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Nevada Communications
189 London Road North End Portsmouth PO2 9AE
Cover: This month's cover picture illustrates our airband theme and shows the RAF's Red Arrows flying in close formation with Avro Vulcan XH558.

Crown Copyright photograph by Sgt. Rick Brewell ABIPP.

DISCLAIMER. Some of the products offered for sale in advertisements in this magazine may have been obtained from abroad or from unauthorised sources. Short Wave Magazine advises readers contemplating mail order to enquire whether the products are suitable for use in the UK and have full after-sales back-up available. The Publishers of Short Wave Magazine wish to point out that it is the responsibility of readers to ascertain the legality or otherwise of items offered for sale by advertisers in this magazine.
**Letters**

**Dear Sir**

I am a scanner and s.w. enthusiast and have noticed an increase in the use of c.t.s.s. on a lot of frequencies, and I wondered if I could get hold of a circuit drawing for a variable frequency c.t.s.s. decoder or could you possibly do an article on the subject?

Also, a humorous tale to amuse your readers and quite true. I think that this story may be very familiar to s.w. listeners who have a shack in the garden, that is the continual chirping of birds in the trees. Only my birds are getting very good at emulating short Morse stations callsigns - please add Short Wave Magazine to your regular mailing list.

Steve Caw

**Warwick**

An interesting letter from Mr. Caw, real name! I have heard starlings imitating electronic telephone "warbles", but this one is new. I wonder if it could pass the Morse test. Just an idea - perhaps you could train a parrot to make those repetitive Q signals needed when contest operating? - Ed

**Letters**

**Dear Sir**

With reference to the article in *SWM*, Jan 94, project, Building The Acorn 1, R. A. Wilson, page 24. He states that PM Components of Gravesend can supply the valve type 955 at a very modest cost. This same company quoted me £4.50 for the 955 and £2.50 P&P plus 17.5% VAT, total, £8.23.

Langrex Supplies in Croydon, quoted me for the valve, £3.50 plus £1.00 P&P plus 17.5% VAT, total, £5.29, a saving of £2.94. It pays to shop around.

A. Dipple

Northumberland

**Letters**

**Dear Sir**

In the December 1993 and January 1994 issue of *SWM*, there were articles on restoration of an R1155a aircraft radio by Mr. Miller. I also have an R1155 which I would like to work on, starting off with a power pack of which I would like to know more about. I need a circuit diagram and information as to where I can obtain components to construct one, I have quite a bit of electrical knowledge having worked in this field all my life.

Do you think that you could help by either putting me in contact with Mr. Miller or by an article in the magazine.

Dennis Pell

Northants

**Letters**

**Dear Sir**

Re: *SWM* Jan 1994, Single Transistor Reflex. I wanted to construct this, and wrote to Maplin for the parts. They told me they do not stock BF254 and do not have a suitable equivalent. Neither do Ciritk.

Can anyone please let me know where this transistor can be obtained or an equivalent which is stocked by the main suppliers.

Thank you.

W. Caley

London

Sorry - we should have checked! We don’t know of a stockist for the BF254, but we believe a BF494 (stocked by Maplin - order number: GQ19V) will work in this circuit. - Ed
Dear Sir
I am writing in reply to the letter from A. Webb from Gwent regarding his musical Discone, I have had a very similar experience. My Discone is mounted on a 6 metre steel mast, fixed to the side of my house with 450mm stand-off brackets.

The first night after installation was disturbed by a constant tone (my musical wife tells me it was G-sharp). The problem was the eight rods vibrating at their natural resonance in a steady wind. This tone was transmitted, via the mast and mounting brackets, to the side of the house which in turn acted like a sounding box. The effect was similar to a tuning fork being struck and the base held against a table.

The solution is simple and inexpensive. Go down to your local fishing tackle shop and purchase a reel of 10-151b nylon line. Tie an old wellington boot wrapped around the mast works fine.

There appears to be no deterioration in signal strength, and the Nylon ‘stays’ are not visible from the ground.

Congratulations on an excellent and informative magazine.

S. P. Winfield
Leeds

Dear Sir
Reference Short Wave Magazine, February 1994 and a letter from A. Webb, Gwent. This letters takes me back many, many years when, as a Police Officer, I was sent to investigate a ‘ghost’ in a dwelling house. Maybe my 6” height contributed to this, but I went alone.

On arrival, residents and neighbours, to say the least, were very disturbed. The resident, a newcomer to the area was said to have bought the ‘haunting’, a screaming ‘banshee scream’ reduced to a ‘howl and hum’. Fortunately, it was summer time and at daylight I returned and yes, there it was, a multi-element TV aerial which howled and hummed to wind velocity and direction. I suggested elements be daubed with a bitumastic rubber solution and the mounting tube filled and sealed with (local product) ‘sandust’. As a result, the ‘ghost’ disappeared and Police Public Relations which (in those days) were good, improved.

Ray Williams
Lincs

These are just two of many letters giving similar solutions. Other readers pointed out that closing the ends of support tubes also reduced ‘singing’. Now if I could only stop the pigeons and sparrows roosting on the antenna system ... (I know - use an imitation owl!) - Ed

Dear Sir
I was pleased to read last year that Aberdeen’s excellent local radio station North Sound Radio was to benefit from a new f.m. transmitter, replacing an old Granite Hill 600W site at Durrus using a much increased power of 10kW, vertically polarised. North Sound Radio was kind enough to send me details of the new site, which they hoped would be on the air at the beginning of January 1994.

I would be very interested indeed to see some reception reports from listeners around North East Scotland, and beyond, as to how the new signal from Durrus is performing.

The official new service area should, I gather, extend from Aberdeen to Peterhead, Turf Hill, Stonehaven, Ballater, Breckin, Forfar and Montrose, but I would expect reception to be possible well beyond perhaps in Perth, Fife, Edinburgh even. Possibilities for Dunbar. Their transmissions are on 95.9v.h.f.f.m.

P.S. How is the new Classic FM main station at ‘Angus’ performing compared to the Forfar site?

M. Smith
3 Charlecole Gardens, Streamside,

Dear Sir
I have any other readers had any problems with the RSGB novice course? This is my story so far.

At the beginning of June 1993, I rang the RSGB enquiring about the novice course. A few days later a letter arrived informing me to contact the Senior Instructor for my area. I left a message on his Answerphone. Two weeks later, no reply, so another message was left on his Answerphone.

A week later the Senior Instructor rang me, took a few of my details and then explained briefly about the course. He then said that he would ring me as soon as a place was available, which would be in about two months time.

Four and a half months later, a third message was left, and within a few days he rang me back, but gave no real answer as to why things were taking so long.

He did say that he passed on my details to another instructor closer to me, and he should have rang me by now. At this point, I offered to have the course run at my house if any others in the area were interested, and if it would help speed things up a little.

