually found the exclusive news incorrect. By that time government switchboards were jammed with the grieving population seeking more information! Sky sacked the engineer. Perhaps in future such dry runs should have a superimposed caption to make the situation clear!

Ian Waller (Lincoln) operates both C and Ku band equipment and has seen Sky News carried in its entirety (i.e. the same as Astra) on Intelsat f 4.06GHz 31°W though with interruptions for the Reuters and WTN news feed offerings late afternoon. Interesting that Haiti has been uplinking news reports on the same bird at 3.89GHz. Most enthusiasts tend to operate Ku band equipment (10.95-12.75GHz) since there is a mass of cheaply available equipment and the large dishes needed for C Band are unnecessary for Ku band.

One such Ku band enthusiast is **Andrew Sykes** (Halifax) who uses a wall mounted 800mm dish with Pace 9200 IRD. Andrew reports several interesting loggings, on Intelsat 601 27°W there is bleedthrough from the Canal France International C Band feed (4.010GHz) somehow due to a fault condition getting onto the old CNNI transponder at 11.155GHz. I checked out this sighting and sure enough the African service of CFI can be seen, though somewhat sparkly, in locking SECAM colour.

Autumn brings the leaves down to earth and at last Eutelsat I F2 25°E can be seen at my home, check out daily for the Channel 4 *Big Breakfast* on this bird, the downlink feeds directly to the presentation studio for inclusion into the programme make-up, the receiving dish itself can often be seen through the french windows! During the daytime, numerous horse racing circuits are carried back to the bookies channel on this bird.

Dutch reader **Berry Habekotte** (Kampen) has just installed a Triax dish atop his 11m high apartment block giving a look angle down to the horizon East and West. A recent catch was the Albanian 5544 test card on 16°E 11.571GHz vertical, (RTSH TV SHQUIPTAR) with clock, captions suggesting RTSH possibly going onto satellite, November 14 being mentioned. Berry has heard that Astra 1A has been suffering overheating problems with certain transponders backing off power output, MTV, Sky News, Sky One and RTL being weaker (more sparklies) than earlier.

Exotic reception by **John Locker** (Wirral) when on Eutelsat II F1 13°E was seen Ten-10 Sydney Master Control advising a news feed, very unusual for an Australasian signal to appear on a Pan-European beam. The Asian Broadcasting Union carries Far Eastern sourced signals during their daily news feed compilation across Europe, this a second hop, the first being C Band from Asia back into Europe and then Eutelsat for domestic pan-European coverage. Originating centre for distribution is Kuala Lumpur, Malaysia, the package is preceded with the 5544 card appropriately idented.

A reader's report says that the Irish *Setanta Sports* programme weekend evenings formerly on the now defunct Olympus 18°W can be found on Telecom 1C - 3°E - Sunday evenings from 1900 at 12.606GHz vertical.

Nicholas Earley (Australia) has written confirming that the new Intelsat 701 is now settling down over the Pacific at 174°E to cover Pacific Basin communications. With a payload of both C and Ku band transponders Nicholas is preparing his system to receive FSS (Ku) band in anticipation of more signals with a much smaller dish than is the norm for the region - any DX is received on large C Band systems which by cost and visual impact narrows those participating to a few.

On an educational theme, Barclays Life are acting as sponsors for the 'Jason Project' and John sent down material relating to this expedition that may well present exciting viewing for readers. Jason is the brainchild of Dr. Robert Ballard (of Titanic and Bismarck location/exploration fame). To promote more excitement and involvement in science education Robert initiated the Jason project that brought the classroom into contact with the World via modern communication in exploration and involvement with nature and science, travelling to remote parts of the World.

Fig. 1: An FSS Ku Band feed at 11.617GHz vert. featuring the Royal watcher James Whittaker sent in by John Locker.

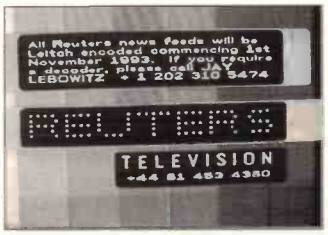


Fig. 2: Most sat-zappers are still puzzling over what Leitch encryption is! Sent in by John Locker.

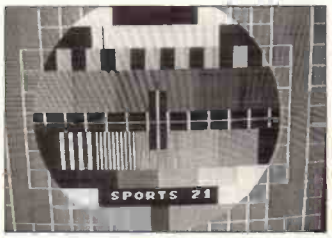


Fig. 3: An unidentified test card seen on Eutelsat II F3 16°E 12.580GHz sent in by John Locker.

For two weeks in early March 1994 an expedition into Central America (Belize) will satellite link back into classrooms across Europe live pictures and sound. 'Planet Earth' will transmit 28 February - 12 March and study the 'health of the earth and the effect of people on the environment'. I'm hoping to confirm the satellite and frequency(ies) being used for the American-Europe feed in time to advise readers and hopefully view the proceedings. The publicity blurb confirms that live interactive broadcasts are transmitted to and from a specially prepared international network of studio locations.

The last expedition that involved satellite transmission used digital coding, hopefully the early '94 project will opt for traditional analogue to embrace more educational establishments in the expedition. If you are involved in education and require more information, write to 'Jason Project', Barclays Life, the Pinnacle, 8 Bedford Park, Croydon CR9 2XS.

Orbital News

Eutelsat confirm that their 'Hot Bird Plus' is now go for launch during Summer 1996 and slotting at 13°E. This will offer 20 dedicated TV transponders to the existing complement of 23 transponders from messers Eutelsat II F1 and October '94 launching II F6. With digital compression just over the horizon the potential of many TV channels is enormous though services will undoubtedly duplicated for some years. By the time these lines are read, Eutelsat II F5 should be in orbit slotting 36°E running 16 transponders in Ku band. This will open up more potential for an improved DX window. And Eutelsat I F1, now parked at 25°E, will shortly move to either 36° or hopefully 50°E to improve European access into the Middle East and the Russias.

Hot rivalry now between newly launched satellite channel TMC - Tele Monte Carlo and the RTL network. With Canal Plus backing TMC so CLT (backers of the RTL group)has wheeled out the big guns in the battle for high viewing figures and market domination. Lined up against the might of Canal Plus are the skills and experience of the RTL-TV, RTL+, RTL-2, 4 and 5. May the best man win...

Fig. 4: The famed Arthur C. Clarke during a live 'hookup' between Sri Lanka and the 'States, Arthur is talking to veteran spaceman Buzz Aldrin via Eutelsat I F5 21°E, sent in by John Locker.

Fig. 5: Tele Monte Carlo is now on Telecom 2B downlinking at 12.648GHz vertical sent in by John Locker.

Fig. 6: The Canal Plus 'Canal Satellite' test card, a satellite channel package from Telecom 2A that offers eight general entertainment channels sent in by John Locker.

Bandscan

EUROPE
Peter Shore

During the Cold War, listening to the short wave broadcast bands in Europe could be hard work and at times downright unpleasant. Jamming was widespread, rendering huge numbers of frequencies unlistenable. Much of that jamming was directed from the Soviet Union and its satellite East European states against Radio Free Europe and Radio Liberty. RFE and RL operated from Munich, as US government stations, with the aim of providing the type of radio that it was believed people living under the hammer and sickle would want if they were free.

Until 1971, the stations were funded directly by the CIA and may have been used to try to destabilise the regimes in the former Soviet empire. Despite its quiet location in a Munich suburb, a bomb exploded in the station's car park in the 1980s, presumably planted by KGB agents. Penetration by the KGB was always a worry, fears that were confirmed when a senior member of the Russian service defected to the Soviet Union.

As the Cold War ended, the jamming stopped. This freed up hundreds of frequencies used by the two stations, and those either side that were often severely disrupted when listening on a receiver that did not have a particularly narrow filter. But RFE and RL transmitters based in Germany, Spain and Portugal continued to broadcast hundreds of hours of programmes each week back to Eastern Europe.

Last autumn, though, President Clinton announced that the two stations' budgets would be cut from its 1993 level of US$220 million to just $75 million in 1995. Almost immediately, the Hungarian service and Radio Free Afghanistan, which emanated from the Munich headquarters of RFE/RL, stopped broadcasting. To save money, the Czech and Polish services will move from Munich to Prague and Warsaw respectively. Hours and staff in other services will be cut.

While the axe falls on several services, brand new services to the former Yugoslavia and Albania will be started by RFE. This seems to go against the ethos of cutting back, particularly since the engineering division of RFE/RL will be merged with the Voice of America's, and VoA already broadcasts to Serbia, Croatia and Albania.

What will happen to the frequencies that RFE/RL will undoubtedly relinquish, and to its huge transmission capability? Only time will tell, as the pattern of international broadcasting continues to change.

Radio Netherlands is going through a period of change. A review of the station's operations was undertaken and the effectiveness of its £28 million budget was examined. It seems that the report suggests that the station should concentrate more resources on serving audiences in Europe, particularly by English language broadcasts. Several languages might be cut back and the money saved ploughed into new areas of priority operation. A further study is underway, looking at possible reorganisation, and that is expected to be released in April 1994.

In the studio at Swiss Radio International Bern.

English language programmes at present can be heard beamed towards Europe at

0830-1025 on Sundays on 5.955MHz
1130-1325 on 9.65 & 5.955MHz
1530-1625 on Sundays on 5.955MHz;
to Africa at 1730-1930 on 21.59, 21.515, 9.605 & 6.02MHz (all from the station's relays in Bonaire and Madagascar) and from 1930 to 2025 on 21.59 & 17.605MHz.

Swiss Radio International has announced that it plans to devote more resources to satellite broadcasting within Europe, delivered via Astra. A new schedule will be introduced in April 1994 that will incorporate some of the changes that are being heard on the station's English service now. As well as transmissions via Astra on transponder 9, English can be heard on short wave at 0500 and 0600 Monday to Friday on 6.165 & 3.985MHz; 0700 daily on 6.165 & 3.985MHz; and at 1100 on 9.535 & 6.165MHz.

Radio France International has inaugurated a number of new transmitters and a revolutionary antenna at its site at Allouis-Issodun outside Paris. RFI has worked with transmitter manufacturers Thomson-CSF to re-equip the station in a revolutionary style. Instead of a central transmitter hall with several high-powered short wave transmitters, linked by lengthy feeders to the antennas, the Allouis-Issodun site is having five 500kW senders dispersed around the site. Each transmitter is built in an underground bunker, and almost immediately above is the transmitters own rotatable curtain antenna.

This concept is claimed by the manufacturers to be more ecologically sound, with less concentrated r.f. than is common with a conventional site, where all the transmitters are located in one central building. The curtain arrays can be configured in a few seconds with a different azimuth bearing and, if needed, radiation pattern.

The five transmitters will come on stream in the next twelve months or so, and then RFI will boast perhaps the most modern, and flexible, transmitter sites in the world. RFI can be heard with English to Europe at

1230UTC on 21.645, 15.155, 11.67 & 9.805MHz
1400UTC on 17.65 & 12.035MHz,
1600UTC on 17.85, 17.795, 17.62, 11.975, 11.705 & 6.175MHz.

Radio Yugoslavia in Belgrade has added four new language services: Albanian, Bulgarian, Greek and Hungarian. The station already broadcasts in Arabic, English, French, German, Russian, Spanish and Serbian. Radio Budapest from Hungary has added two half-hour programmes in Ukrainian on Wednesday and Saturday, and plans to increase the broadcasts to seven days a week in the future.

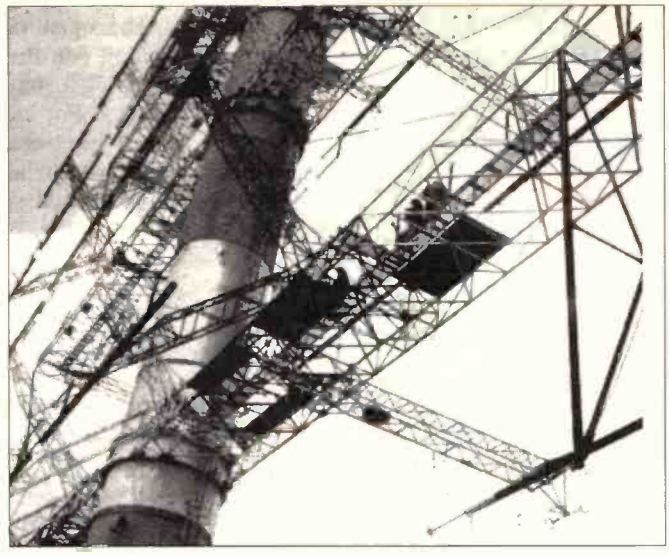
Radio Ukraine International in Kiev continues to benefit from many former Soviet transmitter sites on its territory and seems to have the cash to keep the transmitters on the air. English can be heard at

0100 on 9.86, 9.745, 9.685, 9.505, 7.24, 7.195, 6.02, 6.01 & 4.825MHz, with feeders on 10.344-u.s.b., 7.38-u.s.b. and 7.205-u.s.b.

2200 on 9.86, 9.745, 9.685, 9.505, 7.24, 7.195, 6.055, 6.02, 6.01, 5.96 & 4.825MHz.

Both broadcasts last one hour.

Digital Audio Broadcasting [DAB] continues to be talked of as the radio of the future. The Finnish Broadcasting Corporation, YLE, has announced that it intends to start testing DAB in 1995. The BBC is transmitting a full service from four transmitters in the London area, operating at 225MHz. The transmitters are located at Crystal Palace - a 10kW transmitter - Alexandra Palace, Wrotham and Redhill - all 1kW. The Dutch have begun a twelve-month test in the city of Haarlem and Hilversum with 1kW and 30W respectively. DAB delivers CD quality sound to radio receivers and a comprehensive network of transmitters could be on the air across Europe by 1997.



A view of part of one of the new rotatable curtain arrays at RFI's Allouis-Issodun site.

DXTV Round-up

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

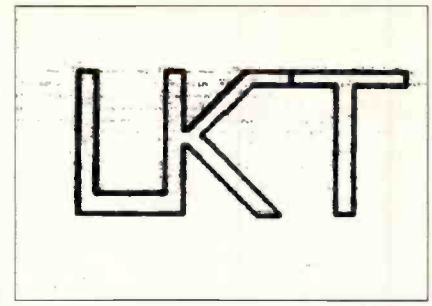


Fig. 1: Unknown logo seen by Peter Barber.

First let me wish you all a Merry Christmas, a prosperous New Year and thank you for your letters and the support that you have given my *DXTV* and *Propagation* columns throughout the past year. Let's hope that 1994 produces a few more tropospheric openings like the ones that upset Bands III, IV and V between 25 October and 2 November.

Such events also played havoc with the IBA transmissions in Band III (175-230MHz) back in the days of 405-line television. Customers found it hard to understand why their BBC pictures, in Band I (40-68MHz), were clear and their IBA programs were in chaos. During the summer months it was usually reversed, the BBC channels were upset by Sporadic-E while the Independent network was clear.

405-Alive

Although 405-line transmissions ended in the UK in 1985, there are many collectors and vintage television enthusiasts who still keep the subject alive. Toward the end of the 1940s, I remember installing single-channel 225mm (9in), 405-line receivers and advising customers to have a 'dim' light on in the room while viewing and warning them about a variety of interferences that might spoil their evenings entertainment. Around that time, the BBC transmitted a trade test-card for about two hours in the morning, an hour's programme in the afternoon and 1.5 hours (2030-2200) each evening. A 'big' step forward came on Fridays when they began at 2000 with a 30 minute news reel. It was common to hear people saying, "Friday night is newsreel night".

I was reminded of all this when I met fellow columnist **Andy Emmerson**, the editor and publisher of the magazine *405 Alive* that recalls the golden years of black and white television. A good number of people enjoy collecting and restoring '405' receivers and Andy's magazine is there to assist them. At present he has around 260 international subscribers. The fee is currently £13 per annum for which four magazines are supplied during the year. Each one is A5 size and is packed tight with articles and readers' letters on all aspects of the subject. In addition, several pages are devoted to 'Market Place' where televisors and associated equipment are listed for sale or wanted.

Readers' letters are important to all concerned, because they raise common problems that can be jointly discussed and probably answered by fellow subscribers who have maintained such sets in the past.

In my view, any sort of enthusiast is wise to join a specialist group, like *405-Alive*, to reap the benefit of the pooled knowledge of like minded people. A specimen copy of the magazine (£2.50) is available from Andy, at 71 Falcutt Way, Northampton NN2 8PH.

Take Care

If any of you obtain an elderly 405-line televisor, please take great care, especially if you have no experience with this type of radio engineering.

Beware of high voltages and possibly a chassis at full mains potential relative to earth. In plain terms, if the mains plug is wrongly wired you can get a severe electric shock from any of the internal metal work. In addition, keep clear of the very high voltages around the rectifier and the valve holders, the line time-base and the extra high tension (e.h.t.) around the e.h.t. transformer and connections to the cathode ray tube. Your safety must come first, so, if you are unsure about these points do ask a qualified engineer to check it and advise you accordingly.

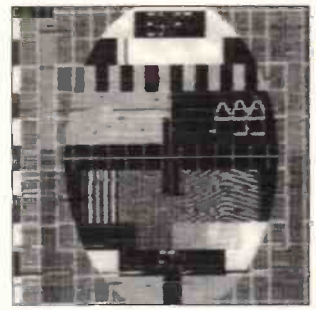


Fig. 2: Test-card from Egypt.

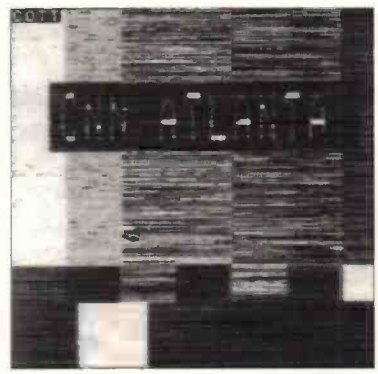


Fig. 3: CNN ident.

Fig. 4: CNN ident.

Fig. 5: SSTV from Russia.

Before switching-on, remove the chassis from the cabinet, take great when you handle the cathode ray tube (c.r.t.), because it may be 'soft' (air inside caused by a crack in the glass) and the glass suddenly shatter. In any case, make sure the tube is well supported while its screen is out of the cabinet frame and/or rubber mask. Check the mains lead for perished insulation, be sure that both poles on the double-pole on/off switch are working and that the polarity of the mains-lead is correct. See that any internal fuses are of the recommended electrical size and type. (Some sets have anti-surge fuses). Thoroughly clean the set and the loudspeaker cone and frame-work, look for corrosion around valve pins and sockets, general purpose resistors, any mains droppers and the turret tuner contacts.

The wiring to and from the mains dropper may be perished and cause a short circuit, especially at points where the wires pass through the chassis.

All the time a valved set is running it keeps itself dry through the internal heat generated by the valves. However, many of the 405-line receivers now reaching collectors have suffered from the damp of unsuitable storage conditions. One source of trouble, caused by damp, is the variable and pre-set potentiometers. These are employed for line and frame lock (hold) adjustments, picture width and height, linearity, brightness, contrast and sound volume. If the wiper on these pots. cannot make good contact with the track then the associated circuit cannot be properly controlled.

Normally such controls are correctly set in about the centre of their travel. However, if the wiper is hard over one end and the circuit is still out of control, test the fixed resistors in the circuit and no doubt one or more will have gone 'high' through age. Shorted turns or open-circuit transformers and leaky 'small' capacitors can cause all sorts of problems in the time-base circuits.

Check that the c.r.t. base is making good connection and that the ion trap is in the right position. The latter is a small magnet on a fibre band secured around the neck of the tube, near its base, by a bolt. In time the heat from the tube causes the fibre to snap and the band come loose. Gravity then takes a hand, the magnet swings to the lower half of the neck and the electron beam is deflected away from the screen. The result of heat and age can cause the time-base deflector coils to stick tight around the tube neck, so do take great care if you have to adjust these to get the picture horizontal on the screen. Do not try and force anything to do with the tube in case the glass cracks. I came back to the workshop one day in the late 1950s to find bits of jagged glass stuck in the door frame, floor and ceiling following the explosion of a 9in tube!.

Back to Now

Today we take for granted the strong, 625-line, colour pictures coming from a nearby u.h.f. relay

Fig. 6: SSTV from Russia.

station. Most of us have the choice of BBC 1 & 2, the IBA's CH 4 and, at least one or possibly two of the independent regional networks. Although my television pictures come from the Midhurst transmitter, I can also receive programmes from London, thus giving me the bonus of Carlton and LWT. It's no big deal, It's just modern technology, but, to the delight of DXers, we still get troubled by upsets in the troposphere.

Band I

Robert Connolly (Kilkeel) logged good quality colour pictures from Spain (TVE1) from 1305 to 1440 on October 15. "The program content appeared to be a news broadcast followed by *Television Journal*", said Robert. He uses a Nikkai receiver that covers the v.h.f. Bands I & III, plus the normal u.h.f. bands. He feeds this with vertically and horizontally polarised u.h.f. arrays with a diplexed down lead. One of these is beamed southwards for RTE from Dublin and the other faces north for the BBC. The signal from Spain was most likely picked-up by the horizontal array beaming south.

Peter Barber (Coventry) received pictures from Italy (RAI-Uno) around 1040 on the 18th, a fluttering test-card from Norway (NRK) on the 'E' channels and mix-ups and glimpses of such programmes as art, cartoons, cycling, dancing, football, horse-riding, news, netball and tennis, on the 'R' channels during the morning of the 19th and, 'pulsing ghost pictures', at various times between 0832 and midday on the 20th. The latter sounds like 'F2' activity, Peter, and those images may have been coming from the Far East.

Among the logos he saw, mainly on the 'R' channels, on the 19th were AVRO, TV at top right of the frame, a V with ORO above it, the large figures 1 and 2 and one that he cannot identify, looks like LKT, any ideas? I have reproduced these letters, from his sketch, **Fig. 1**, using the Windows Paintbrush program on my Packard Bell computer. Peter is equipped with Binatone Minivision and Citizen DD-T126TV receivers and feeds them with a simple dipole cut to CHs. E3/R2 (55.25/59.25MHz) for Band I, a Yagi, set for Ch. 8 (196.25MHz) for Band III and an 18-element, high-end, beam for Bands IV and V. He can also tune through Band I on a vintage Hallicrafters S-27 communications receiver.

In New Radnor, **Simon Hamer** received a test-card and Teletext from Iceland (RUV) on Ch. E4 and Norway (NRK), on CHs. E2 and E3 respectively, at 1230 on October 14 and pictures from Portugal (RTP1) and Spain (RTVE1 & 2) on CHs. E2, 3 and 4 at 1230 on the 15th.

"During the recent problems in Russia I saw some of the logos that were new to me on the BBC and ITV news when they used input from Russian TV", wrote **John Woodcock** (Basingstoke) who finds this information a great help when trying to identify stations under Sporadic-E conditions. This is a good idea John, I learnt that NTA was one of the CIS logos from the same source.