It has been almost seven months since my first enquiry and I’m still no nearer to starting a course. I do appreciate that it is organised and run on a purely voluntary basis, and there is no doubt there is a huge waiting list and very few instructors willing to give up their time.

But, I do think that almost seven months is a little long to wait. Especially when I was told originally that I would have to wait about two months. Have any other novices had similar experiences or am I just unlucky?

Also, has anyone, who doesn’t want a ‘black box’ transceiver, tried to find a manufacturer who makes a kit for 430MHz?

J. Tiney
Northants

Dear Sir
With reference to Lee Williams letter about his Russian DX catch on 7.105MHz, I think he possibly heard Radio Dnestr International, operated by separatists in the Snestr region of Moldova, which broadcasts in English to the Americas from 03.30 to 04.00 UTC Saturdays to Thursdays on 7105kHz.

The probable address for this station is 25th October Street, 45, Tiraspil, Pridnestrovie, Via C.I.S.

Tony Vaughan
Hants

Peter J. Kay GW4GCB
Clwyd
rallies

February 26: Tyneside Amateur Radio Society are holding their eighth annual rally at the Temple Park Centre, South Shields. 18.00 sq. feet of floor space, all one level, direct access to the exhibition floor, ample car parking for exhibitors and visitors, comprehensive catering and welfare facilities. Jack GD0ZG on 0191-265 1718.


*March 12/13: The London Amateur Radio & Computer Show will be held at the Pickets Lock Centre, Pickets Lock Lane, Brentford, London. Large trade presence, free parking, lectures and disabled facilities. Bring & Buy, special interest groups, talk-in on S22. (0203) 893893.

*March 26: Norbreck Amateur Radio, Computing & Electronics Exhibition, Norbreck Castle Hotel, Queens Promenade, Blackpool, Lancashire. Extended free car parking with free bus service. Novice licence details and demonstrations, Bring & Buy, competitions, refreshments, talk-in on S22. Doors open 11am (disabled entry with ramp from 10.45am) close 5pm. Admission £1.50, over-65s £1.00, under-16s free. Peter Denton GD4CCG on 051-530 5790.

March 26: Tiverton South West Radio Club are holding their 1994 Mid Devon Rally at the Pannier Market, Tiverton. Doors open at 10am. Easy access only from junction 27 on the M5. Excellent free parking, two halls of trade stands, Bring & Buy stall and mobile snack bar. Large displays and full refreshment facilities in the club room bar which is open throughout the day. Talk-in on 22. G7SW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

March 27: Boumemouth Radio Society are holding their 7th Annual Sale at Kinson Community Centre, Pelhams Park, Milham Road, Kinson, Bournemouth. Doors open at 10am. Talk-in from G1RSB on S22. Amateur Radio and Computer Traders, clubs and specialised groups. Admission £1 including free raffle ticket. Ian GZ0VR OTHM on (0203) 986887.

March 27: Pontefract & DARS are holding their 14th Annual Spring Rally at the Carlton Community Centre, Carlton Road, Pontefract. Doors open at 11am, 10.30 for disabled. Bring & Buy, traders, bookstall, licensed bar and refreshments. Marquee, tombolo, tractors, car boot spaces available, admission by prize programme, 3 prizes plus special draw for the ladies. GD0NE, OTHM on (0371) 677066.

AVON

RSGB City of Bristol Group: last Mondays, 7.30pm. The Small Lecture Theatre, Queen's Building, University of Bristol, University Walk, Bristol. February 28 - History of Portishead. Dave. (0272) 671214.

Shirehampton ARC: Fridays. March 4 - Wonderful weather of world satellites, 11th - Chat night, 18th - VHF equipment (check your rigs emissions). Ron Ford G4GTD. (0272) 770004.

South Bristol ARC: Wednesdays. Whitcheoch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitwchurb. March 2 - 15m activity evening, 9th - Aviation video evening, 16th - First aid in home and resuscitation, 23rd - How about showing the club your Morse keys. For more information ring (0275) 834282 on a Wednesday evening.

BEDFORDSHIRE

Shefford & DARS: Thursdays, 8pm. Church Hall, Ampthill Road, Shefford, Bedfordshire. March 17 - Members activity night, 24th - Junk sale. Paul G1SRR (0462) 700618

DEVON


EXETER


FIFE

Dundee ARC: Tuesdays, 7.30pm. College of Further Education, Graham Street, Dundee. March 1 - Lecture "Viewing the bands - DIY panoramic reception" by Bill Wilson, Aberdeen ARS, 8th - Construction night, 15th - Lecture, 22nd - Construction night, GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.

Dunfermline & DARC: Thursdays, 7.30pm. The former RAF radio station, Dunfermline & DARC: Thursdays, 8pm. The Victory Social Club, Kechill Cemetery Hotel, 470 Bury Road, Rainham, Kent. (0977) 677006.

Edgeware & ORS: Thursdays, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak. February 24 - Morse training evening, plus station on the air, March 10 - AMTOR, 24th - Morse training evening, plus station on the air. Rod Bishop. 081-204 1868.


HEREFORD & WORCESTER


Droitwich Spa AR. 1st Tuesdays, 8pm. Droitwich Community Hall. Many interesting evenings already booked. Jenny Read. (0956) 711571.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. March 3 - Preparation for London Amateur Radio Show, 17th - Visit to Martin Lynch’s shop in Ealing, 18th - Club annual dinner at The Chequers Inn, Wireside, Nr. Ware. John G7CTC. (0205) 469630.

KENT


MESSENGE

Selton ARC: Fortnightly meetings at The Liverpool Prison Officers Club. Details from G4KIN. 051-531 0991 or G8YPL. QTH.

NORFOLK

Norfolk ARC: Wednesdays, 7.30pm. Formal meetings: University Arms, Southwold, Southwold Avenue, Norwich. Other meetings: Hewett School, Hall Road, Norwich. March 2 - (formal) Safety in the shack by Arnold G3FTP, 9th - informal! Night on air, construction ARP; Morse practice, club coach to Pickets lock. 16th - (formal) First h.f. NFD briefing, 23rd (special) The making of 'Anglia At War' by Richard Kennan. Sheila Smilling G0PKV. (0993) 618910.

NOTTINGHAMSHIRE

Mansfield ARC: 2nd Mondays, 7.30pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. March 14 - Junk sale. Mary G0HZA. (0262) 750258.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. Oak Hotel, Shrewsbury. February 24 - A demonstration of FAX/STV by Clem G0DVL, March 10 - A construction/ project discussion night by Terry GB9ID and Paul G7LBD. 24th - A second construction night, advice and discussion, leading to the under a fiver construction competition. Sheila Blumfield G0GST. (0743) 361935.