Fig. 7: SSTV from Portugal.

Satellite TV

Among the satellite TV pictures copied in October by **John Scott** (Glasgow) is a test-card from Egypt, **Fig. 2** and idents from CNN Atlanta, **Fig. 3** and CNN International Newsource, **Fig. 4**.

Weather

I recorded 184.2mm of rain during the first 13 days of October compared with 82.3mm for the whole month in 1992. More than half the amount (105.4mm) fell on the first two days. From the 14th onward we had seven consecutive frosts, some cold winds and generally overcast skies.

The atmospheric pressure readings for the period September 26 to October 25, **Fig. 10**, were taken, at noon and midnight, from the recording chart on my own barograph.

Tropospheric

"The 1st/2nd [November] was the best I have ever seen, my D100 converter was working at full steam", wrote **Andrew Jackson** (Birkenhead) after the extensive tropospheric opening that began on October 25. Conditions were right for such an event, the prevailing very high pressure was being pushed by 'lows', it was foggy and the temperature and humidity kept changing. Andrew had a fantastic haul throughout the period. For instance, spread through the days, he logged clocks, programmes, Teletext, test-cards and logos, etc., from a number of stations in Belgium (BRT1 and RTBF1), Denmark (DR), France (Canal+), Germany (ARD1, BR1, NDR1, RTL+, WDR1, ARD/ZDF), Holland (NED1) and Norway (Bergen) in the v.h.f. Band III and Belgium (BRT2), Denmark (DR & TV2), France (France 2 & 3, TDF, TF1), Germany (BR1, HR3, MDR3, NDR3, RTL+, SAT1, WDR3 and ZDF), Holland (NED1, 2 & 3), Ireland (RTE1 & Network 2) and Sweden (SVT2) on many spots in the u.h.f. Bands IV and V. He saw strong pictures with good colour on most days.

Fig. 8: SSTV from Spain.

On the 19th, Simon Hamer received strong pictures from Norway in Band III and Belgium, Denmark, Germany, Holland, Ireland and Sweden in both the v.h.f. and u.h.f. bands.

"The DX assault started on 25 October with RTE in Band III and weak Dutch and German u.h.f.", wrote **David Glenday** (Arbroath) and added, that more distant German signals started leaping in on the 27th. "Trops were very good on the 28th and 29th", he said with Belgium, Denmark, France, Germany, Holland and Sweden in on both days. On 1 November, David saw RTL-TV1 on Ch. E24 for the first time, plus Hessen 3 and many other German stations and networks, not forgetting plenty of signals from Belgium, Denmark, France and Holland.

Having moved to a new home in Edinburgh, **George Garden** was keen to see some DX, especially on his new JVC AV 25S1EK receiver. "It is very simple to operate", said George, "as you can type in the channel No. directly". By typing in familiar numbers while looking for DX, between 26 and 30 October, he was rewarded with pictures, at varying strengths, from the BBC/IBA transmitters at Angus, Bilsdale, Caldbeck, Chatton, Darvel, Durris, Emley Moor, Isle of Man, Pontop Pike, Selkirk and Waltham. In his usual way, George identified the weaker signals with patience and programme guides that are among the essential tools for a u.h.f. DXer.

SSTV

During October, **John Scott** found that around 1630 was the best time to look for slow-scan television pictures in the 14MHz band. He copied a couple of interesting calling captions from UA3AJ, **Figs. 5 & 6**, in Russia and one from CT1ANO in Portugal, **Fig. 7**. John caught a 'stand by' caption from EA2JO, **Fig. 8**, in Spain and another showing a 1920s style three valve receiver, **Fig. 9**.

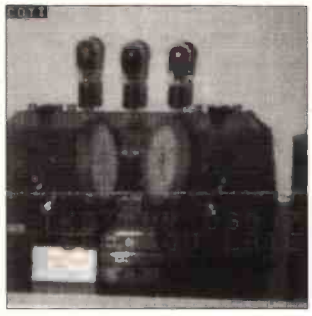


Fig. 9: SSTV picture.

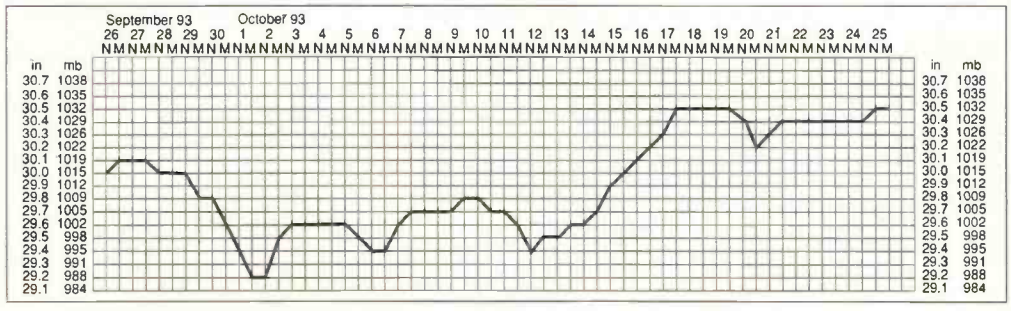


Fig. 10: Barometric pressure chart.

SSB Utility Listening

Graham Tanner,
42 David Close, Harlington, Middlesex UB3 5EA

The November issue of this column contained a photograph of an aeroplane, but without a caption, so here is the missing text: **A United States Navy P-3C Orion about to depart from RAF Northolt during August 1986. This particular aircraft was operated by VP-44 Squadron, and used the sallying "LMT 441".** This should make more sense when you read the item in that issue concerning US Navy aircraft scansions.

Britannia

In the November issue of *SKIM* I mentioned Britannia Airways and their new high frequencies. This prompted a very detailed and interesting letter from **Malcolm W.** who has first-hand experience of the frequencies - he's a pilot for Britannia Airways and regularly uses those frequencies while flying Boeing 757s and Boeing 767s.

He confirms that the three frequencies are all correct, but 11.363MHz is the one most often used. While flying, they keep one set of h.f. equipment tuned to that frequency.

On the ground at Luton, they use an ISAM h.f. transceiver connected to a rotatable 3-element beam tuned for 11.363MHz. They also have an ISAM R-71 receiver that is set up to scan the three company frequencies; this is connected to a trapped dipole. The h.f. station was introduced on 24 March 1993 (did anyone copy any transmissions on that day?), and Malcolm says that it is completely independent from Monarch Airlines.

G'day

During the summer, **Keith Elgin** and I had an interesting conversation with a crew-member of a Royal Australian Air Force (RAAF) aeroplane at one of the larger UK air-shows. He gave us details of their h.f. network, including their frequencies and locations of the ground stations.

The primary frequency is **8.976MHz**, although they do also have **3.032MHz**, **8.688MHz** and **11.237MHz** available. The ground stations are at **Sydney**, **Perth**, **Townsville** and **Tawing**; they use the prefix **Air Force** when talking with aircraft and other stations (e.g., Air Force Sydney). Typical aircraft scansions are 'Awes' and 'Stallion'. Keith reports that the best of these frequencies (for UK readers, at least) is 8.976MHz, which is often loud and clear for the first few hours in the morning (UTC); in one listening period he reports hearing all but one of the ground stations.

For those of you who have not yet heard signals from Australia or New Zealand yet, you can always try listening to one of the VOLMET stations. These transmit weather observations at set times throughout the day, either continuously or at certain minutes past each hour. To hear such transmissions from Australia, try listening to either 11.387 or 6.676MHz during the early morning, on the hour and on the half-hour. New Zealand appears on 13.282MHz during the early morning at 20 and 50 minutes past each hour. Although these transmissions are quite easy to hear, nothing beats the thrill of hearing signals from the other side of the world for the first time. Good luck.

More CAP

About a year ago, Peter Rouse gave a brief run-down of the Civil Air Patrol in the USA. Just recently, I have received a letter from **Miscall Schulsinger** in Ohio, USA. He has been tuning around and found a number of CAP 'nets' in the h.f. bands that he says should be audible in the UK over the winter period. The CAP National Command Net checks-in each weekday at 11am (1600UTC) on 7.635MHz, and then they meet at 11.30am (1630UTC) on 14.902MHz (note the change from 14.905). These are all u.s.b. frequencies, and the 'net' is only a few minutes long unless there is traffic to pass. Miscall says that an even easier 'net' to catch is the CAP National Chaplains Net that meets on 7.635MHz at 5pm (2200UTC) and continues on 4.582MHz at 5.15pm (2215UTC).

Sea King HAR3 at the RAF Fairford International Air Tattoo in July '93. *Photo. Mike Richards.*

The above 'nets' are all national nets that cover the whole of the USA. There are also 'nets' that are used by each State. The North-Eastern Region net operates on 4.466MHz, the Mid-Eastern Net operates on 4.585MHz and the South-Eastern Net operates on 4.469MHz (once again, all u.s.b.). Miscall recommends listening on the hour and half-hour either side of midnight UTC for these.

Letters

Another letter from **Mike Le Ves Conte** provides a summary of his research into 'illegal transmissions' close to agreed ICAO aeronautical frequencies. For 10 weeks during the summer, Mike noted details of signals that were within 2kHz of official stations. Nearly 650 'illegal transmissions' were heard, of which 400 were Italian, and just over 100 were either UK or Irish stations. Mike says that one group of four UK stations thought that they were operating 7kHz away from their actual frequency.

Geoff Halligey writes with details of some interesting transmissions that he has been hearing on 19.800MHz **l.s.b.** The signals come from Qatar in the Arabian Gulf, and answer as 'Speedbird Executive Aircraft' - is this connected with British Airways (who use the sallying 'Speedbird London')?. They make contact with some aircraft, who use the scansions 'Mary 2' or 'Mary 3', and they also talk to somebody in Doha (Qatar) who uses the sallying A7A211. Has anyone heard anything on this frequency, or can add any more information?

Finally, what has happened to all your letters, they have almost dried-up over the past few weeks? I need your letters and logs to help me produce this column each month. Even if you are listening to transmissions that don't change much (e.g., VOLMET), I would still like to hear about them, if only to know that they are still active. Please make it your new-year's resolution to write me a letter.

Amateur Bands Round-up

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

Please, will all correspondents make sure they include their **name** and **address**, every time they write. I see so many letters that, while I might recognise the handwriting or style as that of someone who has written before, I won't be able to recall a name if the letter isn't signed.

Over the years I have often been asked about the effect of, for example, a severe shortening of the antenna. Recently, I have found out the hard way! I am talking about an end-fed wire against earth, used with an antenna tuning unit.

The vertical section - some ten metres - was intact, as was the far end section, but the bit in the middle had disappeared. Thus on Top Band, instead of 3λ16l I had suddenly come down to 1λ16l. Tuning up the a.t.u. on this abbreviated length showed that a signal that normally showed as above the S9+10 mark on the meter had suddenly dropped to a meter S7, in each case on speech peaks. In each case the station antenna tuner was able to bring the wire to resonance, so detuning effects had been eliminated. What resulted from shortening was a drastic fall in radiation resistance, while the loss resistances in wire and earth were constant. Thus, by Ohm's Law, a much larger proportion of a received signal was being dropped across the loss resistance, leaving a much lower proportion to appear at the receiver input.

What this means to the ordinary short wave listener is that each slight improvement in his antenna will open up an improvement in their DX.

When the conditions are less than good, it will continue to hear DX that would have been below the noise on the unimproved antenna. It will also be noted that the band seems to open a bit earlier and close a bit later on the improved antenna. The moral - improvements to the antenna farm, particularly the earthing arrangements, are never wasted!

Letters

Mr C. Yorke of Liverpool 13 asks what sort of form a report should take. Separating out by bands, as much detail as possible on 'oddities', a note on your equipment, and a culling of what you regard as common-or-garden about sums it all up. Don't forget you name and address! Otherwise, so long as I can read it, fair enough.

A different sort of question from **Mark Malone**, who wants to know about: EX0A, C40R and ZW5B. The first hails from what used to be the USSR, and the 0 suggests the UA0 region. The second one was in Cyprus, while on the third one, I believe it to be in South America, but for some reason having heard it myself I omitted to note any supporting details in the log. So - who's going to show me up??

Still with Mark, he was copying the East Coast Ws on Eighty, plus EA8PP, PZ1EL, OY1HJ, VO1FG, VE1UK and HK4DHR. 7MHz was useful, with EA8DV, PZ1EL, VK6LK, ZL4BC, VE1DCG, 4Z5BR, CM7CM, CP6UA, PY5HOT, PY5EG and ZW5B. Up on 18MHz A45ZZ, 9H4CM, and on 21MHz ZW5B again, 4X/P/S59PR, EA8APL, A71BA and 5B4AAJ while a nil report on 24 and 28MHz leaves us just 14MHz where as always, the heavy traffic really lies. Here Mark recorded shoals of Ws, out to W0AIH, VUs , P39WW in Cyprus, ZP5JCY, VE1AL, VE7ZT, VE3DDB, VE1ZPA, VE3RIU, 9H1AL, DU1PX, 9M2CW, 9M2WQ, JY6ZZ, JY5IN, VO2/KB4GYT, 4X6RM, 4X1AT, 4Z5BR, 4Z5AF, HS0/G4UAV, JA3BOA, EA8AM, EA9LZ, 4K4/UA0KBZ (Dickson Island), 9V1ZD, AP2AL, ZS6AME, BY1QH, V85PB, 9K2JC, 9K2RA (club station), ZB2JL, TU5DX, YV1AVO, PY5ZBU, PP5JD, C40R, HH2PK, VK6UE, 5B4ABU and C91AIA.

Nice to hear again from **Geoff Crowley** in Hafnarfjördhur in Iceland; it seems that Geoff's move is now slated for the end of the year. However, he has had a little preview visit to Ecuador, and records his thoughts. He was quite impressed by a visit to the HCJB set-up, and describes it as 'interesting - a mixture of the latest technology and a shoestring operation all in one!' - of course HCJB was the place where the Cubical Quad antenna was invented. Another point noted was the number of beams to be seen atop buildings in Quito.

Back in Iceland, Geoff noted a spectacular display of aurora, and notes that up there aurora often brings a 28MHz opening, while 18, 21, 14 and 7MHz bands all die. The 3.5MHz band can go either way, but the only Top Band signals ever heard from Iceland was a GM YL net unidentified. As to lists, Geoff seems to have had a play in the RTTY contest with considerable effect, and to have done quite a bit of c.w. too; the 'phone list is relatively quite short.

Now we head for South Birmingham and **John Collins**, who has an end-fed wire out, fed into an a.t.u. and an Eddystone 870A. This time John seems to have stuck to 7MHz, where he noted YI0B (an International Festival at Babylon, QSLs via Box 55072, Baghdad), VP9IN, IT9FTG, UH8EA, T940N, EA7BA, an ex-Brit, PY7AUT. On Sundays, John comments, 7MHz suffers bad QRM from French and some EI stations; one assumes he is talking about the News Bulletins on that band.

We can get a little warmer now, by heading for Guernsey, where **Tim Gentle** lives. Recently Tim had a holiday in Tenerife (EA8) and took along his Trio R1000. With six metres of wire Tim was able to string out an impromptu antenna, and listen on his favourite 14MHz band. The collection included such as 8R1J, CN8GS, C6AGR, ZD7DP, ZL2APH, ZS6DB, V51GB, TL8MS, 5X1C, VP2V/AB4JI, A22RV, C31GN, KC7TC/AM, 6W1/IK7SUE, DU1PX, VP8COT, C91AI, XQ8ABF, V41OK (a special-event station), VK9MM on Mellish Reef, P39KH, 9G1AX, C53HG, HP1XVH, TU2PA, XU3RLD, HR1RON, J28RD, JX3EX, 9Y4VV, J69J, HK5JPS, 9M2AB, FO4OK, LU6FBJ, PY2LG, VK6EWM/MM, KG4DX, FK8CP, J28GG, 7X2LS, 8P6AM, P40ST, N9QJS/5N6, 3X0TT, JY6ZZ, AP2JZB, VU2PAB/MM, YS1RRD, CX1TE, HS0ZAK, RA1/RK1NWD, 5N1MRE, 7P27LI, 4U48UN, ZS9A, KM4ZA/PJ2 and, of course, the usual crop of smaller fry. Let's hope Tim can continue reporting, as he obviously prefers the radio to the beach!

A receiver he built from a kit is the tool used by **Steven Sawyer**, though he doesn't say what he has up in the air at Ashington. A look at the s.s.b. end of the 3.5MHz band yielded EA3JE, LA2CH, SM3ROR, PA3BFS, PA3CWF, OK2JX, DL3NPC, DL0CPM, PA3GBU, PA2FAS, UA2WJ and LY1BZB. On 7MHz, Steven found IK2RND, ON6IP and IK5MEJ, before he cranked the bandswitch round to 14MHz. Here he leads of with HG750ERD, JX3EX, 401V, LY2JB, YU7KMN, 4O9S, WZ9XWH, HA3FI, ES1WW, UW3GJ, KM1ER, SP1KQR, SK7JAM, RW3QG, UA3DR, LA6REA and OE6MBG. Then 21MHz, where SV7ALN, LZ2VP, UZ3RYX, YU7BW, N4ZC, WA1CEH, 4X1MQ, UO5ON, YO9KPP, UT4UO, WB4MRH, EP3DQ, N6BV/P1, K1FX and Europeans.

Last time I got a list without a name, and lo!, the same handwriting has appeared in the pile again this time. It comprises three Xerox copies, hand written, very legible, and the listings, from left to right are: date, callsign, country of origin, band, time of day. Please, who ever you are, drop me a line and identify yourself!

Ron Newsome started with an elderly CR100 in St Just after he discovered the limitations of CB in the local terrain, but he has now progressed to a Lowe HF-150, coupled by way of an AT-1000 antenna tuner to an Amtron 99. A listen around at 1530 on September 30, found OO5AZ for a special call, and a string of G stations calling in; GC3IGB, GB2SM, GM0NAF, G0JPH, GH3KTF, GW4WWN, G0MAX, G4MXU, G3LNC, GW4JCO, G3NCP who was mobile in France as F5VAH, G0TTZ and various German and European callsigns. Another visit to the band on October 3 resulted in the hearing of the GB2IWM signal from Duxford, working in a net with G4EQQ, G4ETJ, GB2SEG up in John o' Groats, G4ROE, G4GMC, G3KEV, G0TON who said he was aboard HMS *Bronington* at Swalford Quay, and LA9SEA. Oh, and I mustn't forget VK5BC, heard in contact with DF3PYY.

Harry Richards has been unable to put hand to tuning-knob this month in Barton-on-Humber, as he has been fully occupied with some home-repairs needing to be completed before winter sets in. Harry has a Grundig Satellit 700, which collects its signals from a Datong active antenna arranged as an inverted-vee.

Listener Contest

David Whitaker writes to remind me of the White Rose International Short Wave Listener Contest. Noon GMT on 15 January 1994 to noon on 16th. A station may only be operational for 18 of the 24 hours, the six hour rest period being clearly marked in the log. Two sections, 'phone and c.w.; no multi-op, no mixed-mode. Transmitting licence holders may enter. Bands, 1.8, 3.5, 7MHz. The object is to log a maximum of five stations in as many countries as possible. Countries outside one's own continent five points, others one point. No CQ, QRZ or similar calls will be allowable for points; aeronautical mobile or maritime mobiles not acceptable.

Score for each band, total points times number of countries logged on the band; total score the sum of the band scores. Logs to show: date, time (GMT), Station Heard, Station being worked, RS(T) at listeners station. If both sides of a QSO are heard, they may be claimed as separate countries and logged in the station heard column. Logs for each band to be on separate sheets. Add a separate sheet listing all multipliers. Entries to David Whitaker, c/o White Rose ARS, 57 Green Lane, Harrogate, N. Yorks HG2 9LP, to be postmarked no later than February 28. There is a plaque for the overall winner, and Certificates of Merit to the leaders in each country.

That's it for another month, mailed to the Editor a bit early. That means that if your letter landed in the Box a bit late, you'll get your mention next time round! Deadline for input as always is the beginning of the month, to me at Box 4, Newtown, Powys SY16 1ZZ as usual.

Airband

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

It's that time of year again! This year's Christmas Quiz is easier than earlier ones, because so few of you entered previously. Identify the aircraft in the photograph: that wasn't too bad, was it? Now for the tie-breaker. Pretend that you had my job for a month. How would you change this column for the better? Credit will be given for useful, practical suggestions.

The answer, the tie-break reply, and your name & address must all fit legibly on one side of a postcard or equivalent-sized stationery. My decision is final and no correspondence will be entered into. Even Christine, who took the photo, doesn't know what it is - but she's not eligible to enter! Make sure your answer reaches me by the closing date (last day in January). There will be a prize.

Follow-Ups

Having crept into R/T procedure, bad habits are not easily removed. **Martin Sutton** (Arundel) rightly questions the phrase "...at your discretion" as spoken by Air/Ground operators (November). You will recall that the job of Air/Ground is to pass information to pilots so that flights may be conducted safely. No instructions should be issued since pilots are not obliged to follow them. A more suitable way of replying to a pilot who is 'ready for departure' would be to announce that there is 'no known traffic' and to give the surface wind. Martin is right; I will try to encourage the correct phraseology if ever I have the chance. Unfortunately, pilots (especially when learning or inexperienced) feel more confident when told to do something, as distinct from not being told a reason for not doing it!

A suitable qualification for an Air/Ground operator is a Flight R/T Operator's Licence that requires the passing of an exam; if this route is taken, a Certificate of Competency may then be applied for and it is this that allows ground operations.

The next level up is Aerodrome Flight Information Service Officer (AFISO) the qualification for that requires the passing of a different exam. Basic duties and limitations are the same as for Air/Ground but one difference is important. Although AFISOs may not issue clearances, they may read out those issued by other authorities. For example, a flight departing an aerodrome in unregulated airspace would need prior clearance to enter the airways system. The AFISO might arrange this by calling an Air Traffic Control Centre by land-line; the resulting clearance would then be read to the pilot.

For example, the AFISO might read: "London clears Shortwave 194 to enter Bravo Four at Brookmans Park, flight level 110, squawk 4212." The AFISO is not at the London Air Traffic Control Centre but just acts as a remote-controlled mouthpiece.

Understanding Radio-navigation Charts

In the case of airliners especially (as well as numerous other civil and military flights) it is important to understand the principles of radio navigation before an aircraft's position can be established. These operations hop from one radio beacon, or pre-defined reporting point, to the next, tracking along routes called airways. I was frequently asked about this subject at the Leicester Amateur Radio Show at the end of October. The airways structure is represented on published charts that are available to the public by mail order. Addresses of suppliers appear on the Airband Factsheet which you can get from the Broadstone editorial office by sending a stamped, self-addressed envelope (capable of holding one A4 page). Don't forget to mark the envelope Airband Factsheet.