SOMERSET


WILTSHIRE

Trowbridge & DARC: 3rd Wednesday, 8pm. The Southwick Village Hall, Southwick, Trowbridge. March 2 - Workshop. 5th Annual awards group talk by Ivan G3GKC, 16th - Open evening. Ian G0GRI. (0225) 865498.
Spanish Tip

I'm still receiving letters from listeners following my comments on Spanish language transmissions in the January Junior Listener. The latest suggestion comes from Tony Siemeniago who lives near Swindon. He also has an interest in Spanish and finds Radio Madrid on 585KHz medium wave to be very reliable for evening listening. If you want to contact the station for programme details, the address is: Radio Nacional De España, Casa de la Radio, Prado del Rey, 28023 Madrid, Spain.

Novice Start-up

It's not surprising to find that many new short wave listeners become drawn to amateur radio as a natural extension to their hobby. The latest to write is C Yorke from Liverpool. He would like to know a little more about the Novice Licence.

The licence was first introduced back in 1991 as an attempt to encourage people of all ages to take up amateur radio. One of the great things about the Novice Licence is that it gives you access to most of the major bands, albeit at low power. This latest licence also allows the operator to send messages from computer in addition to the more conventional Morse and voice transmissions. This means that the newcomer can really experience the whole range of amateur activities.

The licence also features a very well structured training programme designed to ensure that all those applying have a good basic grounding in radio and operating procedures. The training programme is organised by the Radio Society of Great Britain on behalf of the Radiocommunication Agency. These courses last about twelve weeks and involve around thirty hours of tuition. The course contains lots of practical work and you have the opportunity to build your own receiver and an audio amplifier. In addition to the electronics, the course teaches the student how to operate radio equipment safely.

Once the course has been completed you receive a certificate that qualifies you to sit the Novice Radio Amateur Exam. These are held four times a year in March, June, September and December. The exam lasts about an hour and a quarter and comprises forty-five multiple choice questions covering the work previously completed on the novice course. With both the course and examination successfully completed you can apply for the Novice Licence. To help attract youngsters into the hobby the licence is free to anyone under the age of twenty-one. For everyone else it costs fifteen pounds.

Once you've got your licence you can transmit and receive Morse, telephony, RTTY and data signals on five h.f. bands and four v.h.f./u.h.f. bands. In all cases the maximum transmitter power is three watts. Although this doesn't sound a lot, by careful choice of antenna, frequency and time of day you can work around the world. The great benefit of this low power working is that it forces you to think before you transmit. If you are to make best use of your three watts you have to make sure you have a clear frequency and your antenna is perfectly matched to your transceiver.

If you would like some more information I would recommend you contact the Radio Society of Great Britain, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. Tel: (0707) 659015.

By Jon Jones

Holiday Radio

I received a very interesting letter this month from Mark Mahabir (16) of Leicester. He's been a keen short wave listener for about four years with independent radio and satellite TV being his main interests. The receiver in use is a Ferguson PR39 with an Amstrad-Fidelity SRD-400 satellite receiver for TV. Once he's finished his A Levels he's hoping to install a motorised satellite dish and then turn his attention to becoming a radio amateur. On the career front he's hoping to take a media and communications degree course and pursue a career in either broadcasting or journalism.

Anyway, getting back to the point of his letter, Mark is off to Cyprus in the summer and would like to continue his listening while on holiday. He asks if there's any way of finding out details of all the local a.m. and f.m. transmissions on the island. You could try writing to the local tourism office but perhaps more readily available is the World Radio Television Handbook (or WRTH as it's frequently known). This amazing publication lists comprehensive radio and TV information for every country in the world. By way of an example, here's a few details that I managed to put together to answer Mark's question.

Cyprus Broadcasting Corporation
PO Box 4824, Nicosia
Medium wave: Paphos 555kHz, Nicosia 603kHz and 963kHz, Limassol 1044kHz
FM: 91.1, 94.8, 97.2, 90.2 and 96MHz
British Forces Broadcasting Service - Cyprus
BFBS Akrotiri, BFPO 57
Dhekelia 99.6/95.3MHz
Akrotiri 92.1/89.9MHz
Nicosia 99.6/85.3MHz
BBC East Mediterranean Relay
639, 720 and 1323MHz + many short wave frequencies.
Bayrak Radio & Television Corporation
Yeniseki 1098 and 1494kHz
Sinan Dagi 87.8, 98.1, 90.6MHz
Selvili Tepe 92, 102 and 1056MHz

LAST WRITES!

This is the last ‘Junior Listener’ column I will be writing. My job is taking me away from home much more often and I am finding it increasingly difficult to continue to meet the Editor’s deadlines. I have enjoyed getting the column off the ground and I know that Elaine Richards, my successor, will take it to even greater heights. Elaine already writes ‘Novice Natter’ in Practical Wireless and will, I'm sure, develop ‘Junior Listener’ to cater even more for the beginner to our wonderful hobby.

If you want to write to Elaine about any topic covered by ‘Junior Listener’ her address is PO Box 1863, Ringwood, Hants BH24 3XD. Don't forget to include a s.a.e. if you expect her to reply.
ISWL News

The International Short Wave League callsign, GX4BUC (the X means it’s a club callsign - Ed) will be allocated to a different ISWL member each month during 1994. A special QSL card will be available to anyone working or hearing the call. Reports should be sent, either via the ISWL QSL bureau or directly, to the club callsign QSL manager: Dave Beadle GODB/U10618, "Kenwood", London Road, Lost, Lincolnshire LN11 80H.

The ISWL QSL Bureau address, for cards intended for other members, is: ISWL QSL Bureau, 155 Bruce Street, Swindon, Wiltshire SN2 2EN. The Bureau is administered by Tony Gale G7NUR/G-13287.

Catalogue from C.M.Hoewes Communications

C.M.Hoewes Communications have just published the biggest ever edition of their Radio Kits Catalogue. There are more kits and metalwork packages than ever before with projects that are designed to appeal to anyone with an interest in radio and home construction.

To obtain a copy, send an A5 or A4 s.a.s.e. (with 25p stamp) to C.M.Hoewes Communications, Eydon, Daventry, Northants NN11 3PT. A couple of IRCs would be appreciated from overseas readers. (Please note the changed postcode)

New Books

Details of three new Radio books have arrived in the SWM offices: Monitoring the Yugoslav Conflict, by Langley Pierce, is now in its second edition. The frequency lists now include the UNHCR, Red Cross, French Forces and many more. £4.95.

Intercepting Number Stations by Langley Pierce gives details of the ‘Numbers’ stations which appear to be still very active in spite of the nd if the Cold War. £9.95.

Grove Shortwave Directory - 8th Edition. Edited by Monitoring Times expert Larry Van Horn, this new edition has been extensively updated and expanded. £18.75.

All prices include UK p&p from Interproducts, 8 Abbot Street, Perth PH2 0EB.

Tel/Fax:(0738) 411999.