As an example, I will refer to Aerad chart EUR/1 that, on one sheet, covers all of Ireland and Wales, and all except the south coast of England. At the edges, a little bit of Scotland and the Low Countries have crept in. When buying your charts, ask for the *Aerad Legend Booklet* that comes free of charge with your order and makes things clearer.

Near the south coast of Wales lies airway G1. Just like roads have numbers such as A1 or M40, so do airways (except that various letters are in use and few actually mean anything special). Heading west, G1 passes over the Brecon v.o.r. beacon. This can be tuned in on 117.45MHz in which case its Morse identification (BCN, dah-di-di-dit, dah-di-dah-dit, dah-dit) will be heard. Also, here is a distance measuring beacon (on Channel 121) that is automatically selected by the aircraft's receivers when the v.o.r. is tuned in. The chart also shows the location of the beacon in latitude (degrees north) and longitude (degrees west).

To travel along G1, it is necessary to leave Brecon on a compass heading of 290° magnetic.

The Christmas Quiz mystery aircraft.

This is the bearing to steer assuming calm conditions. In practice the wind will blow and push the aircraft off course, but the correct track along the ground (the 290° bearing) can still be followed by adjusting the heading by reference to the beacon's signal. After flying for 28 nautical miles, a reporting point (AMMAN) is passed. There's nothing there! The reporting point (white triangle on the chart) is an imaginary location along the airway that is arrived at when the d.m.e. reads 28nm from Brecon. If previously requested to do so, the pilot makes a radio report to air traffic control stating the aircraft's position; had the triangle on the chart been coloured black then such a report would have been compulsory.

After this, a further 40nm brings us to the Strumble beacon. Airways exist between defined altitudes or flight levels. In the case of this second leg of our journey (west of AMMAN), the airway starts at FL105 and finishes at FL245 (approximately 24500ft). You could fly under the airway and not infringe controlled airspace, but not over it since all airspace above FL245 is controlled in the UK. Along the airway, the upper and lower limits are shown one on top of the other with a line ruled between them (a bit like the line dividing the two numbers of a vulgar fraction). Next to these levels is often one more altitude; for the west half of our journey it's FL110. This is the lowest permitted cruising altitude, but if climbing into the airway from below then our flight would come under control as soon as it entered at the lowest level (FL105). If this stimulates you into wanting the answers to more questions about navigation then please write in!

Frequency and Operational News

The October *GASIL* from the CAA tells us that the a.t.i.s./ground experimental allocation at Oxford has now been made permanent. As a reminder, the final outcome is: a.t.i.s. 121.75, Ground 121.95MHz. Pilots must consult NOTAMs. This column only shows recently occurring important or permanent changes, but the lead-time in a magazine is too great to allow news to be right up to the minute.

Mike Bennett reports that all the outer markers have been withdrawn at Heathrow. He should know, he lives nearby in Datchet. The controllers know how far the aircraft is from touchdown because the radar tells them. Also, pilots know (and can therefore work out their expected altitude) by reference to d.m.e., so this is still a precision approach. The marker gives an extra degree of confidence that the localiser is being correctly followed and that the marker is being overflown at the correct altitude. So, it seems a pity to economise by removing this inexpensive, but useful, facility. A precision approach is one in which height guidance is given by the radio aids, as distinct from a localiser on its own which only provides directional guidance.

Your Aeronautical Experiences

She's done it again! **Mrs. B** (Isle of Man) got a look in the cockpit when flying by Britannia B.767 between Manchester and Orlando. Outbound, the BY392A was operated by G-BNYS (c/n 24013) Selcall CH-EM, the return BY392B being on G-BOPB (c/n 24239) Selcall CJ-BF. First impression when checking in the baggage, was that every piece is now bar-coded. This reconciles bags against tickets, i.e. (hopefully) against checked-in passengers. This is a security precaution, and the logic behind it is that it is unlikely that terrorists will take their own bomb-loaded bags on a flight knowing that they are about to blow

Continued on page 55

Scanning

Alan Gardner
PO Box 1000, Eastleigh, Hants SO5 5HB

As I mentioned last month, AOR have been busy designing a new hand-held model that they believe will be a quantum leap ahead of the opposition. The factory in Japan has just put the finishing touches to the pre-production model of what AOR describe as a 'wide range - world band radio' and the first indications are that it will be a world beater. AOR have spent a lot of time looking at competitors and listening to scanner users suggestions, including those made by readers during our Autumn 1991 'win an AOR 2000 competition'. Imagine all the best features of current hand-held designs, plus a lot of innovative new ones - well that's the new hand-held.

The unit will have a frequency coverage of 100kHz to 2GHz, which has been engineered to give good performance at all frequencies not just on the v.h.f. and u.h.f. bands. Special attention has also been paid to short, medium and long wave reception, with the inclusion of an internal bar antenna for the lower frequency bands, which will give excellent broadcast radio reception. You will no longer have to carry a separate transistor radio if you want to keep up to date with national news bulletins.

True s.s.b. reception is catered for by a separate narrow filter specifically tailored for optimum performance, a true frequency readout that will take into account the frequency shifts for upper and lower sideband operation and 50Hz steps for smooth tuning across crowded short wave bands.

The case is likely to be slightly smaller and more rounded than current models, with a large specially-designed liquid crystal display offering many new functions such as a bar-graph signal strength meter. The keypad is capable of being back-lit and operations can be password protected. Construction of the circuit boards has been achieved by new techniques, with the circuit main board retaining plug-in sub-modules, which should make servicing (and possibly upgrades) that much easier to implement. New memory management features such as a memory copy and clone function should make maintenance of memory banks child's play.

These features are just the beginning, I'm sure more information will come to light over the next couple of months before the official launch, but it's already got me wondering what the base station model is going to be like - watch this space and start saving now!

Cellular Networks

Observant readers will have noticed a rapid growth in the number of cellular telephone base stations springing up in all manner of unlikely locations. Some sites now have three or more towers on them as rival companies compete to provide advanced personal communications networks.

All of this is not necessarily good news as the latest casualty in this battle has been the decision by Hutchison Telecom to end its 'Rabbit' public telepoint service. This system, which allowed subscribers to use their CT2 cordless phones to make outgoing calls in public places, will be the last of the four original telepoint services to be switched off.

The main reason for the decision to end the service was one of simple economics, not enough people were subscribing to make it worthwhile. Another problem was how to market the idea. The fact that users could not receive incoming calls was seen as a major drawback, causing it to be perceived as the 'poor man's cellphone' - not the best advertisement for a product.

It does seem a pity that the demise of the public service may also affect the future of CT2 cordless phones generally, the technology is good with digital 'ping pong' transmissions providing high quality, interference free, secure speech over good distances (with an external antenna). But like the Betamax/VHS video recorder battle it isn't always the best engineered system that wins - it's the one that people buy.

What do you do if you are a 'Rabbit' subscriber? Well the company intends to offer existing customers some money back for their 'Rabbit' phone and the option of renting an analogue cellular phone at a reduced rate, or if you are prepared to wait, you can have the option of being connected to the new Hutchison digital mobile phone network that is scheduled to come on-line next April.

Quite what will happen to the 865-868MHz band is not too clear. It will have to remain available for the 10 000 or so users of CT2 cordless phones who will still be able to use their own base stations, but it is hard to justify exclusive use of a valuable portion of radio spectrum just for that purpose. One possibility is that it could also be used for short-range radio modems, or used as an extension of the allocation for digital short range radio communications that is supposed to be taking the place of 934MHz CB - but that's another story.

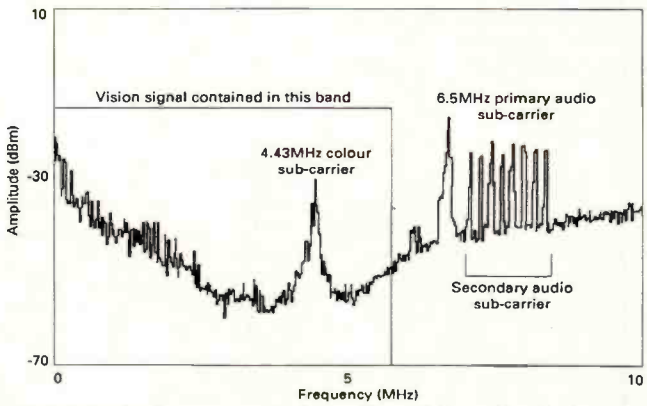


Fig.1: Typical spectrum of satellite TV baseland signal.

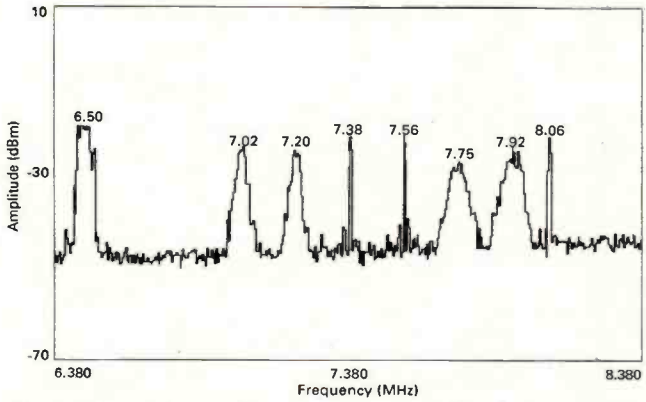


Fig.2: Magnified portion of spectrum showing individual audio subcarriers.

Scanning The Heavens

Many readers have commented on the recent television programme *Dispatches* in which journalist Duncan Campbell was shown sitting outside a government monitoring station with what appeared to be a domestic satellite TV system coupled up to a Lowe HF-125 short wave receiver. The purpose of this demonstration was to show just how easy it is to intercept transatlantic telephone calls made over satellite circuits.

A lot of you asked if it was possible to use a scanning receiver coupled to a satellite dish to achieve the same result. I must say that I don't think that it's quite as easy as the programme may have suggested. The way I believe the equipment was interconnected was that the dish was aligned on one of the few geostationary satellites that still carry non-digital telephone circuits and the short wave receiver was then connected to the video or base-band output of the receiver via a suitable attenuator. The individual Frequency Division Multiplex channels could then be resolved as s.s.b. signals by tuning across the frequency range 0 to 10MHz.

The problem with most domestic receive systems is the limited frequency range and short term frequency stability or phase noise of the LNB. This is the unit mounted at the focus of the dish whose main purpose is to amplify and convert the weak microwave signals from the satellite to a different frequency band at a much higher level, so that it can be used by the satellite receiver.

The LNB uses a free running oscillator usually operating at around 10GHz as part of this process. Because the oscillator is free running it can shift in frequency by anything up to 500kHz away from its design centre frequency. This doesn't matter too much for the reception of TV signals that occupy 33MHz or so of frequency spectrum, but it does make the reception of s.s.b. signals that may only have a bandwidth of 3kHz very difficult. The satellite receiver may be able to compensate for some of this frequency jitter by use of Automatic Frequency Control but it cannot remove it completely and the residual phase noise would make any speech very difficult to resolve, rather like listening to Auroral s.s.b. on the 144MHz amateur band. This can be improved by using phase locked LNB -that is to say one that uses crystal oscillator to control the local oscillator used for frequency conversion. Such LNBs are available for professional

Scanning

applications, but tend to be expensive.

However, if you have a satellite receiver and either a scanner or short wave receiver that will allow you to receive wide-band f.m. over the range 0-10MHz you might like to try this experiment. Most satellite TV broadcasts make use of multiple sound subcarriers to provide different language or radio services. Many of these can be resolved by use of the audio channel selection available on the satellite receiver, but a lot depends on the design. For example, I have an old Amstrad SRX-100 that does not have the facility to demodulate the 6.5MHz subcarrier used as the main mono sound channel on most transmissions.

If you want to be able to tune into other sound carriers all you have to do is to take an signal from either the main video output or, better still, if you have it, the external MAC or decoder output that does not have as much filtering applied to it. This can then be fed via a 60dB attenuator to reduce the level to the receiver. You can then tune across all the subcarriers that are placed higher in frequency than the video signal that ends at around 6MHz. Most of these subcarriers use about 50kHz peak deviation that can be resolved by most scanners with w.b.f.m. Some carriers do not carry programme material but are used as engineering or signalling channels between studios especially on links from outside events and this can make interesting listening. Let me know if you have any additional information or suggestions on this subject.

Sporting Events

My recent comments on monitoring national sporting events interested **Stephen Legg** of Hampshire. He lives on the edge of the Solent and was particularly keen to monitor the action during this year's Whitbread Round the World Yacht race that started at Southampton. As well as monitoring the marine bands, which were very congested as a result of all the weekend sailors joining the flotilla at the start line, he also came across some of the links used by the media to provide coverage of the event. The easiest of these to find was a talk-back channel transmitting on 455.070MHz that was being used by a special event radio station called Whitbread Radio operating during the race in the f.m. broadcast band on 87.7MHz.

As an aside, many radio stations use talk-back links in the 141 and 455MHz bands for similar purposes and an increasing number are now making use of the 47-48MHz band including Isle of Wight Radio that seems to use 48.05625MHz almost permanently as a 'clean' programme feed. This signal is audible for some considerable distance and gives better reception at my house than the actual medium wave broadcast transmission, as this is specially engineered to minimise reception on the mainland.

Whilst tuning around, Stephen also found an ITV talkback link on 455.195MHz that was being used to call out camera shots and pass instructions to the presenters during the course of the race. This can be particularly interesting if the programme is being presented live as you can watch the action on TV and listen to the directions at the same time. All of which gives a good insight into the vast amount of effort put into filming such events - especially when things don't go quite according to plan and the running order has to be changed.

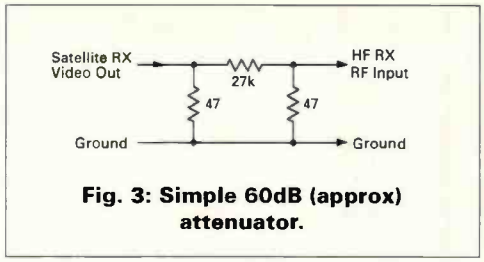


Fig. 3: Simple 60dB (approx) attenuator.

Although I have commented on it before, in 1988 the DTI published a document called *Study of the requirements for a radio frequency plan for services ancillary to the making of programmes, films, presentations, advertisements and other entertainment and sporting purposes* This gives a vast amount of information on the way outside broadcast communications are planned and controlled. One of the examples given was the 1984 round Britain Powerboat race that used more than 44 different communication channels. Remember that this was nearly ten years ago, these days there are many more independent production companies recording the action for satellite TV and specialist video companies - and all of them use some form of radio communications.

Many outdoor events such as agricultural shows and open days also generate a reasonable amount of radio traffic. As well as the usual short-term hire channels that tend to be used for car parking and traffic control you may also come across the some really odd signals. Stephen was lucky enough to hear the voice of 'Welliephant' - the fire prevention elephant - on 457.0375MHz. This was part of a local fire station open day and was used to project 'Welliephants' voice to young visitors.

My thanks to Stephen for his letter - it made me wonder what were the most unusual signals I've heard at special events. I think they must include the voices of a 'Time Lord', 'Dalek' and a promotion using a remote controlled model of a 'Hole in the Wall Cash Machine'. Have you any amusing stories along the same lines?

Thanks for all your calls and letters, as this issue marks the end of 1993, may I wish all of you a Very Happy Christmas and I hope that Santa brings you the scanner you asked for. Until next month - Good listening.

Airband

Continued from page 53

themselves up. What I haven't found out yet is how the airline knows that the terrorist didn't buy a ticket, check in the bag and then walk away. When I last flew, there were no checks of bar-codes on passenger tickets when boarding, and I wasn't aware of a head-count.

Outbound, the route passed over Man (frustrating, isn't it - so near and yet so far!), Belfast and then onto a North Atlantic Track (55°N 10°W, 57°N 20°W, 57°N 30°W, 55°N 40°W, 53°N 50°W), leaving the Track at St. Anthony to route Bangor, Kennebunck, Richmond and Orlando via airways ('Jet Routes' as they call them over there). The in-flight entertainment screens were capable of displaying the route and position!

As usual, h.f. was a problem due to distortion and interference. This is a pity when many airliners offer satellite-linked telephones to their passengers! I am sure that Mrs. B's family couldn't hear the Selcall chimes from the passenger cabin. These chimes aren't usually heard even in the cockpit, as they have to finish sounding before the receiver responds by alerting the crew. The tones sound harsh (because two tones are actually transmitted at once) and the apparent musical interval between them varies from one code to another. In the cabin is a two-tone attendant call chime, activated when a passenger presses an overhead call button or if the aircrew want to speak to a cabin attendant on the interphone. This is what Mrs. B's family heard.

Return was via St. Anthony, joining the Tracks for 52°N 50°W, 53°N 40°W, 53°N 30°W, 53°N 20°W, 53°N 15°W, leaving the Track for BURAK and Shannon. In future, Britannia's fleet will become all B.757/767 with disposal of the B.737s. Interestingly, British Airways operate the B.737 and B.767 but it was Britannia that pioneered the introduction of these types into British service.

Information Sources

Twice a year, airlines make major changes to their schedules. Keeping up-to-date with these is Airtime Publishing Ltd., (13 The Hollows, Long Eaton, Nottinghamshire NG10 2ES) who have just produced the Winter 93/94 edition of *Airport Timetables UK.* This comes to you for £11.50 plus postage, which is an additional £1 (UK); I suggest that overseas purchasers add a further £1.47 for surface mail.

What do you get for your money? Every UK airport that operates time-tabled flights is included (but at Heathrow only overseas flights are given). In chronological order, for each airport, flights are listed showing origin, flight number, aircraft type and seating configuration, outgoing departure time, destination and flight number, and operator (or charterer). This ought to go a long way to helping readers disentangle callsigns.

The next three deadlines (for topical information) are January 14, February 11 and March 11. Replies always appear in this column and it is regretted that no direct correspondence is possible. All letters to 'Airband', c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex HA8 8PS.

Genuinely urgent information/ enquiries: 081-958 5113 (before 2130 local please).

Abbreviations

a.t.i.s.	automatic terminal information service
B.	Boeing
CAA	Civil Aviation Authority
c/n	constructor's number
d.m.e.	distance measuring equipment
FL	flight level
ft	feet
GASIL	*General Aviation Safety Information Leaflet*
h.f.	high frequency
MHz	megahertz
N	north
nm	nautical miles
NOTAM	*NOTice to AirMen (and AirWomen)*
R/T	radiotelephony
SelCal	Selective Calling
v.o.r.	very high frequency omni-directional radio range
W	west

Info in Orbit

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

Fig. 1: A GMS-4 image sent in by Quentin Hordle.

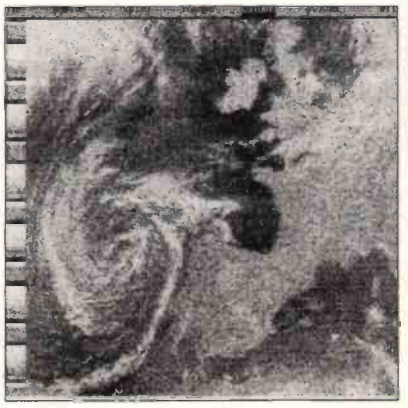


Fig. 2: An image produced by Peter Finn on his bubble jet printer.

Autumn has seen few changes in WXSAT operations. METEOR 3-3 continued visible-light only transmissions on 137.30MHz, and poor signals were often received from METEOR 2-21 on 137.85MHz. As each satellite approaches the terminator, we can anticipate operation of one of the other METEORs. Launches of future CIS WXSATs remain scheduled. NOAA 10 remains inoperative during those few days when its passes overlap with NOAA 12, and NOAA 9 continues a similar relationship with NOAA 11.

Pictures

Many good pictures have been received. I am limited to space for three or four, so unfortunately many cannot appear.

Quentin Hordle sent in a large format picture (**Fig. 1**) of the whole earth as seen by the Japanese WXSAT GMS-4, positioned near the longitude of Australia. It is dated August 12 and is apparently a visible-light image. It may be a composite, but I am not sure of its origin because METEOSAT-4 transmits infra-red GMS-4 WEFAX images.

Peter Finn of Dyfed sent two NOAA 13 images printed on his Cannon bubble jet printer, one of which, dated August 16, is shown in **Fig. 2**. Peter uses PROsatII software.

Michael Smith of Sherborne uses his 16MHz 286 computer and PROsatII to process images received by his Martelec MSR 20. He sent a picture, **Fig. 3**, showing what he suggests might be a dust storm off the Sahara desert, taken last July. A later image was observed to show the same feature having drifted slightly north.

John Wills of Romford sent me a picture of the Arctic Ocean region near North Cape imaged by METEOR 3-3 on 21 April 1993, together with a transparency from an old atlas covering the same region. He used this combination to identify land masses shown in the METEOR picture. Unfortunately the transparency would not reproduce properly. The right side of the picture, **Fig 4**, shows the Kara Sea and Novaya Zemlya.

An Audio Compressor

Like other readers, **Ray Howgego** monitors regions of special interest, such as the Aral sea, and has built an audio compressor. This can enhance land surface features, particularly from METEOR satellites, which contain detail low in the grey scale (that is, they are usually very dark - but still present). Ray's compressor reduces the amplitude of peak whites (to avoid losing cloud detail) and enhances the dark greys. This is similar to the use of contrast expansion options that are usually included in WXSAT image processing software.

Ray tells me his compressor has revealed just how much detail is present in METEOR images. "Europe is seen with all of its major rivers, urban areas, (quite small towns showing up if the light is right,) and forests". This is my experience with the METEORs; their resolution is higher than the NOAA WXSATs, (because they transmit single images,) and enhancing the dark levels invariably reveals detail as Ray describes.

Once again Ray is kindly offering correspondents the benefit of his work. Ray describes his compressor as "easy to build and costs about £5 for the components. It is based around the SSM2120 chip". If any reader would like a copy of the constructional details, p.c.b. track plan and layout diagram, please send an s.a.e. May I suggest that some form of contribution to Ray's costs would be reasonable. Write to him at 31 Campbell Road, Caterham, Surrey CR3 5JP.

Cirkit WXSAT RX

A fascinating letter from **Andrew Blott** described his work to eliminate paging interference from his Cirkit WXSAT receiver. He appears to have isolated and cured the problem for his original version, and gone some way to fixing it for Maplin receivers as well.

Andrew wrote his own software for decoding data, using variously the CBM64, an Atari, and even an Oric computer. He used a Lindenblad antenna and says that during the early months he did not receive any paging interference. When the interference started, he found it difficult to obtain more than 30 seconds of data.

After examining the signal at various points in the receiver he deduced that two new filters were needed, and an adjustment to the i.f. amp to compensate for insertion loss. The result 'works like magic'. Andrew's notes may be of use to other Cirkit RX users, but it would be necessary to be familiar with the testing and adjustment of such circuits.

Michael Thomas of Peacehaven kindly wrote to pass on the telephone number of a supplier of Cirkit receiver crystals, which may be of use to those wanting to locate such crystals. Contact QuartSLab Marketing Ltd., Tel: (0322) 330830 for further details.

Maplin Help?

The Science Department at Edmonton School in Enfield purchased a Maplin WXSAT system last year. A letter from **M. Ambridge**, the science technician, asks whether any reader of *Info* knows of a program to manipulate, store or print the files?

More Letters

Paul Wright GW6NCP from near Chester, has recently set up a new WXSAT receiving system that has allowed him to obtain pictures from all of the operating satellites, and he particularly comments on the help received from **Henry Neale G3REH**, the chairman of the Remote Imaging Group. The RIG was formed a few years ago and publishes its own quarterly magazine, apart from organising national meetings for fellow enthusiasts. For more details on the group, contact Des Watson, Norton, Gote Lane, Ringmer, Nr Lewes, East Sussex BN8 5NX.

Kepler Elements

The automatic reading of Kepler elements into satellite predictions software is of interest, mainly to those newcomers who have modems, and can therefore download elements from a remote BBS. **Roger Holtham** of Eastbourne and **Bruce Wise** of Berkshire asked about the way in which this could be done.

As mentioned recently, there are at least four British BBS carrying Kepler elements that can be downloaded, either as a file, or via terminal capture. Files may need minor editing, depending on their origin, so that any associated text is removed, leaving the elements in either NASA two-line format, or the slightly different AMSAT format. The NASA format should be used wherever possible, because it is more compressed (and will therefore cost less in telephone time). Recent reductions in weekend telephone charges will help.

Satellite predictions software normally allows automatic reading of such files, and it is also possible to type in the data manually.

Different sources of elements may contain slightly different parameters; I am often asked about the **decay** figure. This is not an essential parameter (if it is required, but not quoted - use zero), so if your program (perhaps Public Domain or Shareware) does not use it, this matters little. **Decay** (or **drag**) refers to the instantaneous measurement of the rate of change of mean motion, and its value may be changed by solar radiation, or even the proximity of the moon! Because of this, I sometimes wonder whether it is best omitted.

Another common question about Kepler elements is the recommended period between updates. This depends on what predictive accuracy you want. Elements are normally available every few days on the appropriate NASA BBS. NASA were kind enough to give me a password to access this data, and anyone else who wishes to tap into their BBS can request similar facilities. Remember the 'phone bill!

For predictive accuracy to within a few minutes, you should be able to update your Kepler files once per month. The METEORs are orbiting higher than the NOAAs, so suffer from less atmospheric drag. Consequently METEOR predictions should retain their accuracy for some weeks. The OKEAN satellites (apparently no longer operating) have much lower altitudes, so would have required updating more frequently.

The date of origin of the elements is shown in the EPOCH parameter. It is based on January 1 being day 001, and December 31 is (usually) day 365. So when you are considering updating your elements, you should aim to use

elements that are no older than perhaps one month (for the uncommon satellites), but aim for two weeks for the WXSATs. As regularly mentioned, I retain such data for the readers of *Info* - see end of column.

DR-DOS, MS-DOS and WINDOWS

Those many WXSAT hobbyists who run PCs will know that upgrades to the operating systems MS-DOS and DR-DOS occur regularly. A few correspondents have reported occasional problems when running Timestep's PROsatII with DR-DOS version 6. Timestep state that their software is designed for Microsoft (MS) DOS, rather than either WINDOWS or DR-DOS.

I have experimented with some (other) satellite software running under Windows, and have found that some can run reasonably well, after manipulation of certain parameters. Windows consumes so much raw computing power - memory and processing time that I normally run tracking programs from DOS.

WINDOWS can be of use when wanting to be able to jump instantly from one program to another, for example from a word processor to a tracking program. Switching between programs requires about two key presses. It is only done effectively on a 386 PC upwards, though I did manage to set up a 286 to do this, but it is slow!

An alternative multi-tasking program, for those wanting to have the switching facility without using WINDOWS, and which is also supplied with MS-DOS, is DOS-SHELL. This also allows one to run a number of programs simultaneously, assuming of course that your computer has sufficient memory. DOS-SHELL has the benefit of being straight-forward, yet is, so I understand from journalists in the computer industry, little used.

Co-processors

Computers of the IBM-compatible variety (80286 and 386 versions) have a socket where a co-processor can be fitted as an option. This device performs mathematical calculations in a highly efficient manner, so, for those programs that can use it, a co-processor can speed up operations that are otherwise performed more slowly by the main processor. **Roger Ray** noticed a considerable speed improvement when using the gridding option in Timestep's PROsatII software. Tracking programs may similarly work more efficiently, though the benefit may be less obvious. Not all software utilises co-processors.

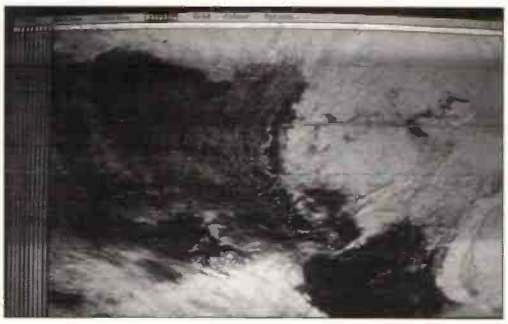


Fig. 3: NOAA 10 on July 27 sent in by Michael Smith.

Fig. 4: Picture of the Arctic Ocean sent in by John Wills.

Make Your Own Keplers

When a new WXSAT starts transmitting for the first time, it will be picked up by many people. The main requirement for reception is a suitable receiver - one that can tune the 137-138MHz band. The signals are powerful and even a hand-held receiver fitted with a rubber duck antenna, operated outside, will hear a signal when the satellite passes at a reasonable elevation.

We had been expecting the launch of NOAA 13 for some months, so during August I did even more monitoring than usual. Then I heard and recorded its first signals. Within a few days, I received dozens of letters requesting confirmation, and asking for Kepler elements for the new WXSAT.

Trevor Lane of Bideford told me that he had had a go at generating his own set of Kepler elements for NOAA 13 by substituting new parameters for those of other NOAA WXSATs. This method can be quite effective.

I normally receive such elements fairly quickly, but perhaps due to holidays, they didn't materialise. So I made my own!

The method might be of interest, particularly for those who have the necessary software to hand. You need a tracking program, preferably one that allows you to edit the elements and produce sets of schedules. I used InstantTrack, though other software (such as TrackII) can also do the job.

The first task is to positively identify the nature of the WXSAT - easy in this instance - it was NOAA 13. Had it been a METEOR WXSAT I would have to confirm whether it belonged to the series two or three group.

The NOAA WXSATs have several things in common - similar inclinations, mean motions and eccentricities. NOAA 13 runs a couple of hours earlier than NOAA 11, so I started by adding a new satellite to the database, having the same elements as NOAA 11.

There may be a more efficient way to synthesise Kepler elements, but I derived the following method by trial and error, after spending some time checking out the mathematics!

The process of adjusting elements to fit the WXSAT requires that you measure the times of acquisition and loss of signal from at least a day's worth of passes, and preferably measure the passes for a couple of other days for confirmation. You also need to estimate the maximum elevation of each pass (assuming land is visible); this gives meaning to the subsequent predictions, as you gradually 'tune-in' the elements.

I set the **Epoch** (reference date for the simulated orbital measurements) to 1993 200.0, and entered my most recent NOAA 11 parameters. This produced a set of predictions that were not wildly out, but pass times and elevations needed adjustments. By increasing the **RAAN** parameter in steps of 5° and then reducing it similarly, one can adjust one of the passes to match the approximate elevation of a pass actually observed. At this point you are only concerned to match the elevations. After adjustment, the RAAN parameter can be left alone.

A similar set of trial runs is performed on the **mean anomaly** parameter, and you will see that small changes to the pass times occur. Similar experiments on other parameters, like **eccentricity**, reveal that they have only minor effects on the final result, hence they can be left unchanged.

Your aim so far, has been to obtain a sequence of passes having matching elevations - perhaps two if not three in a row - one day's observations. Now we make the final adjustments - the **Epoch**!

This parameter represents the time at which the measurements were (hypothetically) made. In effect, you can change this by tiny amounts until a close match with observed pass times occurs. I increased the Epoch parameter by 0.1 of a day, and as expected, the pass times moved dramatically. By reducing it very slowly, the pass times were edged from 1258UTC back towards 1236UTC, the actual observed time of one pass.

Having synchronised calculated times to within a few minutes of the observed times, I made small changes to the RAAN to further improve the predictions. The final check was to produce predictions for the next 24 hours and to see how well they fitted!

In fact, the three calculated pass times were very close and the elevations also looked very good. These 'dummy' Kepler elements were then issued to those requesting data - together with the warning that they were unofficial! A few days later I received the official set.

You can practise this method of element generation by taking a set of NOAA elements and adjusting them to match the 'sister' satellite, for example use NOAA 10 elements to produce NOAA 12 elements (or *vice versa*).

Season's Greetings

This column appears just before Christmas so may I wish all *SWM* readers a very happy Christmas, and sincerely thank those many readers who have contributed to this column during the last twelve months.

Kepler Elements

I will send a print-out of the latest elements upon receiving an s.a.e. and extra stamp. All known weather satellites, plus MIR can be included, together with their transmission frequencies if operating. Satellites such as the amateur radio series, GLONASS, GPS and others are available in two-line format, together with a description of format conversion. For print-outs, please include at least two extra stamps towards the cost of collection. This data originates from NASA and is collected from UK BBS as well as other sources.

Frequencies

This short list includes WXSATs that are currently operating. METEOR frequencies remain subject to change.. NOAAs 9 & 11 a.p.t. on 137.62MHz; NOAAs 10 & 12 on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METEOR 2-21 on 137.85MHz & METEOR 3-3 on 137.30MHz

Decode

Mike Richards G4WNC
PO Box 1863, Ringwood, Hants BH24 3XD

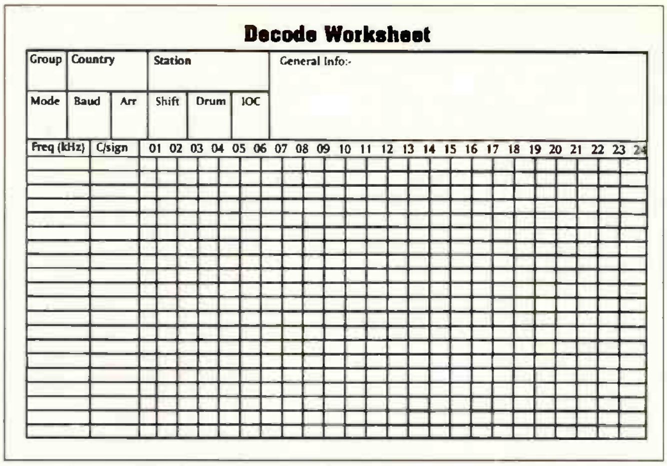


Fig. 1.- A sample worksheet.

As I've got so much to report on this month, I've taken the liberty of holding over the readers letters for next time.

Work Sheets

A letter from regular contributor **Day Watson** has reminded me a of very powerful log keeping system that may be of interest. I first came across the system in the early days of this column when I received my first reports from Day. In addition to sending me copies of his conventional logs, he included a pack of work sheets. The great advantage with the work sheet is that you can see the transmission patterns of any station at a glance. So, having whetted your appetite, let's take a look at how the system operates.

Start off by checking out the sample shown in **Fig. 1**. The top section of the chart is used to store the basic details of the station and its transmission modes. There's also space to add some general information about the station. The heart of the system is in the matrix that follows. In the left-hand portion of the chart the frequencies and callsigns used by the stations are listed. For example, if you were creating a sheet for Offenbach Met, you would show 117.4kHz (DCF37) and 134.2kHz (DCF54) down the two left-hand columns. The matrix to the right is divided-up to show the twenty-four hour clock along the top and is used to show the times the particular transmission has been logged. To complete the chart all you have to do is draw a horizontal line to cover the period over which you heard the station active.

As you can see the system is very flexible and lets you gradually build-up extensive information about a station. As shown in the example, it's well worth leaving a few blank lines between each entry to allow for seasonal or other regular schedule changes that may occur. You can also use different colours to help differentiate transmissions. The worksheet system provides a very well structured way of documenting your monitoring and can be adapted for most types of listening activities. My thanks to Day Watson for the idea.

Weather FAX Book

Philip Mitchell of Newbury has just sent me the latest revision of his popular FAX book. The book is titled *The Interpretation of Facsimile Weather Maps and Charts* - a bit longwinded but very descriptive! I first publicised the book around a year ago and it received a good reception then. Philip has written the book specifically to meet the needs of the utility listener such as himself. Although most of the information in the book can be obtained from other sources, there is no single publication that I know of that wraps everything into one publication. The other problem is that most of the other sources of information are aimed at the professional user and carry a suitably weighty price tag! Philip has managed to compress all the important information into a forty-eight page A4 sized soft bound book. As the book is both written and published by Philip, it has a home-made feel about it, but despite this, the content is well put together.

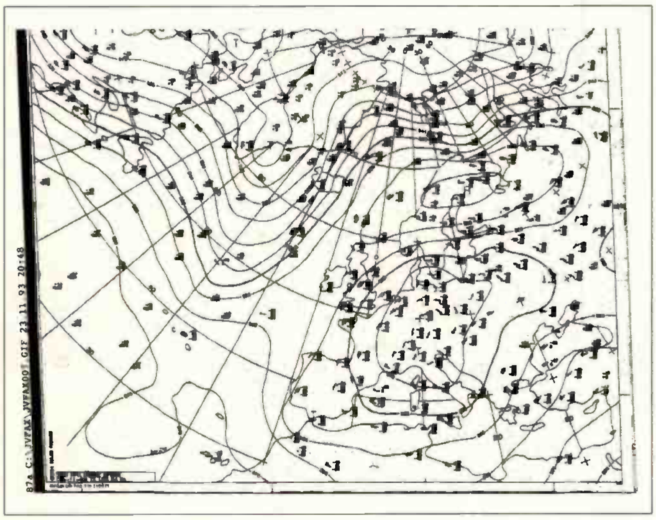


Fig. 2. - A chart received using JVFAX.

The book tackles this complex subject in a step-by-step fashion by showing examples of charts received off-air and then guiding the reader through the interpretation. The coverage extends from surface analysis charts through to complex aeronautical charts and graphs. The final section even includes a few suggestions on equipment to use to receive FAX transmissions.

The book costs £7.50 inclusive and is available direct from Philip Mitchell at: 2 The Marlowes, Newbury, Berks RG14 7AY.

Free FAX Software!!

Yes it's that program again! Having mentioned the latest release of JVFAX last month, I now have the author's permission to copy the program to readers. Before I go into the details of how to get your copy, I thought I ought to at least give the latest version a review.

One of the changes with JVFAX v6.0 is the method of distribution. Whereas earlier versions were distributed as a set of discrete files on a disk, the new version comes as a single self extracting archive file called ARJFAX6.EXE. The beauty of this method of distribution is that it helps ensure that the full set of JVFAX files are transferred from user to user. This tends to prevent users only being supplied with part of the package and consequently running into problems. The disk supplied to me by Eberhard Backeshoff also contained a hex and object file with firmware for a specific interface that's popular among German listeners. The main archive file is around 522K in size and expands out to need at least 1.5Mb of disk space. In practice you will need plenty of disk space as some of the saved image files for typical FAX charts can run to over 1Mb each.

Before you install the program you need to consider the hardware requirements. The program will run on any IMB PC or 100% compatible system running a DOS version equal or greater than 3.0. Although the program will run on 8088 and 8086 based machines the performance is likely to be degraded. On the graphics front you will need at a least a VGA card and this latest version provides support for most of the common SVGA systems including VESA local bus systems. This means I'm now able to run my own system with 600 x 800 resolution and 256 colours. It's also important to note that this program, like many complex utility packages, does not run under a multi-tasking environment such as Windows.

The author's recommended minimum system comprises at least a 386 computer with SVGA-256 graphics and at least 4Mb RAM.

The next item to decide on is the interface system between the computer and the receiver. JVFAX v6.0 supports a wide range of interfaces, but perhaps the most popular is the simple comparator type that connects to the serial port. This comprises a 741 op-amp and a few components that can usually be mounted inside a standard 25-way D connector. You will find that this interface is used by many commercial FAX programs and JVFAX has been designed to make use of these. The results from this simple interface are usually good enough to satisfy most listeners, but if you want better quality you will need to look at a more complex interface unit. These more complex units give access to smoother grey scales and better processing of detailed satellite images.

The easiest way to obtain a complex interface may be to wait for the latest release from Martelec Electronics. For more details on this refer back to last month's 'Decode'. If you have facilities for home construction there are a set of GIF files supplied with the program that give full circuit diagrams for a sophisticated interface. The other alternative is to contact a few of the German companies that are listed in the Interface document that's supplied on disk with JVFAX. This gives comprehensive details of the various types of interface and lists eight German suppliers. If you opt for the simple comparator interface all you have to do is connect this to the line or external speaker jack of your receiver.

Once the program is installed and the interface decided, the next

step is to set the configuration to match your system. JVFAX has an impressive range of configuration options that enable the experienced operator to fine tune the program. However, to get started all you need to do is ensure you have selected to correct interface and set the video and printer types. If you're running JVFAX on a slow 8088/6 machine you may also have to limit the resolution by reducing the maximum interrupt frequency.

JVFAX featured good printer support with the following types included: IBM ProPrinter, Epson 8/9 pin narrow and wide plus 3 x interleaved, Epson 24-pin narrow and wide, Toshiba 24-pin, Itoh 8510 plus 2 x interleaved and HP Laserjet 500+ at 150 and 300 d.p.i. This should cover just about all of the common variants as most printers can emulate one of those listed units.

As I mentioned earlier, JVFAX includes support for SVGA modes. This is supplemented by a detailed graphics set-up where the video mode can be set to match a variety of common video chip-sets.

With everything configured and ready to go, receiving FAX has been made very straightforward. From the main menu you select FAX and the program enters receive mode with a blank screen except for a status box. This status box provides a summary of the available commands and settings and includes a very good spectrum analyser style tuning display. JVFAX has been designed to be extremely versatile and includes ten pre-set receive modes. This covers all the standard h.f. transmissions plus most of the satellite based systems. Just to make the system even more flexible, each of these modes can be completely reconfigured by the operator.

In its default mode the program is set for automatic picture reception so can be left largely to its own devices. This makes FAX reception a very straightforward and painless operation. You can also save the received image to disk or printer for use later. In fact the disk save operation is particularly good as JVFAX includes a useful set of viewing options. Perhaps the most useful of these is the zoom facility as it enables you to view detail that cannot be seen in the original image. Amateur meteorologists will find this particularly interesting as JVFAX always stores the image at the maximum received resolution rather than that used by the screen. You can also use the date based reception facility for fully unattended operation.

Many programs in the past have suffered through poor print routines. This is certainly not the case with JVFAX as the print quality using my Cannon BJ300 with the IBM driver was very good.

Although not particularly relevant to this column, JVFAX also supports FAX transmission and SSTV reception.

Overall then JVFAX 6.0 is a very competent FAX package and ideal to get started with. I'm sure you're all wondering how to get your copy? Well it couldn't be simpler. All you have to do is send a blank formatted (720K or 1.44Mb) IBM PC 3.5in disk, three first class stamps and a return address label to the address at the head of the column. It would be helpful if you marked the envelope JVFAX.

Satellite Utilities

Things seem to be warming up a bit of late so I can offer some help to get you started. I realise that for many of you satellites are a completely new area, so I will be putting together a more detailed tutorial for publication later. For now I'll just offer a few suggestions for those of you fortunate enough to already have a satellite receive system.

Let's just start with a quick run down on how satellite communications systems operate. The main advance with satellite communications came with the discovery of the geostationary orbit that occurs in what has become known as the Clarke belt after Arthur C Clarke who predicted its existence many years ago. Once a satellite has been placed in a geostationary orbit it appears to be stationary in the sky. The great advantage with this is that the ground based transmit and receive antennas don't have to track a moving target. You can imagine the fun and games (and expense) associated with receiving satellite TV if we all had to have tracking steerable dishes! Needless to say the Clarke Belt is very much in demand with satellite suppliers and is suffering a fair degree of congestion. The result is that maximum use is made of every satellite and they all carry a wide range of services on their transponders.

A typical satellite transponder has a bandwidth of around 36MHz and will carry one video signal plus a number of audio channels. Many of the more popular satellites such as the Astra series carry many of these transponders. Utility or data links are also carried on these satellites in a number of different formats. One simple way is to include the data in what are known as sub-carriers along with the TV audio. These are the easiest to detect and decode as they often use similar formats to their h.f. predecessors. It's this type of data signal that I will concentrate on. To receive these you need to connect the base-band output from your satellite receiver to the antenna input of an h.f. receiver. Unless you are very sure of what you're doing, I would recommend that you avoid direct electrical connection of these two units. A simple way to achieve this is to wrap together the insulated centre conductors of the leads from both units. Once the link is made, try tuning between 7 and 10MHz. If you want to hear some data, set your dish to Intelsat 601 (27.5°W) and tune your satellite receiver to transponder 75B (11.562GHz vertical). Now tune your h.f. receiver to 8.217MHz u.s.b. whereupon you will hear intermittent bursts of data at around 1200 baud.

There has been a lot of activity from listeners in the USA to detect and decode these signals as they are particularly common over there. The reason for this is tied-up with the satellite band used. The early satellite TV systems used transmissions based in the C band at around 4GHz. In many parts of the world this has now been superseded by the higher frequency Ku band which operates between 10.95 and 12.75GHz. Utilities in this band seem to be somewhat more illusive through the use of complex encoding systems.

At this point I need to introduce a new term that is used by the satellite world to describe what we know as utilities. This term is Single Channel Per Carrier or SCPC. Whereas conventional TV transmissions will have a number of carriers carrying different portions of the main signal e.g. video plus audio channels, SCPC transmissions have the information for a single user modulated onto one carrier. In order to make some progress and start receiving these transmission we need access to the satellite equivalent of my h.f. frequency list. These are understandably a little illusive.

However, there are various sources of information that are about to become available. One of these is Design Technology Ltd., based in Sunningdale. This company specialises in satellite communications and runs a number of information distribution systems. Whilst most of these centre around providing information on video and radio channel occupation, they also cater for some utilities. If you have access to a FAX machine, a call to their information service on (0336) 400213 will provide an eight-page document describing how to receive utilities from satellites. As this is a premium rate line you will be charged 36p/min cheap rate and 48p/minute at all other times. If you have a computer with a modem you could also try accessing Design Technology's Datastream Network. This is available on another premium rate line (0891) 516526 and gives access to a very wide range of satellite related information. The only point to watch here is that some of the files are very large and you can very quickly run up some big phone bills. In a recent conversation with Design Technology's Bill Smith, he reports that he will soon be publishing a listing of active SCPC channels. This should be available both through the FAX service and the Datastream network.

That completes this first look at satellite utilities and, as you can see, there is a lot more information to come. If you have any further information to offer please drop me a line.