It Was 40 Years Ago Today...

well, almost. From Short Wave Magazine, February, 1954:

ANOTHER TRANSISTOR TRIUMPH

Among those amateurs experimenting with transistors is G3HMO (Buckingham), whose line of approach is a little different from most, in that he is making his own germanium triodes! Having obtained LF oscillation around audio frequencies, the next step was to try to get one of his home-made transistors oscillating in our lowest frequency amateur band. This was successfully achieved on January 3, when in the presence of G5RZ and G6FO—assisting in the experiment—oscillations were obtained on 1900 kc, but with a very rough and unstable note. By the use of an 1898 kc crystal, however, the signal was cleaned up considerably, but was still not good enough to do much with on the air. G3HMO then made yet another transistor, and using a QCC Type P5 crystal of 1858 kc, was able to radiate a perfect T9x CW signal, received at S9+10 at G6FO 13 miles distant on January 19 for his first "cold QSO". On Sunday, January 24, extensive tests were undertaken. The transistor CC CW on 1858 kc was received at RST-569 by G5RZ, Leighoton Buzzard (15 miles); at 559x by G3JNU, Bedford (22 miles); at 409 by G3ADK, Luton (25 miles); at 559 by G5WW, High Wycombe (28 miles); and at 449x by G6XH, Chorley Wood (24 miles). Input to the single stage transistor transmitter was 20 milliwatts maximum. Later G3HMO attempted to phone, which was received locally at readable strength by G6FO and G6KJ. Note that all this was with a home-made transistor, giving an r.f. output of perhaps 5mW; taking the input power as 20 milliwatts and G6XH as "best DX", the power-range figure is 1,7000 miles per watt on this QSO. These striking results represent probably the very first use of a home-made germanium triode for actual communication purposes. It is also interesting to note that, in the course of the tests, G3HMO discovered that he could receive phone from local stations G6FO and G6KJ on the transistor transmitter, which was thus operating as a true transceiver! Experiments are proceeding and will be full described in SHORT WAVE MAGAZINE in due course, with the circuitry and other details.

Contest News

The International Listeners Association has opened its quarterly contests to non-members. They have told us of two contests in April:

On 10 April the 2nd Prefix Contest 1994 and on 17 April the 2nd Set Listening Period 1994. Both contest cover the period 0000 to 2400UTC, but you must select six hours total logging time.

For the Prefix Contest monitor the 7 and 14MHz amateur bands and log as many amateur prefixes as possible on each band. Multiply the totals from each band together to get the total points.

For the Set Listening Period monitor the 31 and 41metre broadcast bands and log as many stations as possible in the time allowed.

For both contests send a copy of your log and an entry fee of £1.00 to K Burnell, Contest Manager, 91 Mablins Lane, Coppenhall, Crewe, Cheshire CW1 3RG who, I’m sure, would be willing to send you details of other contests on receipt of an s.a.s.e.
Residential Radio Course

In our December '93 issue we gave details of a residential weekend course called An Introduction to Amateur Radio at Kilve Court Residential Education Centre. Unfortunately the course dates have had to be changed from February to 15-17 April 1994. All other details are as previously stated.

Further details from: Kilve Court Residential Education Centre, Kilve, Bridgwater, Somerset TA5 1EA. Tel:(0278) 741270 / 741326, Fax:(0278) 741551.

CQ all Amateur Radio Educationalists

The Science and Technology through Educational Links with Amateur Radio (STELAR) Group was launched at the January Meeting of the Association for Science Education as a means of supporting good practice in the teaching of Science and Technology.

The first initiative of the Group is to distribute the AMRED (AMateur Radio in EDUCation) newsletter to all interested Educationalists. Initially AMRED will appear termly (August, December and April), with the first edition scheduled for Summer Term 1994.

The Chairman of STELAR is Richard Horton G3XWH, the Head of Physics & Information Technology at Harrogate Ladies' College.

STELAR would like to hear from all Schools and Colleges who have an interest in Amateur Radio activities. Information to forward should include full contact details (Address / telephone / fax / packet BBS), callsign of club, contact person, modes and frequencies of operation and any details of club activities (e.g. special event stations).

If there is any particular activity that you would like to see STELAR pursue, or if you are keen to take part on the organisational level, please include these in the communication.

The Group is attempting to form international links with educationalists throughout the world and to this end three of the committee have already been invited to speak at the annual meeting of the German equivalent of STELAR - 'Amateurfunk in der Schule' in March. Details of any international contacts you may have would be appreciated.

Richard can be contacted at STELAR, c/o Harrogate Ladies' College, Clarence Drive, Harrogate, North Yorkshire HG1 2QG. He is also contactable electronically as G3XWH @ GB7CYM, OSCAR22/KITSAT GOHCA (Harrogate Ladies' College Club Callsign), on Internet: COM2RH/GPS.LEEDS.AC.UK, by Fax: (0423) 871027, or if that's not enough he's QTHR. (Phew! - Ed)

Getting The Best Reception

Now available is a new FREE booklet entitled Guide to Television and FM Radio Reception. This 16-page guide is available from Maxview Limited, Common Lane, Setchey, Kings Lynn, Norfolk PE33 0AT. Tel:(0553) 810376

Pocket Size Frequency Counter

Quantek Electronics have announced a high sensitivity pocket size frequency counter model FC2000 capable of measuring frequencies from 1MHz to 2.4GHz.

Conventional frequency counters typically have a specified sensitivity of 10mV. The sensitivity of the FC2000 is less than 1mV between 10 and 850MHz and is typically 225µV @ 150MHz, this enables the FC2000 to be used for measuring transmitted radio frequency signals as well as laboratory bench measurements.

The compact and ruggedly-built FC2000 features a bright 8-digit LED display, 2 gate times, hold function, 50Ω BNC input, internal 700mAh NiCad batteries and is supplied complete with a mains adapter/charger and telescopic antenna.

The FC2000 costs £119 + £5 P&P direct from: Quantek Electronics, 3 Houldey Road, Birmingham B31 3HL.

Book Catalogue

Of interest mainly to US readers, is a catalogue (or catalog!) listing a wide range of radio books. Copies obtainable from Taure Publications, PO Box 493, Lake Geneva, WI 53147, USA. Tel:010-414-248-4845

EDXC Conference

For those who would like to take a trip to Paris in the spring we have received news of the European DX Council Conference from Friday, 20 to Monday, 23 May 1994.

Each year, nearly 150 people from 20 countries including club leaders, international radio stations, DXers and listeners attend the conference. It is the annual meeting for short wave listeners in Europe, organised by the French club Amitié Radio.

The conference takes place at the Hôtel Itinérares at Nanterre, in the suburbs of Paris. There are good Metro connections to the main railway stations and to Roissy-CDG and Orly Airports.