Frequency List

As usual I have compiled a brief listing of this month's utility logs from readers. If you would like a copy of my Decode list or Day Watson's beginners list just send three first or second class stamps to the address at the head of the column. Don't forget to include a return address label and mark the envelope Decode, Beginners or Both.

3.3569MHz	FAX	120	576	-	0510	USN Norfolk sat pix
3.36MHz	FAX	90	576	RPN71	0444	Kiev Met
7.646MHz	RTTY	50	400	DDK	1725	German Met
7.658MHz	RTTY	50	400	YZD	1455	Belgrade Press TANJUG
7.959MHz	RTTY	50	400	-	1940	Tehran Press IRNA
8.08MHz	FAX	120	576	NAM	2315	USN Norfolk sat pix
9.395MHz	RTTY	50	400	-	1835	Pyongyang press
10.1612MHz	RTTY	50	400	-	1323	INA Baghdad
10.298MHz	RTTY	50	400	-	1409	Bangkok Met
10.423MHz	RTTY	50	850	YMA20	1530	Ankara Met
10.634MHz	RTTY	50	400	-	1530	MAP Rabat press
10.686MHz	RTTY	50	400	-	1810	Tehran Met
11.453MHz	RTTY	50	400	IMB3	1830	Rome Met
13.51MHz	RTTY	75	850	CFH	1440	Halifax Met
13.9654MHz	ARQ-625	100	170	-	1120	Int Red Cross
14.88MHz	RTTY	75	850	JMG	1415	Japan Met
19.5748MHz	TDM342	96	170	-	1100	Brussels
19.748MHz	RTTY	50	400	6VU	1520	Dakar Met
23.37MHz	RTTY	100	850	HZN	1500	Jeddah Met

Long Medium & Short

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

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; time in UTC (= GMT). Unless stated, logs compiled in the four week period ending October 30

Medium Wave Chart

Freq (kHz)	Station	Country (kW)	Power	Listener
520	Hof-Saale (BR)	Germany	0.2	J*,R*
531	Ain Beida	Algeria	600	A*,L*
531	Torshavn	Faroe Is	100	C*,D*,K*
531	Leipzig	Germany	100	J*,L,M*,Q*
531	Oviedo(RNE5)	Spain	20	J*
531	Beromunster	Switzerland	500	K*
540	Wavre	Belgium	150/50	I,J*,L,M,N
540	Solt	Hungary	2000	I,J*
540	Connemara	Ireland (S)	2	D*
540	Sidi Bennoud	Morocco	600	A*,L*
549	Les Trembles	Algeria	600	A*,L*
549	Thurmau (DLF)	Germany	200	I,J*,L*,M,N,Q*
549	Quarayyat	Saudi Arabia	2000	K*
558	Rostock(NDR)	Germany	20	J*
558	Tirgu Jiu	Romania	200	L*
558	RNE5 via ?	Spain	?	J*,L*
567	Berlin	Germany	100	J*
567	Tullamore(RTE1)	Ireland (S)	500	B*,C*,I,L*,M,N,Q,U
567	RNE5 via ?	Spain	?	L*
576	Muhlacker(SDR)	Germany	500	I,J*,N
576	Riga	Latvia	500	L*
576	Barcelona(RNE5)	Spain	50	L*
585	Paris(FIP)	France	8	L
585	Madrid(RNE1)	Spain	200	C*,J*,L*,M*
594	Frankfurt(HR)	Germany	1000/400	C,I,J*,M*
594	Oujda-1	Morocco	100	A*,L*
594	Muge	Portugal	100	J*,L*
594	Duba	Saudi Arabia	2000	K*
603	Lyon	France	300	J*,L*
603	Sevilla(RNE5)	Spain	50	L*
603	Newcastle(BBC4)	UK	2	C*,J*
612	Athlone(RTE2)	Ireland (S)	100	C*,G*,I,L*,M,N,Q
612	RNE1 via ?	Spain	10	L*
621	Wavre	Belgium	80	I,L*,M*,N
621	Batra	Egypt	2000	A*
621	Barcelona(OCR)	Spain	50	J*,L*,Q*
630	Vigra	Norway	100	C*,J*,L*
630	Tunis-Ojedida	Tunisia	600	A*,L*
639	Prahal(Liblice)	Czech	1500	D*,I,J*
639	RNE1 via ?	Spain	?	C*,J*,L*,M*
648	Mallorca(RNE1)	Spain	10	J*
648	Orfordness(BBC)	UK	500	C*,J*,L*,M,N
657	Neubrandenburg(NDR)	Germany	250	J*
657	Madrid(RNE5)	Spain	20	J*,L*,Q*
657	Wrexham(BBC Wales)	UK	2	I,M,N,R
666	Bodansees'dr(SWF)	Germany	300/180	I,J*
666	Lisboa	Portugal	135	L*
666	Barcelona(COPE)	Spain	10	K*
675	Marseille	France	600	J*,L*
684	Sevilla(RNE1)	Spain	500	C*,J*,L*
684	Beograd	Yugoslavia	2000	I,J*,L*
693	Potenza	Italy	20	J*
693	Burghead(BBC5)	UK	50	Q
693	Droitwich(BBC5)	UK	150	C*,L*,M,N
702	Flensburg(NDR)	Germany	5	J*,N
702	Presov	Slovak Rep	400	L*
702	Zamora(RNE1)	Spain	10	J*,L*
711	Rennes 1	France	300	I,J*,L*,M*,Q*
711	Heidelberg	Germany	5	J*
711	Laayoune	Morocco	600	A*,L*
720	Langenberg	Germany	200	J*,N
720	Lisnagarvey(BBC4)	Ireland (N)	10	C*,E*,L*,N
720	Norte	Portugal	100	J*,L*
720	Sfax	Tunisia	200	L*
720	Lots Rd, Ldn(BBC4)	UK	0.5	L
729	Putbus/Bergen(NDR)	Germany	10	K*
729	Cork(RTE1)	Ireland (S)	10	C*,J*,L,M,Q
729	RNE1 via ?	Spain	?	J*,L*
738	Paris	France	4	L
738	Poznan	Poland	300	L*
738	Barcelona(RNE1)	Spain	500	J*,L*
747	Flevo(Hilv2)	Holland	400	J*,L*,M,N
756	Braunschweig(DLF)	Germany	800/200	I,J*,L*,Q*
756	Bilbao(EI)	Spain	5	L*
756	Redruth(BBC4)	UK	2	E*,J*,L,N
765	Sottens	Switzerland	500	J*,L*,M*
774	Enniskillen(BBC4)	Ireland (N)	1	J*
774	S. Sebastian(RNE1)	Spain	50	J*,L*
783	Burg	Germany	1000	I,J*
783	Miramar(R. Porto)	Portugal	100	J*
783	Dammam	Saudi Arabia	100	L*
792	Limoges	France	300	L
792	Lingen(NDR)	Germany	5	J*,L*
792	Sevilla(SER)	Spain	20	J*,L*,Q
801	RNE1 via ?	Spain	?	C*,J*,L*
810	Madrid(SER)	Spain	20	J*,L*
810	Burghead(BBC)	UK	100	C*
810	Westerglen(BBC)	UK	100	B*,E*,I,J*,M,N,Q
819	Batra	Egypt	450	A*,K*,L*
819	Toulouse	France	50	J*,Q
819	Rabat	Morocco	25	J*,K*
819	Warsaw	Poland	300	L*,N*
828	Hannover(NDR)	Germany	100/5	J*
828	Barcelona(SER)	Spain	50	J*
837	Nancy	France	200	I,L,Q*
837	Sevilla(COPE)	Spain	10	C*,J*,L*
846	Ostrava	Czech Rep	30	D*
846	Rome	Italy	540	J*,L*,M*,N*
855	Murcia(RNE1)	Spain	125	C*,J*,L*,M*
864	Santah	Egypt	500	A*
864	Paris	France	300	I,N*,S
864	Socuellamos(RNE1)	Spain	2	J*,L*
873	Frankfurt(AFN)	Germany	150	J*,L*,M*,N*
873	Zaragoza(SER)	Spain	20	J*,L*
873	Enniskillen(R.Ul)	UK	1	J*
882	COPE via ?	Spain	?	J*,L*
882	Washford(BBC)	UK	100	C*,J*,L,M,N*
891	Algiers	Algeria	600/300	A*,D*,J*,L*,M*,N*
891	Huisberg	Netherlands	20	J*,L*,N*
900	Milan	Italy	600	D*,J*,L*,Q*
900	Bilbao(COPE)	Spain	10	J*
900	Qurayyat	Saudi Arabia	1000	K*,L*
909	Mallorca(RNE5)	Spain	10	J*
909	B'mans Pk(BBC2)	UK	140	L,M,Q
909	M'side Edge(BBC2)	UK	200	N*
909	Westerglen(BBC2)	UK	50	C*
918	R. Ljubljana	Slovenia	600/100	D*,J*,L*,N*
918	Madrid(R. Int)	Spain	20	J*,L*
927	Wolvertem	Belgium	300	I,J*,L,M,N*
927	Evora(RRE)	Portugal	1	K*
936	Bremen	Germany	100	J*,L*,Q*
936	Venezia	Italy	20	L*
936	RNE5 via ?	Spain	?	C*,J*
945	Toulouse	France	300	I,J*,N*
954	Brno(Oobrochov)	Czech Rep	200	J*,N*
954	Madrid(CI)	Spain	20	J*,L*
963	Sofia	Bulgaria	150	J*
963	Pori	Finland	600	I,J*,L*,M*,N*
963	Paris	France	8	L*
963	Tir Chonaill	Ireland (S)	10	L*
972	Hamburg(NDR)	Germany	300	I,J*,M*
972	RNE1 via ?	Spain	?	J*,L*
981	Alger	Algeria	600/300	A*,D*,J*,L*,N*
981	Megara	Greece	200	A*
981	Coimbra	Portugal	10	L*
990	Berlin	Germany	300	I,J*,N*
990	R. Bilbao(SER)	Spain	10	J*,L*
990	Redmoss(BBC Scot)	UK	1	J*,N*
999	Schwerin (RIAS)	Germany	20	I,K*
999	Madrid(COPE)	Spain	50	C*,J*,N*
1008	Las Palmas(SER)	Gran Canaria	?	J*
1008	Flevo(Hilv-5)	Holland	400	C*,I,J*,L*,M*,N
1008	Aleksinac/B'grad	Yugoslavia	400/200	L*
1017	Rheinsender(SWF)	Germany	600	C*,I,J*,L*,M*,N
1017	Burgos(RNE5)	Spain	10	J*
1026	Graz-Dobl	Austria	100	D*,J*,L*
1035	Tallinn	Estonia	500	L*
1035	Lisbon(Prog3)	Portugal	120	J*,L*
1044	Dresden	Germany	250	J*,L*
1044	Thessaloniki	Greece	150	D*
1044	Sebaa-Aioun	Morocco	300	A*,D*
1044	S. Sebastian(SER)	Spain	10	J*,L*
1053	Zarogoza(COPE)	Spain	10	J*
1053	Burghead(BBC1)	UK	20	Q
1053	Droitwich(BBC1)	UK	150	C*,L,M
1062	Kalundborg	Denmark	250	B*,C*,J*,L*
1071	Prague	Czech Rep	60	J*
1071	Brest	France	20	J*,L
1071	Lille	France	40	E*,S
1071	Onepropetrovsk	Ukraine	20	C*
1080	Katowice	Poland	1500	C*,E*,I*,J*,L*
1080	SER via ?	Spain	?	J*,L*
1089	B'mans Pk(BBC1)	UK	150	L,M,Q
1089	M'side Edge(BBC1)	UK	150	C*
1098	Nitra(Jarok)	Slovakia	1500	J*,L*
1098	RNE5 via ?	Spain	?	C*,J*,L*
1107	Munich(AFN)	Germany	40	C*,I*,J*,L*
1107	Logrono(RNE5)	Spain	25	J*,L*
1116	Bari	Italy	150	D*,I*
1116	Bologna	Italy	60	C*
1116	Pontevedra(SER)	Spain	5	J*
1125	La Louviere	Belgium	20	J*
1125	Deanovec	Croatia	100	I*
1125	RNE5 via ?	Spain	?	C*,J*,L*
1134	Zadar	Croatia	600/1200	C*,I*,J*,L*,M*
1134	COPE via ?	Spain	2	L*
1143	Stuttgart(AFN)	Germany	10	H*,J*,M*
1143	Messina	Italy	6	J*
1143	Bolshakovo(Mayak)	Russia	150	K*
1143	COPE via ?	Spain	2	L*
1161	Strasbourg(Flnt)	France	200	I*,J*
1179	Santiago(SER)	Spain	10	J*
1179	Solvesborg	Sweden	600	C*,E*,G*,I*,J*,L*,M*,Q*
1188	Kuurne	Belgium	5	J*,L,S
1188	Reichenbach(MDR)	Germany	5	K*
1188	Szolnok	Hungary	135	D*,J*
1188	St.Petersburg	Russia	10	K*
1197	Minsk	Belarus	50	C*
1197	Munich(VOA)	Germany	300	J*,M*
1197	Virgin via ?	UK	?	C*,G*,J*,L,Q
1197	Cheltenham(V)	UK	1	E
1197	Chesterton Fen(V)	UK	02	M
1206	Bordeaux	France	100	I*,J*,L
1206	Wroclaw	Poland	200	C*,L*
1215	Virgin via ?	UK		C*,L,Q,Q
1215	Droitwich(V)	UK	105	M
1224	Vidin	Bulgaria	500	C*,J*,L*
1233	Liege	Belgium	5	J*,L*
1233	Nitra	Slovakia	40	C*,J*
1242	Marseille	France	150	J*
1242	Virgin via ?	UK		J*
1251	Marcali	Hungary	500	C*,J*
1251	Tripoli	Libya	500	K*
1251	Huisberg	Netherlands	10	L*
1260	Rhodes(VOA)	Greece	500	D*,J*
1260	Szczecin	Poland	160	I*
1260	Valencia(SER)	Spain	20	J*,L*
1269	Neumunster(DLF)	Germany	600	C*,I*,J*,L*,M*,Q
1278	Strasbourg	France	300	C*
1278	Dublin/Cork(RTE2)	Ireland (S)	10	G*,J,L*,M,Q,R,S
1287	RFE via ?	Czech Rep	400	C*,J*,L*
1287	Lerida(SER)	Spain	10	L*
1296	Valencia(COPE)	Spain	10	J*
1296	Orfordness(BBC)	UK	500	J*,L*
1305	Rzeszow	Poland	100	I*,L*
1305	RNE5 via ?	Spain	?	J*,L*
1314	Kvitsoy	Norway	1200	B,C*,J*,L*,M*,N,S
1314	Valladolid(RNE5)	Spain	10	J*
1323	Leipzig(RMWS)	Germany	150	C*,I*,J*
1332	Rome	Italy	300	C*,I*,J*,L*
1341	Lisnagarvey(BBC)	Ireland (N)	100	C*,E*,I*,L*
1350	Nancy/Nice	France	100	C*,I*,J*,L*,R
1359	Melilla	Morocco	5	L*
1368	Foxdale(Manx R)	IoM	20	E*,J,L*,M*,Q,R
1377	Lille	France	300	I*,J*,L,M*,N,R
1386	Kaliningrad	Russia	500	E*,J*,L*,M*,R
1395	Lushnje(Tirana)	Albania	1000	C*,J*,L*,M*,Q
1395	RNE5 via ?	Spain	2	J*
1404	Brest	France	20	I*,J*,L,M*,R
1413	RNE5 via ?	Spain	?	L*
1413	Pristina	Yugoslavia	1000	L*
1422	Heusweiler(SR)	Germany	1200/600	C*,I*,J*,M*,R
1440	Marnach(RTL)	Luxembourg	1200	C*,I*,J*,L*, M*,N,O,P,R
1440	Damman	Saudi Arabia	1600	A*,J*
1449	Berlin	Germany	5	J*
1449	Squinzano	Italy	50	L*
1449	Redmoss(BBC4)	UK	2	N,Q*,T*
1458	Lushnje(Tirana)	Albania	500	C*,K*
1458	B'mans Pk(BBCWS)	UK	50	Q*
1467	Monte Carlo(TWR)	Monaco	1000/400	J*,L*
1476	Wien-Bisamberg	Austria	600	C*,J*,L*
1485	Bournemouth(BBC1)	UK	2	L
1485	Carlisle(BBC4)	UK	1	R
1494	Clermont-Ferrand	France	20	I*,J*,L*
1494	St.Petersburg	Russia	1000	C*,J*,L*
1503	Stargard	Poland	300	F*,I*,J*,M*
1512	Wolvertem	Belgium	600	C*,G*,I*,J*,L*,M*,N
1512	Jeddah	Saudi Arabia	1000	D*
1521	Kosice(Cizatice)	Slovakia	600	J*,L*
1521	Duba	Saudi Arabia	2000	A*,D*
1521	R. Manresa(SER)	Spain	2	L*
1530	Keflavik(AFRTS)	Iceland	0.25	C*
1530	Vatican R	Italy	150/450	J*,L*,M*
1539	Mainflingen(DLF)	Germany	700	C*,G*,I*,J*,L*,M*
1557	Nice	France	300	I*,J*
1557	Kaunas (R. Vilnius)	Lithuania	75	J*
1566	Mayak	Russia	?	J*
1566	Sarnen	Switzerland	300	J*
1566	Sfax	Tunisia	1200	A*,D*,L*
1575	Genova	Italy	50	J*
1575	SER via ?	Spain	5	L*
1584	SER via ?	Spain	2	L*,R*
1593	Langenberg(WDR)	Germany	400/800	C*,G*,I*,J*,L*,M*,R*
1602	SER via ?	Spain	?	L*,R*
1602	Vitoria(EI)	Spain	10	R

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

Listeners:
A: Darren Beasley, Bridgwater.
B: Vera Brindley, Woodhall Spa.
C: Geoff Crowley, Hafnarfjördhur, Iceland.
D: Gerry Haynes, while in Talgarth, Powys.
E: Simon Hockenhull, E Bristol.
F: Richard Howard, Northampton.
G: Rhoderick Illman, Oxted.
H: Ronald Kilgore, Co. Londonderry.
I: Alex Mackow, Ilford.
J: Eddie McKeown, Newry.
K: Roy Merrall, Dunstable.
L: George Millmore, Wootton IoW.
M: Sid Morris, Rowley Regis.
N: John O'Halloran, Harrogate.
O: John D'Toole, Stratford.
P: Harry Richards, Barton-on Humber.
Q: Tom Smyth, Co. Fermanagh.
R: John Stevens, Largs.
S: Phil Townsend, E London.
T: Michael Williams, Redhill.
U: Tom Winzor, Plymouth.

In an attempt to improve reception in selected areas, some international broadcasters may bring new s.w. transmitters into service during 1994, or make even greater use of relays. Some may opt to send their programmes to listeners via a domestic TV satellite.

Not all listeners will welcome these moves, because the thrill of receiving direct s.w. transmissions from around the world will be denied them, but new technology is bound to bring changes!

Reports on all aspects of broadcasting are always welcome for *LM&S*, so please keep sending them to me. Happy New Year!

Long Wave Reports

Whilst checking the band in Redhill, **Micheal Williams** was drawn to a weak signal on 189kHz. It was a sports programme broadcast by Radiotelevisione Italiana (RAI) via their 10kW outlet in Caltanissetta, Italy. At best it was SIO122 at 2020UTC.

Medium Wave Reports

There was a marked improvement in m.w. transatlantic signals in October. Several stations in Canada and the USA were heard at night by listeners in the UK.

Particularly good conditions were observed on October 17 by **Ron Damp** in E Worthing. He logged CJYQ in St.John's, on 930 as 32222 at 0043. Three stations in New York were identified: WBBR on 1130 (33333 at 0052), WINS on 1010 (22222 at 0122) and WEVD on 1050 (32222 at 0124). The signal from WBBR peaked S4 at times! Around 0230, three US stations became audible on 1440, but Ron was unable to identify them. No such difficulties with WSSH in Boston, on 1510, rated 33333 at 0248 and peaking 43333 by 0300!

Much earlier reception of the signals from WINS was reported by **Robert Connolly** in Kilkeel, Co. Down. By 0010 their signal was 32332. During his checks in Dunstable, **Roy Merrall** came across WSSH on October 3 (SIO243 at 0340), 23rd (SIO142 at 0043) and 29th (SIO232 at 0240). Down in Bridgwater, **Darren Beasley** logged CJYQ as 24222 at 0025. He also heard VOCM in St.John's, on 590, rated 23212 at 0040.

Darren also checked the band in the late evening and found conditions favoured reception from N Africa and the Middle East. He says, "I have never heard so many stations in those areas before. The strongest signals were from Algeria. 891 Algiers was 43333 and 981 Alger was 44434". Those in the chart were heard between 2130 and 2330.

Good reception from N Africa and the Middle East was also noted by **George Millmore** in Wootton. However, he found signals from Spain much weaker than hitherto. Three of the m.w. outlets in Saudi Arabia that 'sign on' at 0300 were logged by Roy Merrall on October 9.

Up in Iceland, the hours of darkness have now greatly increased, consequently **Geoff Crowley** (Hafnarfjördhur) has been able to receive the sky wave signals from many m.w. stations in Europe. No doubt the two UK local radio stations in his list would be surprised to hear from him!

The ground waves from some local radio stations travel considerable distances to reach **Ross Lockley** in Stirling. He picked up a recorded message from BBC Greater London Radio (GLR) to the effect that their broadcasts on 1458kHz have ceased. Their programmes are now in stereo on 94.9MHz.