For further information contact: Amitié Radio, BP 56, F-94002 Créteil Cedex, France. Tel: 010-33 43393841 evenings (answering machine during the day) or Fax: 010-33 49803305.

news

New ITU Members

Since 1 January 1993 the following new Members have joined the ITU:

Czech Republic (1 January 1993)
Georgia (7 January 1993)
Slovakia (23 February 1993)
Kazakhstan (23 February 1993)
Micronesia (18 March 1993)
The former Yugoslav Republic of Macedonia (4 May 1993)
Turkey (7 May 1993)
Eritrea (8 August 1993)
Andorra (12 November 1993)

EDXC Conference

For those who would like a trip to Paris in the spring we have received news of the European DX Council Conference from Friday, 20 to Monday, 23 May 1994.

Each year, nearly 150 people from 20 countries including club leaders, international radio stations, DXers and listeners attend the conference. It is the annual meeting for short wave listeners in Europe, organised by the French club Amitié Radio.

The conference takes place at the Hôtel Itinérares at Nanterre, in the suburbs of Paris. There are good Metro connections to the main railway stations and to Roissy-CDG and Orly Airports.

For further information contact: Amitié Radio, BP 56, F-94002 Créteil Cedex, France. Tel: 010-33 43393841 evenings (answering machine during the day) or Fax: 010-33 49803305.
**Broadcast Schedules**

Every post seems to bring another batch of shortwave broadcast schedules into the SWM office. Obviously we cannot publish everything or there would be no room for anything else in SWM, but we will attempt to squeeze in as many of the English language listings as we can using a condensed “frequency(MHz) / time(UTC) / target region” format. We will also try to list the dates for which these schedules are valid.

**Radio Nigeria**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Time</th>
<th>Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.326</td>
<td>0430-2300</td>
<td>Lagos Transmitter</td>
</tr>
<tr>
<td>4.770</td>
<td>0430-2300</td>
<td>Ibadan Transmitter</td>
</tr>
<tr>
<td>4.990</td>
<td>0430-2300</td>
<td>Lagos Transmitter</td>
</tr>
<tr>
<td>6.025</td>
<td>0430-2300</td>
<td>Enugu Transmitter</td>
</tr>
<tr>
<td>6.050</td>
<td>0430-2300</td>
<td>Ibadan Transmitter</td>
</tr>
<tr>
<td>6.090</td>
<td>0430-2300</td>
<td>Kaduna Transmitter</td>
</tr>
<tr>
<td>7.572</td>
<td>0430-2300</td>
<td>Kaduna Transmitter</td>
</tr>
<tr>
<td>9.570</td>
<td>0430-2300</td>
<td>Ibadan Transmitter</td>
</tr>
</tbody>
</table>

English Network News on all stations 0600-0630, 1500-1530 and 2100-2130 daily.

**Voice of Nigeria**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Time</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.255, 9.690, 11.770 and 15.120MHz</td>
<td>0100-0130</td>
<td>English language</td>
</tr>
</tbody>
</table>

**Radio Tashkent (Spring/Summer)**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Time</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.190</td>
<td>0100-0130</td>
<td>English language</td>
</tr>
<tr>
<td>7.285</td>
<td>1200-1230</td>
<td>English language</td>
</tr>
<tr>
<td>7.285</td>
<td>1330-1400</td>
<td>English language</td>
</tr>
<tr>
<td>9.715</td>
<td>0100-0130</td>
<td>English language</td>
</tr>
<tr>
<td>9.715</td>
<td>1200-1230</td>
<td>English language</td>
</tr>
<tr>
<td>9.715</td>
<td>1330-1400</td>
<td>English language</td>
</tr>
<tr>
<td>15.295</td>
<td>1200-1230</td>
<td>English language</td>
</tr>
<tr>
<td>15.295</td>
<td>1330-1400</td>
<td>English language</td>
</tr>
<tr>
<td>17.745</td>
<td>1200-1230</td>
<td>English language</td>
</tr>
<tr>
<td>17.745</td>
<td>1330-1400</td>
<td>English language</td>
</tr>
</tbody>
</table>

**Syrian Radio & Television**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Time</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.950</td>
<td>2010-2105</td>
<td>Europe</td>
</tr>
<tr>
<td>9.950</td>
<td>2110-2210</td>
<td>USA, Canada, Japan and Australia</td>
</tr>
<tr>
<td>11.625</td>
<td>2010-2105</td>
<td>Europe</td>
</tr>
<tr>
<td>11.625</td>
<td>2110-2210</td>
<td>USA, Canada, Japan and Australia</td>
</tr>
<tr>
<td>12.085</td>
<td>2010-2105</td>
<td>Europe</td>
</tr>
<tr>
<td>12.085</td>
<td>2110-2210</td>
<td>USA, Canada, Japan and Australia</td>
</tr>
<tr>
<td>15.095</td>
<td>2010-2105</td>
<td>Europe</td>
</tr>
<tr>
<td>15.095</td>
<td>2110-2210</td>
<td>USA, Canada, Japan and Australia</td>
</tr>
<tr>
<td>15.373</td>
<td>2010-2105</td>
<td>Europe</td>
</tr>
<tr>
<td>15.373</td>
<td>2110-2210</td>
<td>USA, Canada, Japan and Australia</td>
</tr>
</tbody>
</table>

**Radio Cairo External Services**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Time</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.900</td>
<td>2115-2245</td>
<td>Europe</td>
</tr>
</tbody>
</table>

**RADIO AND TV DX NEWS**

With the liberalisation of Eastern Europe so Poland has seen a dramatic change in emphasis from national to regional radio stations. The former Radio Poznan which airs now as Radio Merkury is now a top station, transmitting 24 hours a day in the old OIRT band 67.40MHz (10kW) and the ‘new’ Band 2 at 102.7MHz (100W). Numerous FM stations are now on-air, most are running in stereo and transmit dual band, i.e. the OIRT and Band 2 FM - there are still many pirate (unlicensed) radio stations in operation! Estonia will experience a dramatic increase in local broadcasting with 45 new licenses being issued to TV and radio stations - at least 20 are already in operation!

Free broadcasting is about to happen in Nigeria following deregulation, some 25 companies have received licences to set up their own TV stations - 14 for terrestrial and the rest on cable/satellite. Lagos will sport 4 new stations and new regional broadcasters will be sited at Ibadan, Aha, Enugu, Obosi, Abuja, Warri and Benin. Terrestrial broadcasters will operate at UHF. Elsewhere in Africa, Zimbabwe have dropped their announced plans for expansion - a shortage of cash is blamed. There will be a ‘resuscitation of short wave transmission’ to provide radio coverage of the country and beyond.

The Ministry of Information and Broadcasting in Tanzania have confirmed that their own TV service should be on the air by end 1994 based around 40% local material and the rest imported. No news yet on channels to be used.

German Digital Audio Broadcasting (DAB) will start on an experimental basis in 1995 despite reservations expressed over funding by mainline broadcaster ARD. The 1.5GHz band is most likely to be exploited although initial transmissions on an experimental basis are thought to be likely at 50MHz. The Dutch are now testing with 12 months of DAB transmissions though, unlike their neighbours 50MHz test frequency, the Dutch are using the Band 3 TV spectrum at 189.25MHz using a 1kw transmitter at Haarlem with a 30 watt relay at Hilversum.

Rumours are suggesting that the ARD-1 network could close on 31 December 1995 following the considerable loss of advertising revenue taken by the popular new stations such as RTL.

Roman Catholics in Colombo, Sri Lanka are protesting over the construction of a new VoA site at Iranna wła. The site, of some 400 acres, is 80km NW of Colombo and is planned to be on the air during 1995 and replacing the existing 40-year old facility at Ekala.

The problem of video delays in TV transmission circuits caused by frame stores, digital mixers and the like resulting in a loss of audio synchronisation is to be rectified by BBC engineers. A small data stream is inserted into the video blanking period of the picture which can be analysed and determine the degree of video delay experienced throughout the vision chain. At the output of the studio the total video delay experienced is calculated and converted into an audio delay control process, thus ensuring that the combined audio and video output from the studio is in sync.

The balloon TV transmitter anchored at Key West last March apparently crashed taking the TV Marti (CIA) propaganda transmissions towards Cuba off the air. Late Summer saw the balloon back in operation and the Cubans resumed jamming the Band 3 programming!

And finally the DTI have approved the use of 2.4GHz for ‘Spread spectrum technology for industrial use’. This will allow communication between computers without the use of cables resulting in less installation time and a more flexible approach to office layouts for expansion, rebuilding and the like. Problems that will occur are that of data security and of data integrity across a transmission system.
Introduction Of New Telephone Codes

The telephone code for the former Yugoslavia (38) changed on 1 October 1993. On that date the following codes came into service:

- Yugoslavia 381
- Croatia 385
- Slovenia 386
- Bosnia / Herzegovina 387
- The former Yugoslav Republic of Macedonia 389

Also, since 1 October 1993 the code of 291 is assigned to Eritrea, and the Republic of San Marino is now independent of the Italian system with a code of 378.

New codes of 379 for the Vatican City and 377 for Monaco will be introduced in the near future.

BBC World Service News

Sam Younger has been appointed to the new post of Director of Broadcasting for the BBC World Service.

This appointment follows a decision to restructure World service Management on a regional basis. Sam will work through six regional heads to commission and schedule all World service radio broadcasts, currently over 850 hours a week, in 39 languages and listened to by 130 million listeners world wide.

Leslie Jewell has become the BBC Moscow Bureau’s bi-media producer for both World Service Radio and World Service Television.

Leslie began her broadcasting career with the World Service as a reporter in 1985 and has worked as a staff producer for Reuters Television in both New York and St Petersburg.

The BBC has extended its Arabic Broadcasts and launched a new look schedule.

The Arabic Service, which is the largest of the BBC’s non-English services, has extended its daily transmission by an hour to 11½ hours daily.

The new schedule, too large to print here, runs from 0330 to 2100UTC daily. Further information is available from BBC World Service, International Press Office, Bush House, London WC2B 4PH.

In-Car Power Connector

J.P. Micro Services have introduced a simple, yet effective, device for connecting all those electronic devices to your car’s power, known as a Tim Box. The adaptor plugs into the car’s cigarette lighter socket with a fused plug and provides connectors for at least three devices without the need to attach power connectors. It is available at a price of £12 (plus £1 P&P) from J.P. Micro Services, Unit 5, Churchward Trading Estate, Bux Court Road, Hereford HR1 1EN. Tel:(0432) 359155, Fax:(0432) 354154.

National Channels Transmitter News

We have been informed of the following changes to the national networks:

11 January 1994 - New Radio 1 FM transmitters at Churchtown Hill, Gloucestershire on 98.6MHz and at Manningtree, Essex on 97.7MHz.

18 January 1994 - New television relay, called St Fillans, situated at Wester Glentarch, 45km west of Perth (NGR NN 663 248), carries these transmissions: BBC 1 Scotland - Ch51, BBC 2 Scotland - Ch44, ITV Scottish - Ch47, C4 - Ch41. All vertically polarised.

19 January 1994 - New television relay, called Loodlearnhead, situated at Carrturan, 52km west of Perth (NGR NN 594 227), carries these transmissions: BBC 1 Scotland - Ch58, BBC 2 Scotland - Ch54, BBC 3 Scotland - Ch64, ITV Scottish - Ch61, C4 - Ch54. All vertically polarised.

25 January 1994 - New television relay, called Portwood, situated 1km NE of Stockport (NGR SJ 908 911) carries these transmissions: BBC 1 North-West - Ch22, BBC 2 North-West - Ch 28, Granada - Ch32, C4 - Ch25. All vertically polarised.

31 January 1994 - New television relay, called Kintlaw, situated 25km S of Oban (NGR NM 830 048) carries these transmissions: BBC 1 Scotland - Ch40, BBC 2 Scotland - Ch46, ITV Scottish - Ch43, C4 - Ch50. All vertically polarised.

Listen With Grandad by Leon Balen & David Levetett

I see Grandma is not amused at having her smalls aired in public.

Short Wave Magazine, March 1994
The Pacific Airband Scene

The North Pacific is a notoriously difficult part of the world to monitor from Europe and on the aviation scene there seems to be very little published. R O Ball hopes to clarify things.

At first, monitoring the aeronautical bands in the Pacific tends to lead to total confusion as, having first ascertained that the North Pacific is generally divided into three areas for the sake of h.f. communications, some of these areas are further divided on a company-to-company basis. The Klingenfuss Guide to Utility Stations whilst acknowledged widely as the utility DXers' Bible is very poor when it comes to the aeronautical bands and HF Oceanic Airband Communications by Bill Laver is not too detailed.

The following is the situation whilst monitoring from an oil tanker making voyages from the West coast of North America to Asia during the first part of 1993. Everything has been gleaned from monitoring rather than from official sources or other publications. I hope it clarifies things!

Central East Pacific
San Francisco Radio normally operates with at least two streams of traffic, with the third and fourth streams being brought into use as traffic levels dictate. The traffic is divided by company rather than direction or height. The frequency 'families' are always the same, with the same companies using the same families.