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum R	I	7.50	C,D,H,J,K,M*,R
585	R. Solway	B	2.00	D,I*,K,M*
603	Cheltenham(CD603)	I	?	J,K,N,O,R
603	Invicta SG (Coast)	I	0.10	H,I*,J,R
630	R. Bedfordshire(3CR)	B	0.20	C,D,F*,H,J,K,N,R
630	R. Cornwall	B	2.00	D*,I*,J,P,R
657	R. Clwyd	B	2.00	D,I*,J,K,N,R
657	R. Cornwall	B	0.50	D*,J
666	DevonAir R	I	0.34	C,D,J,R
666	R. York	B	0.80	D,R
729	BBC Essex	B	0.20	C,D,J,L,R
738	Hereford/Worcester R	B	0.037	D,J,K,R
756	R. Cumbria	B	1.00	D,L
756	R. Maldwyn	I	0.63	D,J,K,N,R
765	BBC Essex	B	0.50	D*,H,I*,J,K,R
774	R. Kent	B	0.70	C,H,J,R
774	R. Leeds	B	0.50	L
774	Gloucester (3CSG)	I	0.14	D,J,K,N
792	Chiltern (S.Gold)	I	0.27	D,H,J,K,N,R
792	R. Foyle	B	1.00	D,L,O*
801	R. Devon	B	2.00	C,D,E,J,R
828	Chiltern (S.Gold)	I	0.20	C,D,H,N,R
828	2CR (Cl.Gold)	I	0.27	E,J,R
837	R. Cumbria/Furness	B	1.50	D,I*,N
837	R. Leicester	B	0.45	C,D,J,K,N,R
855	R. Devon	B	1.00	C,J
855	R. Lancashire	B	1.50	I*,Q*
855	R. Norfolk	B	1.50	C,M,R
855	Sunshine R	I	0.15	D,E,K,N,R
873	R. Norfolk	B	0.30	D,J,N,R
936	Brunel R (Cl.Gold)	I	0.18	D,J,K,L*,N,R
945	R. Trent (Gem AM)	I	0.20	D,J*,K,N,O,R
954	DevonAir (Cl.Gld)	I	0.32	D,J,R
954	R. Wyvern (WYVN)	I	0.16	D,K,N,R
990	WABC (Nice & Easy)	I	0.09	D,K,N,Q*,R
990	R. Devon	B	1.00	D,J,R
990	Hallam R.(Gt.Yks)	I	0.25	R
999	R. Solent	B	1.00	D,J,R
999	R. Trent (Gem AM)	I	0.25	D,N,R
1017	Beacon R (WABC)	I	0.70	D,G,J,K,N,R
1026	Downtown R	I	1.70	D,G,N,O
1026	R. Cambridgeshire	B	0.50	D,H,R
1026	R. Jersey	B	1.00	J,R
1035	NorthSound R	I	0.78	D
1035	R. Kent	B	0.50	D,H,J,R
1035	R. Sheffield	B	1.00	R
1035	West Sound R	I	0.32	G,I*
1107	Moray Firth R	I	1.50	D,I*
1116	R. Derby	B	1.20	D,I*,K,N,R
1116	R. Guernsey	B	0.50	D,J,R
1152	BRMB (Xtra-AM)	I	3.00	D,I*,K,N
1152	Great North R(GNR)	I	1.80	B*,D*
1152	LBC (L. Talkback R)	I	23.50	D*,J,M*,R
1152	Piccadilly R(Gold)	I	1.50	N
1152	R. Broadland	I	0.83	D,I*,R
1152	R. Clyde (Clyde 2)	I	3.06	B*,D*,G,I*
1161	Brunel R.(Cl.Gold)	I	0.16	D,J,N,R
1161	R. Bedfordshire(3CR)	B	0.10	R
1161	R. Sussex	B	1.00	D*,J,R
1161	R. Tay	I	1.40	G,I*
1161	Humberside(Gt.Yks)	I	0.35	A,I*
1170	GNR Teeside	I	0.32	G,I*
1170	Portsmouth (SCR)	I	0.12	J,R
1170	R. Orwell (SGR)	I	0.28	D*,I*,R
1170	Signal R.(S.Gold)	I	0.20	K,N
1170	Swansea Sound	I	0.58	D,G
1242	Invicta Snd(Coast)	I	0.32	D*,H,R
1242	Isle of Wight R.	I	0.50	D,I*,J,R
1251	Saxon R. (SGR)	I	0.76	D,G*,R
1260	Brunel R (Cl.Gold)	I	1.60	J,R
1260	Sunrise R	I	0.29	D*,K,R
1260	Marcher Snd (Gold)	I	0.64	D,N
1305	Barnsley (Gt.Yks)	I	0.15	R
1305	Red Dragon (Touch)	I	0.20	D,R
1323	R. Bristol (Som.Snd)	B	0.63	D,I*,R
1323	Brighton (SCR)	I	0.50	D,J,R
1332	Hereward R.(WGMS)	I	0.60	D,R
1332	Wiltshire Sound	B	0.30	D,I*,J,R
1359	Essex R.(BreezeAM)	I	0.28	D,H,R
1359	Mercia Snd(Xtra-AM)	I	0.27	D,K,N
1359	Red Dragon (Touch)	I	0.20	O
1359	R. Solent	B	0.85	D,I*,J,R
1368	R. Lincolnshire	B	2.00	D,R
1368	R. Sussex	B	0.50	D,J,R
1368	Wiltshire Sound	B	0.10	D,J
1413	Sunrise R.	I	0.125	A*,D,J,R
1431	Essex R.(BreezeAM)	I	0.35	D,H,I*,J,R
1431	R 210 (Cl.Gold)	I	0.14	D,I*,J,R
1449	R. Peterboro/Cambs	B	0.15	J,P,Q*,R
1458	GMR	B	5.00	G*,I*
1458	R. Cumbria	B	0.50	P,Q*
1458	R. Devon	B	2.00	D,J,R
1458	R. Newcastle	B	2.00	G*
1458	Radio WM	B	5.00	D,K,N
1476	County Sound	I	0.50	D,G,H,I*,J,Q*,R
1485	R. Humberside	B	1.00	A,D,I*
1485	R. Merseyside	B	1.20	D,I*,N,P
1485	R. Sussex	B	1.00	D,J,R
1503	R. Stoke-on-Trent	B	1.00	B*,D,N,R
1521	Reigate (City Snd)	I	0.64	D,G,I*,J,R
1530	R. Essex	B	0.15	I*,J,R
1530	R. Wyvern (WYVN)	I	0.52	D,G,I*,J,K,N,R
1548	Capital R (Cap G)	I	97.50	D,J,M,R
1548	R. Bristol	B	5.00	D,I*
1548	Liverpool (City G)	I	4.40	N
1548	R. Forth (Max AM)	I	2.20	D,G,I*,P
1557	Chiltern R.(Gold)	I	0.76	D,I*,K,N,O*,R
1557	Southampton (SCR)	I	0.50	D,I*,J,R
1557	R. Lancashire	B	0.25	D,I*,N,P*
1557	Tendering (Mellow)	I	?	G,R
1584	Kettering (KCBC)	I	0.04	R
1584	R. Nottingham	B	1.00	A,D,G*,R
1584	R. Shropshire	B	0.50	D,K,N,R
1584	R. Tay	I	0.21	G*,I*,O,P
1602	R. Kent	B	0.25	D,I*,J,K,P,R

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

Listeners:
A: Leo Barr, Sunderland.
B: Geoff Crowley, Hafnarfjördhur, Iceland.
C: Ron Damp, Worthing.
D: Gerry Haynes, while in Talgarth, Powys.
E: Simon Hockenhull, E Bristol.
F: Rhoderick Illman, Oxted.
G: Ross Lockley, Stirling.
H: Alex Mackow, Ilford.
I: Eddie McKeown, Newry.
J: George Millmore, Wootton, IOW.
K: Sid Morris, Rowley Regis.
L: John O'Halloran, Harrogate.
M: John O'Toole, Stratford.
N: Martin Price, Shrewsbury.
O: Tom Smyth, Co. Fermanagh.
P: John Stevens, Largs.
Q: George Tebbitts, Penmaenmawr.
R: John Wells, East Grinstead.

Short Wave Reports

How well the **25MHz (11m)** broadcasts have reached their intended target areas is unknown to me, but quite often UK listeners have heard them via back scatter and other modes. They come from UAE R, Abu Dhabi 25.690 (Ar to Far East 0900-1100) SIO333 at 1005 by **Bill Clark** in Rotherham; R. Norway Int, Oslo 25.730 (Norw to ? 1300-1329) and R. Denmark via RNI 25.730 (Da to ? 1330-1355) 23222 by **Fred Pallant** in Storrington; RFI via Issoudun 25.820 (Fr to Africa 0900-1555) 25222 at 1000 by **Simon Hockenhull** in E Bristol; R. Nederland via Flevo 25.970 (Sun only, Du to Africa 1030-1125) 45243 at 1030 by **Eddie McKeown** in Newry.

Although meant for other areas R. Australia's **21MHz (13m)** signals have reached the UK most mornings. Their Darwin signals to SE Asia on 21.525 (Eng 0100-0900) was logged as 24433 at 0756 by **David Edwardson** in Wallsend; and to Asia on 21.745 (Eng 0900-1100) 33333 at 1055 by **Tom Winzor** in Plymouth. to S Asia on 21.595 from Carnarvon (Eng 0100-0900) 34322 at 0758 by **Gerry Haynes** in Bushey Heath.

Also heard here in the morning were R. Moscow Int, Russia 21.615 (Eng WS 0400?-1100) 44333 at 0830 by **Sheila Hughes** in Morden; BBC via Limassol 21.470 (Eng to Af 0430-1615) SIO111 at 1028 by **Philip Rambaut** in Macclesfield and 34433 at 1202 by **Peter Polson** in St.Andrews; UAE R. Dubai 21.605 (Eng to Eu 1030-1055) 44434 at 1055 in Bridgwater; R. Pakistan, Islamabad 21.520 (Eng to Eu 1100-1120) 44434 at 1113 in E Worthing; RFI via Issoudun 21.580 (Fr to Af 0900-1655) SIO433 at 1130 by **John O'Halloran** in Harrogate; Vatican R, Italy 21.850 (Port, Sp to S Am 1100-1210) 44444 at 1145 in Kilkeel.

Later, R. Nederland via Bonaire 21.515 (Eng to Af 1730-1925) was 34223 at 1745 in Newry; HCJB, Ecuador 21.455 (Eng, u.s.b.+ p.c) SIO433 at 1825 in Rotherham; WYFR via Okeechobee 21.500 (Eng, Ger to Eu, Af 1700-1900) SIO333 at 1830 by **Kenneth Buck** in Edinburgh; Monitor R. Int via WCSN 21.640 (Eng to Af 1800-2000) 45333 at 1840 by **Ronald Kilgore** in Co. Londonderry; WYFR via Okeechobee 21.615 (Eng to Eu, Af 1900-2000) 55444 at 1936 by **Vera Brindley** in Woodhall Spa; HCJB Quito 21.480 (Eng to Eu, Af 1900-2000) 45554 at 1940 by **John Parry** in Northwich; R. Nederland via Bonaire 21.590 (Eng to W Af 1730-2025) 54444 at 1950 by **Chris Shorten** in Norwich; VOA via Greenville 21.485 (Port, Fr, Eng to Af 1730-2200) SIO112 in Redhill.

R. Australia's **17MHz (16m)** broadcasts have also reached the UK. Their Darwin transmission to S Asia on 17.695 (Eng 0700-0900) was 34543 at 0756 in Wallsend; to S Asia via Carnarvon 17.750 (Eng 0700-0900) was 44322 at 0746 in Bushey Heath.

In the morning, the occupants of this band include DW via Jülich? 17.780 (Eng to Asia, Pacific 0900-0950) 43434 at 0926 by **Leo Barr** in Sunderland; China R Int, Beijing 17.710 (Eng to Pacific areas 0900-1057) 43333 at 0930 in Morden; Monitor R Int via KHBI Saipan 17.555 (Eng to NE Asia 0900-1100) 22432 at 0955 in Bridgwater; Channel Africa, Johannesburg 17.805 (Eng to E Af 1000-1100) 32332 at 1004 in E Worthing; R. Pakistan, Islamabad 17.900 (Eng to Eu 1100-1120) SIO323 at 1020 by **John Stevens** in Largs; BBC via Mayhe 17.885 (Eng to E Af 0800-1400) SIO111 at 1107 in Macclesfield; Israel R, Jerusalem 17.545 (Eng to Eu, USA 1100-1130) 53333 at 1103 in Plymouth.

Those noted in the afternoon were R. Tashkent, Uzbekistan 17.745 (Eng to S Asia 1200-1230) 43433 at 1208 by **Darren Taplin** in Brenchley; RCI via Sackville 17.820 (Eng to Caribbean 1300-1400) 54444 at 1315 in Norwich; R. Finland via Pori 17.740 (Eng to USA? 1430-1500) SIO333 at 1430 by **Richard Howard** in Northampton; DW via Jülich? 17.765 (Eng to E/C Af 1500-1550) 44444 at 1500 by **Michael Griffin** in Ross-on-Wye; VOA via Morocco? 17.790 (Eng to Af 1600-1730) 55555 at 1718 in Co. Londonderry; RTM via Tanger 17.595 (Fr 1400-1700) SIO444 at 1600 in Harrogate.

Later, HCJB, Ecuador 17.490 (Eng, u.s.b.+ p.c.) was SIO344 at 1910 in Edinburgh; also 17.790 (Eng to Eu 1900-2000) 33323 at 1915 in Woodhall Spa; R. Nederland via Bonaire 17.605 (Eng to W Af 1930-2025) SIO444 at 1930 in Rotherham; VOA via Bethany, 17.800 (Eng to Af 1800-2200?) 34553 at 1945 in Northwich; BBC via Ascension Is 17.880 (Eng to Af 1400-2030) 33332 at 2029 by **Rhoderick Illman** in Oxted; R. Havana, Cuba 17.760 (Eng to Eu, M East, Af 2100-2200) 35544 at 2100 in Stirling.

Early risers who search the **15MHz (19m)** band may pick up R. New Zealand's broadcast to Pacific areas via Rangataiki on 15.120 (Eng 2137-0658). Their signal peaked 54433 at 0656 in Bushey Heath! Radio Australia's broadcasts may also be heard here: 15.240 from Shepperton (Eng to Pacific areas 0030-0900); 15.170 from Carnarvon (Eng, Chin, Cant to N Asia 0900-1400) and 15.530 from Darwin (Ind to SE Asia 0900-1230) logged as 43322 at 0700, 34322 at 1018 and 45333 at 1036 respectively in Bushey Heath; also 15.630 from ? (Eng to S Asia 1100-1300) 34433 at 1221 in Brenchley.

In the daytime the BBC via Limassol 15.575 (Eng to M East, India 0400-1500) 24312 at 1001 in Sunderland; R. Austria Int, via Moosbrunn 15.450 (Ger, Eng to Aust 0800-1100) SIO444 at 1020 in Macclesfield; Israel R, Jerusalem 15.615 (Heb

Long Medium & Short

[Home Service] to Eu, USA 0400-2300) 45554 at 1035 by **John O'Toole** in Stratford; AIR via Aligarh? 15.120 (Eng to SE Asia 1330-1500) 54444 at 1340 in Norwich; R. Moscow Int, Russia 15.540 (Eng WS 1200-1600) SIO222 at 1400 by **Tom Smyth** in Co. Fermanagh; China R. Int, Beijing 15.165 (Eng to S Asia 1400-1557) 22222 at 1530 in Woodhall Spa; R. Veritas Asia via Palauig 15.140 (Pil [Eng ident 1529] 1505-1530) SIO444 at 1525 in Northampton; R. Nederland via Talata Velon 15.150 (Eng to S Asia 1430-1625) 23343 at 1553 in Oxted; KTWR Agana, Guam 15.610 (Eng to S Asia, India 1500-1700) 32332 at 1600 in E Worthing; Africa No.1 via Moyabi 15.475 (Fr to W Af 1600-2000) 44444 at 1615 by **George Tebbitts** in Penmaenmawr.

After dark, Vatican R, Italy 15.090 (Fr, Eng, Port to Af 1700-1830) was SIO222 at 1730 by **Phil Townsend** in E London; Channel Africa, Johannesburg 15.240 (Eng to Af 1600-1755) 44444 at 1726 in Iceland and 44444 at 1745 in St.Andrews; WWCR Nashville 15.685 (Eng to Eu 1100-0000) 45344 at 1812 by **John Eaton** in Woking; Voice of Vietnam, Hanoi 15.009 (Eng to Eu 1800-1830) 22222 at 1830 in Kilkeel; RFI via Allouis 15.300 (Fr to Af 0600?-2155) SIO433 at 1840 in Rotherham; BBC via Ascension Is 15.400 (Eng to Af 1500-2315) 55444 at 1844 in Co. Londonderry; Monitor R. Int via WSHB 15.665 (Eng to Eu 1900-2200) SIO455 at 1930 in Edinburgh; VOIRI Tehran 15.260 (Eng to Eu 1930-2030) 44444 at 1940 in Newry; VOA via Morocco 15.410 (Eng to Af 1600-2200) 34553 at 2000 in Northwich; RNB Brasilia, Brazil 15.265 (Eng, Ger to Eu 1800-2055) 34433 at 2005 in Ross-on-Wye; WINB Red Lion, 15.295 (Eng to Eu, N Af 1700?-2100) 55333 at 2050 in Plymouth; also 15.185 (Eng to Eu, N Africa 2100-2245) 34333 at 2100 in Morden; KTBN via Salt Lake City 15.590 (Eng to USA 1600-0200) 23432 at 2100 in Stirling; RCI via Sackville 15.325 (Eng to Eu 2130-2230?) 55555 at 2130 in Bridgwater.

The **13MHz (22m)** broadcasts to Europe include Croatian R, Zagreb 13.640 (Cr, Eng [Ident 0911] 24hrs) 34433 at 0903 in Sunderland; R. Prague, Czech Rep 13.580 (Eng 1600-1625) 54434 at 1605 in Penmaenmawr; UAE R. Dubai 13.675 (Eng 1600-1640) 45333 at 1630 in Ross-on-Wye; WHRI South Bend 13.760 (Eng 1700-0000) 44333 at 1732 in St.Andrews; RCI via ? 13.650 (Russ, Ukr? to Russia 1730?-2030) SIO455 at 1830 in Edinburgh; R. Kuwait, Kbad 13.620 (Eng 1800-2100) 44334 at 1835 by **Peter Pollard** in Rugby and 45444 at 2100 in E Bristol.

Whilst beaming to other areas DW via Jülich 13.790 (Eng to W Af 0600-0650) was 44444 at 0615 in Norwich; Monitor R. Int via KHBI Saipan 13.615 (Eng to Oceania 0800-1000) 32432 at 0834 in Bridgwater; R. Australia via Darwin 13.605 (Eng, Chin to Asia 0800-1400?) 55433 at 0900 in Bushey Heath and 54444 at 1311 in E Worthing & via Carnarvon 13.755 (Kh, Eng to S Asia 1230-1430) 44444 at 1420 in Brenchley; SRI via Sottens? 13.685 (It, Eng, Fr, Ger to Aust, S Pacific 0830-1030) 54254 at 0920 in Newry; Monitor R. Int via KHBI Saipan 13.625 (Eng to SE./S Asia 1200-1400) 22222 at 1200 in Kilkeel; SRI via Sottens? 13.635 (Eng, Fr, Ger to S/C Asia 1500-1630) SIO211 at 1500 in Co. Fermanagh; R. Nederland via Flevo 13.700 (Eng to S Asia 1330-1625) 45333 at 1605 in Co. Londonderry; Pakistan, Islamabad 13.590 (Eng to M East 1600-1630) 34333 at 1625 in Oxted; VOA via Selebi-Phikwe 13.710 (Eng to Af 1600-2200) 34333 at 1758 in Woking; AWR (KSDA) Agat, Guam 13.720 (Eng to Af 1700-1900, Sat/Sun only) SIO222 at 1820 in Rotherham; R. Austria Int, via Mossbrunn 13.730 (Ger, Eng, Sp, Fr to S Af 1800-?) 34323 at 1937 in Woodhall Spa; WWCR Nashville 13.845 (Eng to E USA 1200-0100) SIO333 at 2025 in Harrogate; BBC via Rampisham 13.660 (Eng to Falkland Is 2130-2145) SIO233 at 2131 in Redhill.

Noted in the **11MHz (25m)** band were HCJB Quito 11.835 (Ger, Fr, Eng to Eu 0600-0830) 54444 at 0808 in Plymouth; R. Finland via Pori 11.755 (Ger, Fr, Eng, Fin, Sw, Russ to Eu, M East, Af) SIO444 at 0855 in Macclesfield; Radio Australia via ? 11.660 (Eng to E Asia 1430-2100) SIO444 at 1430 in Northampton and 33232 at 1845 in Ross-on-Wye; & via Shepperton 11.695 (Eng to Pacific areas 1600?-2030) 35544 at 1957 in Brenchley & via Carnarvon 11.855 (Eng to SE Asia 2200-0000?) SIO333 at 2257 by **Julian Wood** in Elgin; Voice of the Mediterranean, Malta 11.925 (Eng, Ar to N Af 1400-1600) 53333 at 1443 in Penmaenmawr; AIR via Bangalore 11.620 (Eng, Hi to Eu 1745-2230) SIO332 at 1800 in Co. Fermanagh; R Tunisia Int via Sfax 12.005 (Ar to NE Af, M East 0430-2300) 44343 at 1824 in Oxted; R. Japan via Moyabi 11.925 (Eng to Eu 2100-2155) 34433 at 2105 in St.Andrews; VOFC Taiwan via Okeechobee 11.915 (Eng to Eu 2200?-0000) 44444 at 2245 in Stratford; Israel R, Jerusalem 11.585 (Eng to Eu 2230-2300) SIO333 at 2245 by **Francis Hearne** in N Bristol; BBC via Ascension Is 11.750 (Eng to S Am 2200-0330) 34333 at 2302 by **Robin Harvey** in Bourne.

From time to time R. New Zealand's **9MHz (31m)** broadcasts to Pacific areas on 9.700 (Eng 0659-1206) reached the UK, but reception was often poor. In Macclesfield they were only SIO111 at 0830. They were also received in Iceland, rating 13322 at 1032 in Hafnarfjördhur. Three of R. Australia's broadcasts also reached the UK: 9.580 to Pacific areas via Shepperton (Eng 0800-2130) was 31332 at 0801 in Bushey Heath; 9.510 to Asia via Carnarvon (Eng, Chin 0900-1100) 24422 at 1100 in Newry; 9770 to Asia via Shepperton 9.770 (Eng 1430-1600) 43333 at 1513 in Woodhall Spa.

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	K*
153	Donebach	Germany	500	A*,B*,F*,G*,H,I*,K,M*,N*
153	Brasov	Romania	1200	H*
162	Allouis	France	2000	A*,F*,G*,H,I,K,L,M*,N*
171	Kaliningrad	Russia	1000	G*,H*,I,K
171	Medi 1-Nador	Morocco	2000	B*
171	Moscow	Russia	500	C,N*
177	Oranienburg	Germany	750	C*,G*,H,I*,K*,N*
183	Saarlouis	Germany	2000	A*,C,F*,G*,H,I,K,L,M*,N*
189	Caltanissetta	Italy	10	N*
198	BBC Droitwich	UK	500	A,C,G,H,I,L,M*,N*
207	Munich	Germany	500	A,B*,F*,G*,H,K*,M*,N*
207	Azilal	Morocco	800	K*
216	RMC Roumoules	S France	1400	F*,G*,H,I,K,L,M*,N*
216	Oslo	Norway	200	C*,G*
225	Raszyn Resv TX	Poland	?	C*,F*,G*,H,I,K,L,M*,N*
234	Beidweiler	Luxembourg	2000	B*,C*,F*,G*,H,I,K,L,M*,N*
243	Kalundborg	Denmark	300	D*,F*,G*,H,I*,K,M*,N*
252	Tipaza	Algeria	1500	N*
252	Atlantic 252	S Ireland	500	B*,E,F*,G,H,I,J*,K,L,M*,N*
261	Burg	Germany	200	B*,F*,H*,I*,M*,N*
261	Taldom(Moscow)	Russia	2000	C*,G*,K,M,N*
270	Topolna	Slovak Rep.	1500	B*,C*,F*,G*,H*,I,K,M*,N*
279	Minsk	Belarus	500	G*,H*,I*,M*

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

Listeners:
A: Vera Brindley, Woodhall Spa.
B: Simon Hockenhull, E Bristol.
C: Sheila Hughes, Morden.
D: Rhoderick Illman, Oxted.
E: Ronald Kilgore, Co. Londonderry.
F: Alex Mackow, Ilford.
G: Eddie McKeown, Newry.
H: George Millmore, Wootton, IoW.
I: Sid Morris, Rowley Regis.
J: John O'Toole, Stratford.
K: Fred Pallant, Storrington.
L: Tom Smyth, Co. Fermanagh.
M: Phil Townsend, E London.
N: Michael Williams, Redhill.

Quite a number of the broadcasts in this band are meant for Europe. Those noted came from R. Nederland via Flevo 9.650 (Eng 1130-1325) SIO444 at 1130 in Co. Fermanagh; Voice of Greece, Athens 9.425 (Gr, Eng 1200-1250) 44444 at 1247 in Brenchley; R. Pyongyang, Korea 9.325 (Eng 1700-1750, also to M East, Africa) 33333 at 1703 in St.Andrews; SNBC Omdurman, Sudan 9.165 (Eng 1800-1900) 44333 at 1823 by **P Gordon Smith** in Kingston, Moray; VOA via Gloria 9.760 (Eng 1700-2100) 52333 at 1847 in Co. Londonderry; R. Bulgaria, Sofia 9.700 (Eng 1830-2000) 53433 at 1915 in Ross-on-Wye; VOIRI Tehran 9.022 (Eng 1930-2030) 32333 at 1955 in Rugby; Voice of Vietnam, Hanoi 9.840 (Eng 2030-2100) 43333 at 2030 in Morden; R. Portugal via Sines? 9.780 (Eng, Port 1900-2100?) 45554 at 2050 in Wallsend; Voice of Turkey, Ankara 9.445 (Eng, Fr 2100-2300) 44333 at 2115 in Bridgwater; R. Cairo via Abis 9.900 (Eng 2115-2245) 33222 at 2125 in E Worthing; China R Int, Beijing 9.920 (Eng 2100?-2156) 45554 in Stratford; Voice of Israel, Jerusalem 9.388 (Heb [Home Service] 0400-2300) 43334 at 2200 in Penmaenmawr; also 9.435 (Eng 2230-2300) 34322 at 2245 in Sunderland.

Among those logged to other areas were HCJB Quito 9.745 (Eng to Pacific areas 0730-1130) 44444 at 0820 in Norwich; SRI via Schwarzenburg? 9.885 (It, Eng, Fr, Ger to Aust, S Pacific 0830-1030) SIO444 at 0920 in Harrogate; Monitor R. Int via KHBI Saipan 9.355 (Eng to Oceania, M East, Eu 1800-2000, also Af 1900-2000) 44332 at 1828 in Oxted; Yemen R, Sana'a 9.780 (Ar to M East 1000?-2145 [Eng 2100-2135]) SIO334 at 2104 in Redhill; UAE R, Abu Dhabi 9.770 (Eng to USA 2200-0000) SIO555 at 2201 in Edinburgh and 34333 at 2352 in Bourne; AIR via Delhi? 9.910 (Eng to NE Asia 2245-0045) 33333 at 2345 in Kilkeel; RNE via Noblejas? 9.530 (Eng to USA 0000-0200) 35443 at 0000 in E Bristol.

Quite often R. Australia's **7MHz (41m)** broadcast to S Asia has reached the UK. Radiated from Carnarvon on 7.260 (Eng 1430-2100), it peaked SIO233 at 1600 in Edinburgh, 44444 at 2000 in Wallsend and 52332 at 2048 in Bushey Heath.

During their broadcast to Europe, AWR via Forli 7.230 (Eng 0700-0800) rated 43333 at 0700 in Morden; WYFR Okeechobee 7.355 (Eng 0600-0800) SIO444 at 0725 in Rotherham; TWR Monte Carlo, Monaco 7.385 (Eng 0845?-0945 Sun) 55555 at 0915 in Bridgwater; Polish R, Warsaw 7.145 (Eng 1300-1355) 55545 at 1332 in Norwich; R. Tunisia Int, via Sfax 7.475 (Ar 1800-2300) 33332 at 1903 in Oxted; Voice of Greece via Avlis 7.450 (Gr, Eng 1900-1950) 44142 at 1905 in Newry; R. Bulgaria, Sofia 7.455 (Eng 1830-2000) 44433 at 1934 in Brenchley; RAI via Prato Smeralto 7.275 (Eng 1935-1955) 42333 at 1939 in Woodhall Spa; R. Prague, Czech Rep 7.345 (Eng 2100-2127) 43343 at 2115 in Rugby; AIR via Aligarh 7.412 (Eng, Hi 1745-2230) SIO434 at 2120 in Harrogate; R. Ukraine Int, Kiev 7.240 (Eng 2200-2300) 53433 at 2230 in Stirling; Israel R, Jerusalem 7.465 (Eng 2230-2300) SIO222 at 2236 in Elgin; RCI via Skelton 7.250 (Eng 2300-2330?) 32223 at 2320 in Bourne.

Some of the **6MHz (49m)** broadcasts to Europe come from R. Nederland via Flevo 5.955 (Eng 1130-1325) 54444 at 1150 in Morden; R. Austria Int via Moosbrunn 6.115 (Ger, Eng, Fr, Sp 0400?-2300) SIO222 at 1500 in Co. Fermanagh; & 5.945 (Ger, Eng, Sp, Fr 1800?-2300) 33333 at 1935 in Woodhall Spa; R. Prague, Czech Rep 6.055 (Eng 1800-1830) 33343 at 1823 in Oxted; R. Vlaanderen Int, Belgium 5.910 (Eng 1900-1925) 52332 at 1901 in Co. Londonderry; R. Riga Int, Latvia 5.935 (Eng 2000-2028) 43433 at 2000 in Stirling; R. Finland via Pori 6.120 (Eng 1930-2000) 43434 in Rugby; R. Pyongyang, Korea 6.576 (Eng 2000-2050) 44344 at 2000 in Norwich; Vatican R, Italy 6.245 (It 2000-2030) SIO433 at 2015 in Northampton; R. Budapest, Hungary 6.110 (Eng 2200-2300) 55555 at 2200 in Stratford; R. Moscow Int 6.055 (Eng 2200?-2300)

Tropical Bands

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1933	H,J
2.325	ABC Tennant Creek	Australia	1931	H,J
2.485	ABC Katherine	Australia	1704	J
3.220	R. Togo, Lome	Togo	1942	H
3.245	R. Clube Varginha	Brazil	2300	C
3.245	AIR Itangar	India	0047	H,P
3.255	BBC via Maseru	Lesotho	2050	H,Q
3.270	SWABC 1, Namibia	SW Africa	2231	D,H,J
3.277	AIR Srinagar	India	1737	H,J
3.300	R. Cultural	Guatemala	2305	C
3.315	AIR Bhopal	India	0050	H,P
3.316	SLBS Goderich	Sierra Leone	2220	C,H,J
3.325	FRCN Lagos	Nigeria	2037	H,J,O
3.355	AIR Kurseong	India	1715	H
3.356	R. Botswana	Gabarone	2055	J,Q
3.365	AIR New Delhi	India	1745	H,P
3.365	GBC R-2	Ghana	2112	C,O,E,H,J,O,Q,S
3.905	AIR Delhi	India	1705	E,F,H,J,M,T
3.915	BBC Kranji	Singapore	1701	C,E,F,H,J,M,T,W
3.945	AIR Gorakhpur	India	0130	P
3.950	Qinghai PBS, Xining	China	2340	F,P
3.955	BBC Skelton	England	2300	C,D,I,K,O,W
3.955	Novosibirsk rly A.Ata	Kazakhstan	1715	F,M
3.960	RFE/RL Munich	W.Germany	2225	C,D
3.965	RFI Paris	France	2250	C,O,E,F,O,Q,W
3.975	BBC Skelton	England	2331	F
3.980	VOA Munich	Germany	2310	C,D,K,O,Q,R,U,W
3.985	China R via SRI	Switzerland	2210	C,V
3.985	SRI Beromunster	Switzerland	2128	O,L,M,O,Q,W
3.995	DW via Julich	Germany	2250	B,C,D,E,F,O,Q,R,W
4.035	Xizang PBS, Lhasa	Tibet	2238	P
4.130	V of the Strait 1	China	1506	P
4.220	Xinjiang PBS, Urumqi	China	1535	P
4.330	Xinjiang BS, Urumqi	China	1550	P
4.500	Xinjiang BS, Urumqi	China	2345	O
4.735	Xinjiang, Urumqi	China	2349	C,G,H,O
4.750	Xizang BS, Lhasa	Tibet	2326	F
4.755	RRI Ujungpadang	Indonesia	1536	H
4.760	Yunnan PBS,Kunming	China	2315	C,F,H,L,P
4.760	AIR Port Blair	India	1619	H,P
4.760	ELWA Monrovia	Liberia	1944	H,N,P
4.780	TWR	Swaziland	1834	S
4.765	Brazzaville	PR. Congo	2025	O
4.770	FRCN Kaduna	Nigeria	2014	B,O,F,G,H,J,N,O,Q,R,S
4.775	R. Gabon, Libreville	Gabon	2110	H,Q,S
4.775	AIR Gauhati	India	1626	H
4.780	RTD	Djibouti	1953	H
4.783	RTM Bamako	Mali	2107	C,H,S
4.785	Ecos del Combeima	Colombia	2335	C
4.790	AIR Shillong	India	1825	D
4.790	Azad Kashmir R.	Pakistan	1713	H,J
4.790	R. Atlantida	Peru	0137	O
4.790	TWR Manzini	Swaziland	1825	J,O,P,S
4.800	R. Nac Amazonas	Brazil	2310	C
4.800	CPBS 2 Beijing	China	2300	C,F,H,P,R
4.800	AIR Hyderabad	India	1719	F,H,J,N,T
4.800	LNBS Lesotho	Maseru	1917	H
4.805	R. Nac.Amazonas	Brazil	2245	D,O
4.809	R. Libertad, Santa Fe	Bolivia	2340	C
4.810	Voz de Galapagos	Ecuador	0120	C
4.810	R. South-Africa	S Africa	1755	P,S
4.815	China R, Beijing	China	2327	G,H,P
4.815	R. diff TV Burkina	Ouagadougou	2117	C,F,H,J,R,S
4.820	E.Prov.Huila	Angola	1725	R
4.820	La Voz Evangelica	Honduras	2345	C,F
4.820	AIR Calcutta	India	1639	J
4.820	Lhasa	Tibet	2238	P
4.825	R. Cancao Nova	Brazil	2355	F
4.830	R. Botswana, Gaborone	Botswana	2110	H,J,O,Q,S
4.830	R. Tachira	Venezuela	2325	C
4.835	R. Tezulutlan, Coban	Guatemala	0004	F

4Freq (MHz)	Station	Country	UTC	DXer
4.835	RTM Bamako	Mali	2112	B,C,D,H,J,L,N,O,R,S
4.840	Heilongjiang, Harbin	China	2056	H
4.840	R. Andahuaylas	Peru	2355	C
4.845	ORTM Nouakchott	Mauritania	2110	B,C,D,H,J,L,O,Q,R,S
4.850	R. Yaounde	Cameroon	2310	C,O,R
4.865	PBS Lanzhou	China	2226	C,F,G,H,R
4.865	L.V. del Cinaruco	Colombia	0139	G,O
4.865	R. Mozambique	Mozambique	2310	R
4.870	R. Cotonou	Benin	2220	D,H,J,O
4.880	R. Bangladesh	Dacca	1456	P
4.885	R. Clube do Para	Brazil	2350	C
4.885	China R, Beijing	China	2306	G,H
4.885	Voice of Kenya	Kenya	1819	H,J,S
4.890	ORTS Dakar	Senegal	2315	C
4.895	Voz del Rio Arauca	Colombia	2335	C
4.897	Murun	Mongolia	0050	P
4.897	Voice of Vietnam	Vietnam	1447	P
4.900	SLBC Colombo	Sri Lanka	0041	H,P
4.905	Anhanguera	Brazil	0140	O
4.905	R. Nat.N'djamena	Chad	2015	B,O,H,J,O,Q,R,S
4.905	CPBS 1, Beijing	China	2221	P
4.910	Tennant Creek	Australia	2130	P
4.910	V of People Kampuchea	Cambodia	2220	P
4.910	AIR Jaipur	India	1720	E,H,J,N,S
4.910	R. Zambia, Lusaka	Zambia	1810	H,J
4.915	R. Anhanguera	Brazil	0757	O
4.915	R. Nac.Macapa	Brazil	2340	C
4.915	PBS Guangxi, Nanning	China	2340	C
4.915	GBC-1, Accra	Ghana	2007	B,C,D,F,H,J,O,Q,R,S
4.915	Voice of Kenya	Kenya	2007	H,S
4.920	R. Quito	Ecuador	0122	P
4.920	AIR Madras	India	1708	H,J
4.927	RRI Jambi	Indonesia	2158	P
4.935	R. Difusora, Jatai	Brazil	2350	C
4.935	Voice of Kenya	Kenya	1932	H,J,O,Q,S
4.940	R. Abidjan	Ivory Coast	2250	D,R
4.945	Channel Africa	S Africa	1712	H
4.950	V. of Pujiang	China	1515	P
4.950	RTM Kuching, Sarawak	Malaysia	1525	P
4.960	China R, Beijing	China	1926	H,P
4.970	PBS Xinjiang	China	1535	H,P
4.975	R. Uganda, Kampala	Uganda	1933	H,O,S
4.980	PBS Xinjiang	China	2355	C,G,H
4.980	Ecos del Torbes	Venezuela	2357	C,O,O
4.990	Hunan 1, Changsha	China	0015	F
4.990	AIR via Madras	India	0005	C,O
4.990	FRCN Lagos	Nigeria	2108	B,O,H,J,O,Q,R,S
5.005	R. Nacional, Bata	Eq Guinea	2108	Q,S
5.005	R. Nepal, Kathmandu	Nepal	1659	H,J
5.010	R. Garoua	Cameroon	2005	O
5.010	SBC Singapore	Singapore	1449	H
5.015	R. Brazil Tropical	Brazil	0142	O
5.020	PBS-Jiangxi Nanchang	China	0001	C,O,P
5.020	La Voix du Sahel	Niger	2139	H,J
5.021	Hanoi	Vietnam	2336	F
5.025	R. Parakou	Benin	2000	G,H,M,S
5.025	R. Uganda, Kampala	Uganda	1946	D,H,J,S
5.035	R. Aparecida	Brazil	2345	C
5.035	R. Bangui	C Africa	1946	D,H,J,O,R,S
5.040	EP de Benguela	Angola	2255	P,R
5.040	PBS Fujian, Fuzhou	China	1500	R
5.045	R. Cultura do Para	Brazil	2355	C
5.047	R. Togo, Lome	Togo	1937	C,D,F,H,J,O,R,S
5.050	Voz de Yopal, Yopal	Colombia	0005	C
5.050	Em Jesus Gran Poder	Ecuador	2249	D,P
5.050	SBC Singapore	Singapore	1535	N
5.050	R. Tanzania	Tanzania	1930	A,H,J,R,S
5.052	SBC R-1	Singapore	2302	G,H
5.055	RFO Cayenne(Matoury)	French Guiana	2330	C,H
5.075	Caracol Bogata	Colombia	0735	D,N,O,Q,R
5.090	Taiwan 2 Sce, Beijing	China	2100	P

DXers:
A: Vera Brindley, Woodhall Spa.
B: Bill Clark, Rotherham.
C: Robert Connolly, Kilkeel.
D: Geoff Crowley, Iceland.
E: Ron Damp, Worthing.
F: John Eaton, Woking.
G: David Edwardson, Wallsend.
H: P. Gordon Smith, Kingston, Moray.
I: Robin Harvey, Bourne.
J: Gerry Haynes, Bushey Heath.
K: Simon Hockenhull, E Bristol.
L: Sheila Hughes, Morden.
M: Rhoderick Illman, Oxted.
N: Ross Lockley, Stirling.
O: Eddie McKeown, Newry.
P: Roy Merrall, Dunstable.
Q: Sid Morris, Rowley Regis.
R: John O'Halloran, Harrogate.
S: Fred Pallant, Storrington.
T: John Parry, Northwich.
U: Peter Polson, St.Andrews.
V: Chris Shorten, Norwich.
W: Phil Townsend, E London.

SIO222 at 2200 in Elgin; R. Yugoslavia via Bijeljina 6.100 (Eng 2200-2228) 44444 at 2210 in Storrington; R. Sweden via Karlsborg? 6.065 (Eng 2230-2300) SIO333 at 2230 in N Bristol.

Seldom reported are the BBC via Ascension Is 6.005 (Eng, Port? to Africa 0300-0700), logged as SIO232 at 0630 in Harrogate; R. Australia via Carnarvon 5.960 (Eng to S Asia 1800-2100) 32442 at 1945 in Kingston; R. Nac da Amazonia, Brazil 6.180 (Port 0900-0200) 22332 at 2340 in Bridgwater; CKZN St.John's, 6.160 (Eng to E Canada 0930-0500) 32332 at 2350 in Kilkeel.

QUARTERLY LIST OF EQUIPMENT USED

$November '93, #December '93, *January '94.

$Tim Allison, Middlesborough: Lowe HF-225 + r.w.
$#Ted Bardy, N London: JRC NRD-535D + half size G5RV or V Beam 18m long.
$#*Leo Barr, Sunderland: Roberts RC818 or Sony ICF-SW7600 + loop or r.w.
$Richard Bealey, Exeter: Trio R-2000 + r.w.
$#*Darren Beasley, Bridgwater: Philips D-2935 + Hexagon loop or a.t.u. + 15m wire.
$#*Vera Brindley, Woodhall Spa: Sangean ATS-803A or Sangean SW60.
$#*Kenneth Buck, Edinburgh: Lowe HF-225 + s.w. loop.
$#*Tim Bucknall, Congleton: Sony ICF-2001D + AN-1.
$#*Bill Clark, Rotherham: Sony ICF-2001D + built-in whip.
$#*Robert Connolly, Kilkeel: Trio R-1000 or Sangean ATS-803A + Sony AN-1 or 30m wire.
$John Coulter, Winchester: Yaesu FRG-7 + r.w.
$*Geoff Crowley, Iceland: Yaesu FRG-7700 + dipoles + Datong AD370.
#Martin Dale, Stockport: Codar CR-70A + a.t.u. + 23m wire.
#*Ron Damp, Worthing: Racal RA17 or Yaesu FRG-7 or Sangean ATS-803A + a.t.u. + Windom or T2FD dipole.
$#*John Eaton, Woking: Lowe HF-225 + Datong A270 or 23m wire.
$#*David Edwardson, Wallsend: Trio R600 + inverted V trap dipole.
$#Ron Galliers, Islington: Philips D-2935 + a.t.u. + 30m wire.
$#*Peter Gordon-Smith, Kingston, Moray: Icom R72 + a.t.u. + dipole.
$#*Michael Griffin, Ross-on-Wye: Lowe HF-225 + 10m wire.
$Bill Griffith, E Majorca: Sony ICF-2002 + 7m wire.
$#*Robin Harvey, Bourne: Matsui MR-4099 + s.w. loop.
$#*Gerry Haynes, Bushey Heath: Kenwood R-5000 + Rhombic or r.w.
$#*Francis Hearne, N Bristol: Sharp WQT370 or Yaesu FRG-7 + r.w.
$*Simon Hockenhull, E Bristol: HMV 1124 + 3m wire or ITT Colt or Philips D-2345 + built-in whip.
#Simon Hockenhull, Torquay: Philips D-2345 + built-in whip.
$#*Richard Howard, Northampton: Grundig 3400.
$#*Sheila Hughes, Morden: Sony ICF-7600DS or Panasonic DR48 + 15m wire.
$#*Rhoderick Illman, Oxted: Kenwood R-5000 + AN-1.
$#Stephen Jones, Oswestry: Matsui hi-fi.
#Peter Kay, near St.Davids: Sony ICF-2001D.
$#*Ronald Kilgore, Co. Londonderry: Drake R8E + Mag Balun + 20m wire.
$#*Ross Lockley, Stirling: Realistic DX-300 + 50m dipole or 20m wire.
*Alex Mackow, Ilford: Sony ICF-2001D.
$#*Eddie McKeown, Co. Down: Tatung TMR-7602.
$#*Roy Merrall, Dunstable: Kenwood R-5000 + 40m wire.
$#*George Millmore, Wootton, IOW: Sangean ATS-803A or Racal RA17L + loops.
#*Sid Morris, Rowley Regis: Kenwood R-5000 + 11m wire.
$Sid Morris, -Cwm Nantcol, Gwynedd: Sangean ATS-803A + whip.
$#*John O'Halloran, Harrogate: Yaesu FRG-100 + dipole or active antenna.
$John O'Toole, Stratford: Sony ICF-7600.
*John O'Toole, Stratford: Trio R600 + r.w.
$#*Fred Pallant, Storrington: Trio R2000 + r.w. in loft.
#John Parry, Northwich: Realistic DX-400 + 33m wire.
$#Roy Patrick, Derby: Lowe HF-125 + 22m wire.
$#*Peter Pollard, Rugby: Sony ICF-2001D + AN-1.
$#Peter Polson, St.Andrews: Lowe HF-225 + loop or indoor Joystick.
#*Martin Price, Shrewsbury: Matsui MR-4099 + r.w.
#Paul Pybus, Hull: Sony ICF SW55 + 25m wire or Fisher 58 tuner + loop.
$#*Philip Rambaut, Macclesfield: Int. Marine Radio R.700M + r.w.
$#*Harry Richards, Barton-on-Humber: Grundig Satellit 700 + AD270 or Matsui MR-4099 + r.w.
$#Eric Shaw, Chester: Lowe HF-225 + 7m wire.
$#*Chris Shorten, Norwich: Matsui MR-4099 + 10m wire.
$Tony Singh, Hitchin: Zenith 7000 or Grundig Satellit 3400 + built-in whip.
$#*Tom Smyth, Co. Fermanagh: Sangean ATS-803A or M.Richards R191 + whip.
$#*John Stevens, Largs: Hammarlund HQ 180 or Icom R-70 + loop or r.w.
$*Darran Taplin, Brenchley: Yaesu FRG-7700 + FRT 7700 + 35m wire.
$#*George Tebbitts, Penmaenmawr: Blaupunkt Stereo Radiogramme circa 1968.
$#*Phil Townsend, London: Lowe HF-225 + loop or r.w.
$#*John Wells, E Grinstead: RCA AR88D + Hexagonal Loop.
$#*Michael Williams, Redhill: Lowe HF-225 + loop or 10m wire.
*Tom Winzor, Plymouth: Yaesu FRG-7700 + r.w.
$#*Julian Wood, Elgin: Kenwood R-2000 + Yaesu FRT-7700 a.t.u. + 5m wire.