The various families and users are:

<table>
<thead>
<tr>
<th>Frequencies</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.669/5.547/11.282/13.288</td>
<td>United, Continental, New Zealand, Qantas, All nippon: and if the third and fourth groups are not in use, Japanair.</td>
</tr>
<tr>
<td>3.413/5.574/8.843/13.354</td>
<td>Delta, UPS, TWA, Amtrak, Northwest, Varag, Dynasty, Indonesian, Cathay, Mandarin, World, Air China, Asiana, Aloha, Hawaiian, Philippines: and if the third or fourth groups are not in use, Singapore, Koreanair, Canadian, Northwest, Malaysian.</td>
</tr>
<tr>
<td>6.640/11.342</td>
<td>Northwest, American, Military, Canadian, Air Canada, Japanair if fourth groups is not used.</td>
</tr>
</tbody>
</table>

San Francisco's FIR extends virtually from the West coast of North America as traffic is passed to Vancouver on 135.2 at 134°W, Seattle on 132.7 at 128°W, Oakland on 134.14 (occasionally 133.34) at 127°W or Los Angeles on 132.15. Trans-Pacific flights enter Honolulu’s FIR at 150°W, generally North of 39°N, whilst those to the Hawaiian Islands Eastbound transfer at Zolta, Adeney, Beats or Deroc, and Westbound at Coppy, Esgrò or Fezic; these spelling are only guesses! I would also guess that all the named points were probably at 150°W also. Flights to Australasia are passed to Honolulu on the South Pacific group of frequencies around 20°N 143°W.

The first two listed families of frequencies are shared with Honolulu for flights towards the Hawaiian Islands and there seems to be a gentleman's agreement between them and San Francisco that the former uses 13.288 and 5.547 as primaries whilst the latter uses 11.282 and 5.547 from the first family, and for the second family Honolulu uses 13.354 and 3.413 as primaries whilst San Francisco uses 8.843 and 5.547. There are obviously a few exceptions to these 'rules' but they hold good for 90% of the time.

In mid-February 1993 for the first group of frequencies listed above San Francisco used the daytime primary of 11.282, from as early as 1630, though normally the change is made around 1730, with 5.574 staying in use until the last flights reach v.h.f. range of the coast or are transferred to Honolulu. The daytime secondary of 13.288 comes into use at about 1915 and remains so until 5.574 is brought into operation at around 2330. This pairing in maintained until 0200 when the two are reversed and then around 0400 2.869 becomes the secondary until early local morning (1500) when 11.282 is brought back to use. The night-time is normally 5.574 throughout, but occasionally conditions can be poor enough to warrant the use of 2.869 from around 0400, although this is not very usual, but certainly not out of the ordinary. The frequency changes do not obey any hard and fast rules and can vary as propagation dictates, the frequencies listed here are those generally used, but the changes can occur an hour either side of the times listed here, and obviously as the Summer in the Northern Hemisphere progresses the higher frequencies will be used for longer periods during the day.

The following table is in MHz, all times are UTC

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700</td>
<td>11.282</td>
<td>5.547</td>
</tr>
<tr>
<td>1915</td>
<td>11.282</td>
<td>13.288</td>
</tr>
<tr>
<td>2330</td>
<td>11.282</td>
<td>5.547</td>
</tr>
<tr>
<td>0200</td>
<td>5.547</td>
<td>11.282</td>
</tr>
<tr>
<td>0400</td>
<td>5.547</td>
<td>2.869</td>
</tr>
<tr>
<td>1500</td>
<td>5.547</td>
<td>11.282</td>
</tr>
</tbody>
</table>

For the second group listed, San Francisco was using 8.843 as the local daytime primary, from about 1600 until 0300, when 5.574 would take over until 1600, the following local morning. There is obviously some overlap between the two primaries, whilst 5.574 is brought into use at 0300, 8.843 is used until the last flight reach the extremes of the FIR which may take until 0400. The night-time primary can be used until as late as 1730. This does not cause too much of a problem for San Francisco to monitor as 5.574 is used as the secondary for the period 1600-1800, when 13.354 takes over until approximately 0100 when 5.574 is re-introduced, which
We aim to give the best prices on all major brands and we will endeavour to match any competitors genuine offer on Icom, Kenwood, AOR & Yaesu receivers.

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**AOR**

**HF Receiver AR-3030**

- am, s.am, fm, usb, lsb, cw, fax
- Collins mechanical filters
- Optional VHF converters
- Adjustable B.F.O.
- Mains power unit included

**Yupiteru MVT-7100**

Multimode scanning receiver frequency range 530kHz – 1650MHz incl's ssb

**Now only**

£389

**SONY**

**Shortwave Radios**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF SW1E</td>
<td>£179</td>
</tr>
<tr>
<td>ICF SW7600</td>
<td>£179</td>
</tr>
<tr>
<td>ICF SW55</td>
<td>£279</td>
</tr>
<tr>
<td>ICF SW77</td>
<td>£399</td>
</tr>
<tr>
<td>ICF PRO80</td>
<td>£349</td>
</tr>
<tr>
<td>AIR 7</td>
<td>£299</td>
</tr>
</tbody>
</table>

**FRG-100 HF Receiver 50kHz – 30MHz. SSb, CW, AM, FM**

**NEW**

£699

Optional filters SSB & CW £89 each

**FREE AC PSU**

- Includes FREE PAIIC mains power unit list price £39

**SONY**

**Shortwave Radios**

**SONY**

**Shortwave Radios**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF SW1E</td>
<td>£179</td>
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<td>ICF SW55</td>
<td>£279</td>
</tr>
<tr>
<td>ICF SW77</td>
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</tr>
<tr>
<td>ICF PRO80</td>
<td>£349</td>
</tr>
<tr>
<td>AIR 7</td>
<td>£299</td>
</tr>
</tbody>
</table>

**FRG-8800 HF Communications Receiver**

- Built in power unit
- Built in automatic timer
- All mode am, fm, ssb, cw
- Optional VHF converter
- 12 channel memory
- Direct entry keypad

**NEW AND USED HF RECEIVERS AND SCANNERS ALWAYS IN STOCK**

**SMC PRICE**

**or £484 with Yaesu voucher**

Yaesu offer valid till the end of February

*FM unit optional

**AOR**

**Scanning Receivers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR-3000A</td>
<td>£849</td>
</tr>
<tr>
<td>AR-1500EX</td>
<td>£314</td>
</tr>
<tr>
<td>AR-2000</td>
<td>£279</td>
</tr>
<tr>
<td>AR-2800</td>
<td>£399</td>
</tr>
</tbody>
</table>

**FRG-8800 HF Communications Receiver**

- Built in power unit
- Built in automatic timer
- All mode am, fm, ssb, cw
- Optional VHF converter
- 12 channel memory
- Direct entry keypad

**SAVE OVER £200**

**Prices from**

£449
is used until about 0300 when 3.413 is used until 8.843 is brought into service about 1600.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0300</td>
<td>5.574</td>
<td>3.413</td>
</tr>
</tbody>
</table>

The third group of frequencies is brought into use around 1500 as the evening flights from Asia begin to arrive over 150°W, with 6.640 being the primary and 11.342 the secondary. From 1800 the flights are then advised as they call in or are selcalled and told that these two frequencies are reversed. This situation continues until around 0200 when the two are reversed again. Around 0500 sometimes the secondary is made 5.547 and by 0600 all the remaining flights have reached their destination or are transferred to 5.547.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0600</td>
<td>Flights transferred to 5.547</td>
<td></td>
</tr>
</tbody>
</table>

The fourth position is not always brought into use, but when it does, it also caters for the arrival of all the previous evenings' flights from Asia, with 6.673 being the primary from around 1600 and 10.057 being the secondary. Around 1900 the frequencies are reversed and all the traffic is using 10.057 as the primary by 1930. This pair is only used until the peak dies out around 2215, when the last few flights generally are transferred to 8.843.