Off the Record

Andy Cadier
28 Romney Avenue, Folkestone, Kent CT20 3QJ

This quarter, we are opening with reports on some of the numbers stations recently monitored by the European Numbers Information Group. The stories relating to these stations together with their suspected sinister purposes or dubious intentions are well covered in several books. However, with the new friendly relationship with Eastern Europe and the reduction of hostilities in the Middle East, these stations still exist. Add to this the substantial advances in professional communications, that now make the facilities on the Star Ship *Enterprise* almost credible, their continued use is quite amazing. The locations of these stations are not publicised, the messages are coded and several are subject to jamming, thus increasing speculation over the threat they represent.

Lincolnshire Poacher is one of the easiest stations to receive and operates on a number of frequencies, latest reports list the following times.

0700UTC on 7.887; 9.251 & 8.464MHz
1400UTC on 14.487; 15.682 & 16.084MHz
1700UTC on 11.545; 12.603 & 13.375MHz
1900UTC on 9.251; 11.545; 12.603 & 13.375MHz.

SHORT WAVE IRREGULAR BROADCASTS CHART

Atlantis	A, B, F
Belgian Relay	A, C, D, F
Brigitte	B
Britain	B, C, E, F
Caroline SW	A, B, C, D, E, F, G
CRSM	B, F
Delta	A, B, D, G
Diamond	A,
East Coast Commercial	A, B, E, F
European Christian	A, B, G
FRS Holland	B
Jolly Roger	A, B, D, E
Level 48	A
Marabu	A, B, G
Merlin	A, D, F
Optimod	B, D
Orang Utan	A, B, D, F, G
Ozone	B, D, F
Pacman	A
Pamela	A, B, D
PFBS Germany	B
Piranha	A
Reflections	A, B, C, E, F, G
Safari	A
Stella	A, B
Subterranean Sounds	B
Toekomst Music	A
Waves International	B, D
WGAS	A, B, D, G
WNKR	A, B

A: Free Radio Monitoring, Halesowen, W. Midlands.
B: Bob Marsh Bexleyheath, Kent.
C: Darren Taplin, Brenchley, Kent.
O: Rab O'Fokel, Sunderland, Tyne & Wear.
E: Graham Smith, Peterhead, Aberdeenshire.
F: Roger Lewis, Ashford, Kent.
G: Chris Harris, Kidderminster, Worcs.

This station was very active over the summer when changes were made to its regular schedule. Other frequencies worth trying are 5.749 and 6.880MHz, some transmissions are subject to warble jamming.

A station that commences broadcasts with a repetitive three tone signal is only heard on Sunday evenings on 5.718 or 5.617MHz and is very clear in the UK. Broadcasts consist of 5 figure groups read in German by a female.

Spanish stations are reputed to originate in Central or South America, they can be heard in Britain in the early mornings. Frequencies to try are 8.165; 9.156; 5.762 and 5.846MHz at about 0600UTC. Station NNN is one of the smaller stations, transmissions commence with the letter N in Morse code repeated for five minutes, followed by a German female with a group count. Try 5.177 and 5.821MHz at 2000 or 2100UTC.

Grapevine

Radio Brod was off the air during July, but returned at the beginning of August, there is international confusion over the legality of this station's broadcasts. The 50kW transmissions on 720kHz, from the ex-ocean going tug *Cariboo* can be heard in the UK during the night when BBC Radio 4 is off air. The ship is now renamed *Droit de Parole* and is anchored outside the territorial waters of former Yugoslavia, it flies the St. Vincent & Grenadines flag and is financed by the EEC.

Former Radio New York International boss Al Weiner is reported the be one of the key figures behind a new station that as yet has no name! A former trawler *Ross Fortune* now called the *Fury*, has been fitted out with four short wave transmitters, 2 x 10kW and 2 x 40kW and is being backed by an American evangelical mission Overcomer Ministries. One frequency is to be used for religious programming, another by Al Weiner himself (possibly 7.415MHz), a third for the use of the ships flag state, and the fourth to be hired out to another broadcaster. It is intended to be a totally legal operation authorised by a recognised nation, so rather than be a pirate it would simply be a portable, or at least transportable, radio station. A suggested anchorage is Nevis near St. Kitts in the Caribbean.

The Israeli pirate station Voice of Peace closed down on 1 October after over 20 years on the air, the founder Abie Nathan intends to continue his peace project on land and use his ship as a peace museum. It is at present unclear if this will include a land based radio station in the future.

Radio Seagull lost its bid to obtain a licence for the London area, they had applied for 1035kHz a frequency soon to be vacated by BBC Radio Kent at Chatham. The directors of Seagull are principally those involved with Radio Caroline. Many hoped this could have been Caroline's final voyage into the realm of legality. The licence was awarded to London Country Radio. On 27 October at 10am, the Radio Caroline vessel *Ross Revenge* was towed from Dover docks where it had been detained for almost two years. In November 1991 the ship was salvaged by two Dover Harbour Board vessels following a dramatic rescue from the Goodwin Sands. The newly painted and much refurbished *Ross Revenge* was towed by the tug *Sea Challenge* to a mooring near Bradwell Waterside, on the south bank of the River Blackwater in Essex, where further restoration can take place. Most of the repairs have been financed by the organisation's business activities and supporters' donations. Station Manager Peter Moore says he wants the ship to be independently mobile to enable them to obtain temporary broadcasting licences at coastal locations around Europe.

A sample QSL card from a New Zealand pirate station.

Pirate Memories

Two ex-pirate Radio London DJs are publishing books based on their experiences during the middle 60s. Dave Cash, now with Capital Gold, has written a fictional account of his pirate days called *All Night Long*. It is published by Mandarin (£4.99). Keith Skues had intended to release his *Pop Went The Pirates* in 1968, however as he worked for BBC Radio One and was concerned over the legality of publishing a pirate orientated book the project was put on ice. He has now dusted off the manuscript and is vigorously updating each of the 500 or so pages, including the biographies of some 200 pirate radio DJs. Publication date will be 28 March 1994, other details will be available shortly.

Radio Chat

Harry Richards of Barton-on-Humber has written with his recollections of the early days of AFN. He listened to three transmitters Frankfurt, Munich and Stuttgart and says the *Munich Night Train* became a classic programme of its day. He also remembers presenter Sgt. Don Cosgrove and a show called *Off The Record*!

Several readers have commented on the Echo Charlie Band mentioned last quarter. So far nobody has actually found out why it's called EC, however **Bob Marsh** of Bexleyheath has stumbled upon a pirate packet network operating on 6.67724 and 6.68263MHz. He says they are running at 300 baud and using AX25 format. He also supplied me with a vintage Radio Geronimo sticker, which will find a place in one of my radio scrap books. The availability of illegal equipment is pointed out by **Simon Parker** of Wotton-under-Edge, he says that transverters can be obtained in the UK, so can internal boards to convert your CB radio to 6.6 to 7MHz. Output is 12W a.m./f.m. and 15W s.s.b., leaving you to make or buy a suitable antenna.

On the subject of spy stations, **John Franklin** of Ripley sheds some light on the Tyrolean music station, also mentioned in October. He, while in Germany, used d.f. techniques to trace this broadcast to Burg in what was then the German Democratic Republic. Bavarian folk music was followed not by numbers, but by phrases in German. John also refers to the censorship placed on this page by the Radio Communications Agency, in respect of reporting on the reception of pirate broadcasts. *SWM's* present policy is not to provide pirate 'station details', if the frequency is given the station name is excluded and vice versa.

This article should reach you just in time for me to say Happy Christmas to all *SWM* addicts, also may I wish you the very best radio reception in the new year. A special thanks must go to our dedicated band of contributors and monitors whose enthusiastic efforts in this difficult field are very much appreciated.

Trading Post

Fill in the order form in the November Issue in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it, together with your payment of £2.35, to Trading Post, *Short Wave Magazine*, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. If you do not wish to cut your copy of *SWM*, or do not wish to use the order form provided, you must still send the flash from this page, or your subscription number, as proof of purchase of the magazine. Advertisements from traders, or for equipment which it is illegal to possess, use or which cannot be licensed in the UK will not be accepted.

FOR SALE

2 AR88Ds, PCR2, Eddystone 358 (B34) and coils, CR100, RX/TX type 58, all good condition. Also various WWII airborne radar units. **Wanted Indicator 182**, *Practical Televisions* 1964-1980. P. Bristow, 6 Finmere, North Lake, Bracknell, Berkshire RG12 7WF. Tel: (0344) 425638

AOR 2000 scanner, used for very short time, complete in box with all accessories such as NiCads, charger, case, manual, receipt available for inspection, good reason for sale, £230. Peter, Dyfed. Tel: (0646) 695141.

AOR 2002 base or mobile scanning receiver, 25-550 and 800-1300MHz, excellent performance, v.g.c., boxed, £260 inc post. **Wanted Icom R7100** receiver, please quote serial number, can travel to inspect. John, Suffolk. Tel: (0394) 272096.

AOR-3000 scanner, superb condition, boxed, with a.c. and d.c. adapters, manual, very little used, £500. Tel: Stockton-on-Tees (0642) 765529.

Audio filter, unused W9GR DSP II at US price of, £200 ($300) add £3 for postage. Tel: Reading (0734) 722085.

ERA MkII micro-reader, little used with instructions only, £90 with registered postage. Tel: Gwynedd (0407) 830833.

Fairmate HP100 hand-held scanner, 15-550, 805-1300 a.m./f.m., 1000 memories, NiCad batteries, power supply/charger and manual included, £200. Tel: Swindon (0793) 875063.

Good condition Sanyo RP8880 nine band portable short wave radio, f.m./l.w./m.w./m.b. 5 s.w. bands, b.f.o. for s.s.b./c.w. operations, £60. Tel: Surrey (0932) 340468 after 6pm.

Heathkit GR78 general coverage receiver 200kHz to 30MHz a.m. c.w./s.s.b., good working order, complete with manual, £125 o.n.o. Tel: Lincs (0507) 608571.

Icom 7000 v.h.f. receiver, excellent condition, £550, bargain. Icom 71E general coverage, first class condition, £550. AOR 3000 communication receiver, boxed, £450. Eddystone 1837 digital read, excellent receiver, £300. Eddystone 1650 auto/man scanning, 6 filters, 100 channel memories, sweep scan, top range, offer over a thousand pounds. Tel: London 081-813 9193.

Icom IC-R1 scanner, extra battery pack and in car adapter/charger, boxed, hardly ever used and in new condition, £275 or nearest offer. Tel: West Sussex (0444) 452345.

Icom IC-R9000 top of the range 100kHz to 2GHz receiver with screen display of all functions, only, £2 100 for quick sale (£5 000 new!). Tell your friends. Tel: Coventry (0203) 670932.

Icom RC7000 and Icom R71E, both boxed with manuals, excellent condition, £625 each. Tel: Taunton (0823) 351611 anytime.

ICS FAX1 weather map decoder cables, manual printer cable, power supply, guide to facsimile stations Klingenfuss, £200. Tel: Kent (0732) 842288 after 5pm.

ICS FAXIII receive FAX, RTTY, AMTOR, NAVTEX and c.w. on IBM PC, as new, manual, interface and demo tape, 3.5 and 5.25 disks, £70. Denman, 24 Ascot Road, Copnor, Portsmouth PO3 6EY. Tel: (0705) 787693.

Ideal Xmas present, PRO43 Realistic a.m./f.m. switchable hand-held scanner, boxed, as new, long guarantee, includes rechargeable charger, frequency guide, absolute bargain at, £200, interest in amateur radio forces sale. Tel: Glos (0684) 295770 anytime.

Kenwood R1000 h.f. receiver, £225 o.n.o. RX4 multimode receive system and Commodore 64 computer, 2 tape drives and Morse tutor tapes, £130 o.n.o. Lowe HF125 and keypad, £250 o.n.o. Steve, West Sussex. Tel: (0444) 482034.

Kenwood R5000 communications receiver with v.h.f. converter 12V d.c. lead, mint condition, manual with box, £675. Old Philco valved radio model 100, working, v.g.c., £65. Tel: Colchester (0206) 210882.

Kenwood R5000 receiver, mint, very little use, v.h.f. converter fitted, plus global AT1000, manual, boxed, bargain, £625 o.n.o. Tel: London 081-813 9193.

Kenwood R820 amateur and five broadcast bands covered with Kenwood Sp930 speaker, also Icom world clock and Drake speaker (new). Tel: London 081-558 5227 anytime.

Kenwood RS-5000 as new, will sell for £550 or **exchange for an AR-3000** or 3000A, if interested, please contact Mr D. Cole, Caerphilly. Tel: (0222) 864907.

Lowe HF-150 complete with telescopic antenna, mains adapter, magnetic longwire balun, carrying strap, manuals and 20 metres co-ax, very good condition, £300 o.v.n.o. Jim, Somerset. Tel: (0458) 833238 anytime.

Lowe HF-150 general coverage receiver with IF-150 computer interface, £250. Icom IC730 transceiver 80-10m, including WARC, all filter options fitted, OK data modes, £475. Gorrill GM4UJZ, QTHR. Tel: (0383) 823305 evenings or (0383) 820011 daytime.

Lowe HF-225 a.m./f.m. detector, key pad, NiCads, active whip antenna, case, cost new, £675, will accept, £450. AT-1000, £55, SEM HI Q matcher, £40, Discone, £15, all in very good condition. Tony G7NZR, West Yorks. Tel: (0943) 607506.

National 5001G v.h.f./u.h.f. mono TV radio cassette, 4 wave 5.5/6MHz sound, £55 o.n.o. Sharp 14inch mono portable v.h.f./u.h.f. tuners, £25. Sony AIR 7 g.w.o., £175 o.n.o. Realistic 2021 base scanner, £130 o.n.o. Buyer inspect and collect. Tel: Chester 310267 afternoons or evenings.

PRO2024 60 channel v.h.f./u.h.f., £40. PRO2025 16 channel mobile scanner, v.h.f./u.h.f., £30. Admiralty BC40 short wave radio 0.65-30MHz, £40 all g.w.o., buyer pays postage/delivery. Tel: Kent (0304) 368684 after 6.30pm or weekends, ask for Peter.

Realistic PRO-35 100 channel, direct entry programmable scanner plus adapter, telescopic antenna and manual, used once only, v.g.c., £70. Tel: Kettering (0536) 520656 after 6pm.

Receivers, valved, Bush DAC10 two band. Murphy U506 three band. Weimar 4680 four band, all for £50 or £20 each. Grundig Sat. 1400 with Dryfit recharge battery, type 476, £100. G3OXV, QTHR. Tel: (0327) 702265.

Sangean ATS-803A, £50. Amiga FAX, hardware and software TX and RX FAX on your Amiga, A500 or 500+, £50. Vortex AT once plus, 286 AT Emulator for Amiga A500+ all docs and latest software, £100. John G6YRB, Lancashire. Tel: (0695) 33499 evenings/weekends.

Signal 535 v.h.f./u.h.f. airband scanner radio, still boxed, £170 o.n.o. Sony A1 active antenna, never used, £35. Tel: Swindon (0793) 496124 after 6pm.

Signal R535 v.h.f. u.h.f. airband receiver with power supply and carrying case, boxed and in mint condition, £180 o.n.o. Tel: Northampton (0604) 870048 after 6pm.

Sony CRF-320 32 band receiver, unmarked, £375. Tel: Shropshire (0588) 673227.

Sony Earth Orbiter world radio CRF 5090, 9 bands, time zone map, b.f.o. squelch, a.f.c. r.f. tone tuning meter, fine tune, a.c./d.c. portable, excellent condition, the classic world radio, £70 o.n.o. Tel: London 081-747 0069.

Sony ICF SW55 150 to 30MHz, boxed, mint condition, cost, £275, bargain at, £195. Tel: Brighton (0293) 502040.

Sony ICF SW7600, 150kHz-30MHz, a.m., u.s.b., l.s.b., s.s.b., 88-108MHz f.m. stereo, mains adapter, aerial, boxed, as new, still under 7 months guarantee, £110. Global 1000 a.t.u., £50. Active antenna Datong 370, £50, all as new, o.n.o. Peter, Liverpool. Tel: 051-650 0853.

Sony ICF-SW77, used approximately five hours, boxed, as new, £280. John, Romford. Tel: (0708) 742662.

Yaesu FRG-7700 communications receiver, plus FRT-7700 antenna tuner, good working order, £250 o.n.o. Tel: Somerset (0460) 67320 anytime (Answerphone)

Yaesu FT-480R 2 meter all mode transceiver, Bremi stabilised power supply, 13.8V-5A s.w.r., power meter YW3 direction antenna, little used for, £250, illness reason for sale. B. Whitehead, North Devon. Tel: (0271) 865045 any evening after 5.30pm.

Yupiteru MVT-7100 boxed, as new, includes case and manual, virtually unused, bargain, £365 o.n.o. Tel: (0483) 502410.

Yupiteru MVT7100 hand-held scanner, v.g.c., reason for sale, lost interest, complete box, price includes carriage UK, still under manufacturers warranty, mint condition, £340 inc. all accessories. Rob, Clwyd. Tel: (0745) 730056 evenings.

Exchange

Yaesu FRG-7 with digital read-out or AOR-2000 hand-held scanner for a base scanner, both units are in mint condition. Tel: Staffs (0782) 537895 after 6pm.

Yupiteru MVT-8000 with manual, p.s.u., box, a.c. lead, bracket, 12 months old, v.g.c., plus cash for a Kenwood R5000 or maybe an Icom R71E, have car, could travel up to 100 miles. Jim, Huddersfield. Tel: (0484) 846366 between 6 and 10pm.

Wanted

Aerotronic Controls Ltd audio switch unit for v.h.f. u.h.f. scanner. Tel: Liverpool 051-709 2168 after 6pm.

Eddystone 358, 556, EC10, EC10MkII, 870, 960, 1000/1/2, pan unit EP20. Speakers, 652, 1419. Edometer ED902 any condition, also offer, £10 each for scrap sets! Collection possible, phone now. Lepino, Surrey. FAX: (0372) 454381 or Tel: (0374) 128170 anytime.

Grundig Satellit stereo, professional radio, model 2400, mint. Grundig power pack TN12 and Philips table radio, model 561 stereo. Hugh McCallion, No 8 Strathrad Close, Coleraine, Co Londonderry, N. Ireland BT51 3ES. Tel: (0265) 43793.

Grundig Yacht Boy 210, must be in very good condition, please write giving details to: Mr P. Tankard, Flat 8, The Granville, 15 Blenheim Road, Minehead, Somerset.

Hallicrafters S27 v.h.f. receiver, MkI/II 38 set plus accessories, WSet No 19 supply unit, No1 or No2. Info on 'Y' service vehicle installation during WWII. John G8KUZ, Staffs. Tel: (0782) 621031 or (0782) 713350.

Icom R9000, must have all documents, inc. proof of purchase, UK spec only, collection no problem anywhere in UK (always mobile). Price guide, £3000. Conrad, Nuneaton. Tel: (0831) 250330 6-7pm Monday to Friday.

JRC NRD-525 or Kenwood R5000 receiver in new condition with or without extras, cash paid, can collect. Tel: Leicester (0530) 838613.

Scanner, hand-held, full range, nearly new, second hand, reasonable price please because wife also wants new carpet, bunk beds for children, dishwasher, video cabinet, holiday, food etc., etc. Peter, Wolverhampton. Tel: (0902) 340216.

Sony ICF-2001D, must be first class condition with all accessories and operating manual. Tel: Hessle (0482) 645394, 4-8pm.

Transceiver, can pay up to, £600 for best h.f. transceiver offered. A demo of all features will be required. G. Tulley, 11 Norval Road, N. Wembley, Middlesex HA0 3TD.

Trio TX-599 transmitter in good condition, also Trio SP55 speaker. GI4RYP, N. Ireland. Tel: (0861) 524267 after 6pm.

Yaesu FRT-7700 a.t.u., JIM M75/M100 antenna, pre-amp, both must be in good working order and fair price. **Dewsbury Morse Supa-Tuta for sale**, mint condition with instructions, power lead, £35. Phillip, Yorkshire. Tel: (0482) 886130 between 4-8pm.

Please use an order form from a previous issue as there was no room to squeeze it in this month. You must still send the corner flash from this page. Ed.

Closing Date for Adverts: February 1994 Issue - 4th January 1994, March 1994 Issue - 1 February 1994.

SWM JAN 94 TP

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DIAL SEARCH 1992/94
George Wilcox
The listener's check list and guide to European radio broadcasting. Covers m.w., l.w., v.h.f. & s.w., including two special fold-out maps. Also includes a full list of British stations, a select list of European stations, broadcasts in English and 'Making the Most of Your Portable'. *46 pages.* **£4.25**

FLIGHT ROUTINGS 1993
Compiled by T.T. & S.J. Williams
This guide was produced with the sole aim of assisting airband listeners to quickly find details of a flight, once they have identified an aircraft's callsign. Identifies the flights of airlines, schedule, charter, cargo and mail, to and from the UK and Eire and overflights between Europe and America. *122 pages.* **£5.95**

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Langley Pierce
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Edited by Erwin David G4LQI
This book contains a collection of useful, and interesting h.f. antenna articles, first published in the RSGB's *Radio Communication* magazine, between 1968 and 1989, along with other useful information on ancillary topics such as feeders, tuners, baluns, testing and mechanics for the antenna builder. *233 pages.* **£9.50.**

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SATELLITE BOOK - A Complete Guide to Satellite TV Theory and Practice
John Breeds
This book deals almost exclusively with television broadcast satellites and is a comprehensive collection of chapters on topics, each written by a expert in that field. It appears to be aimed at the professional satellite system installer, for whom it is invaluable, but it will be appreciated by a much wider audience - anyone interested in satellite technology.
280 pages. **£30.00**

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Martin Davidoff K2UBC
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A collection of practical ideas gleaned from the pages of *QST* magazine. Plenty of projects to build, hints and tips on interference, c.w. and operating and snippets of information from amateurs who've tried and tested the idea.
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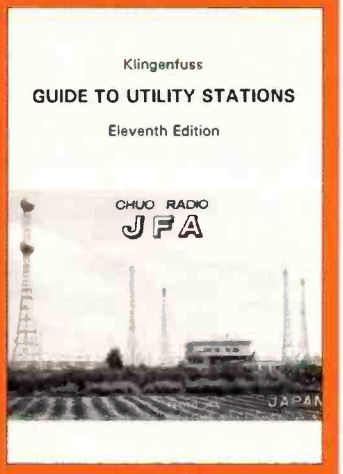

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