As stated above for flights between North America and the Hawaiian Islands, Honolulu shares the first two sets of frequencies with San Francisco. During local daytime 13.288 is used from around 1800, with 11.282 as the secondary until 0100 when 5.547 takes over. This becomes primary around 0400 until 1800. The expected night-time secondary would be expected to be 2.869, but for some reason Honolulu always uses 3.413 from its other family, this is generally utilised between 0400 and 1800, when 11.282 takes over.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600</td>
<td>6.673</td>
<td>10.057</td>
</tr>
<tr>
<td>1900</td>
<td>10.057</td>
<td>6.673</td>
</tr>
<tr>
<td>2215</td>
<td>Remaining flights moved to 8843</td>
<td></td>
</tr>
</tbody>
</table>

The second group uses 13.354 as the daytime primary from around 1730 until 0300. The one of two things can happen depending on conditions (and the operator!), sometimes 8.843 is brought into use until 0500 or the drop can be straight down to the night-time primary of 3413. The daytime secondary from 1730 is 8.843 until 0130 when 5.574 or 3.413 takes over until 8.843 is used again.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>13.288</td>
<td>11.282</td>
</tr>
<tr>
<td>0100</td>
<td>13.288</td>
<td>5.547</td>
</tr>
<tr>
<td>0400</td>
<td>5.547</td>
<td>3.413</td>
</tr>
</tbody>
</table>

The North Pacific group of frequencies is shared between Honolulu and Tokyo. The area is generally North of 37°N and Honolulu takes the guard at 150°W from San Francisco and passes it to Tokyo at 166°E, often at a point called NIPPY inbound or PAYON outbound. Tokyo transfers all traffic to v.h.f. 126.7 at NOUKA (about 1 hr 20 mins Northwest of Narita) or 133.6 when 300nm out of Choisai, a d.f. beacon near Tokyo.

There seems to be a further FIR around Anchorage which operates on v.h.f. only, flights from Asia North of about 53°N are told to call Anchorage on 119.1 when 150 miles west of Shemya or 118.5 when at 160°W when coming from America. This is applicable for trans-pacific flights as well as those for Anchorage itself. Flights South of about 53°N work Honolulu on h.f. the entire way from 150°W to 166°E.

Again both stations try and avoid using the same frequencies at the same time, but with Honolulu using three primaries simultaneously, things can get a bit confusing! The situation arises as the night-time peak from Asia reaches the FIR at 150°W around 0900, and continues until the bulk of the traffic arrives at the FIR with San Francisco at 150°W around 1630. The frequencies are split by the company as follows:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.628/10.048</td>
<td>United, Japanair</td>
</tr>
<tr>
<td>5.667/6.655</td>
<td>Northwest, American, Delta, Canadian, Military, All Nippon, Nippon Cargo</td>
</tr>
<tr>
<td>6.655/5.667</td>
<td>All other companies</td>
</tr>
</tbody>
</table>

One night Honolulu was heard using 2.932 as the secondary in lieu of 10.048, but I have never heard this repeated. This three-way arrangement seems to be quite a recent innovation, as during February all the flights listed on 5.667 were heard on 6.655. After 1550 flights on 5.667 and 6.655 that have not reached the 150°W FIR are moved to 5.628/10.048 as they check in, with the last few flights around 1620 being selcalled and moved. This pair of 5.628/10.048 are used until about 1800, when 10.048 normally becomes the local breakfast time primary, although it is not totally unexpected if 13.273 is employed instead. The situation between 1800 and 2000 can change on an almost daily basis, the secondary can either be 13.273, 17.946 or 21.925, depending on the operator. The frequency of 17.946 can become the primary from around 2000, but it is more usual if 21.925 is utilised. From about 2130 until about 0400 Honolulu operates with two primaries; 17.946 is used by United and Delta flights, whilst 21.925 is used by all other companies; the two frequencies are used as each other's secondary. The daytime primary is 21.925 and seems to be quite recently introduced as not long as 21.964 was used as each other's secondary. The daytime primary is 21.925 used by all other companies; the two frequencies are split by the company as follows:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.628/10.048</td>
<td>United, Japanair</td>
</tr>
<tr>
<td>5.667/6.655</td>
<td>Northwest, American, Delta, Canadian, Military, All Nippon, Nippon Cargo</td>
</tr>
<tr>
<td>6.655/5.667</td>
<td>All other companies</td>
</tr>
</tbody>
</table>

North Pacific

The group did not seem to be used so much during March, but on at least one occasion the companies normally heard on 10.057 were heard on 17.904 around 2002.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0400</td>
<td>8.843</td>
<td>5.574</td>
</tr>
<tr>
<td>0300</td>
<td>8.843</td>
<td>5.547</td>
</tr>
<tr>
<td>1730</td>
<td>13.354</td>
<td>8.843</td>
</tr>
</tbody>
</table>

The situation between 1800 and 2000 can change on an almost daily basis, the secondary can either be 13.273, 17.946 or 21.925, depending on the operator. The frequency of 17.946 can become the primary from around 2000, but it is more usual if 21.925 is utilised. From about 2130 until about 0400 Honolulu operates with two primaries; 17.946 is used by United and Delta flights, whilst 21.925 is used by all other companies; the two frequencies are used as each other's secondary. The daytime primary is 21.925 and seems to be quite recently introduced as not long as 21.964 was the primary for North Pacific area flights.

From about 0330 the secondary becomes 10.048 and this becomes the primary around 0400, with all the traffic off 21.925 and 17.946 by 0520. The secondary becomes 5.638 and this becomes the primary around 0400, with all the traffic off 21.925 and the secondary becomes 10.048 as they check in, with the last few flights around 1620 being selcalled and moved.

As stated above for flights between North America and the Hawaiian Islands, Honolulu shares the first two sets of frequencies with San Francisco. During local daytime 13.288 is used from around 1800, with 11.282 as the secondary until 0100 when 5.547 takes over. This becomes primary around 0400 until 1800. The expected night-time secondary would be expected to be 2.869, but for some reason Honolulu always uses 3.413 from its other family, this is generally utilised between 0400 and 1800, when 11.282 takes over.

As stated above for flights between North America and the Hawaiian Islands, Honolulu shares the first two sets of frequencies with San Francisco. During local daytime 13.288 is used from around 1800, with 11.282 as the secondary until 0100 when 5.547 takes over. This becomes primary around 0400 until 1800. The expected night-time secondary would be expected to be 2.869, but for some reason Honolulu always uses 3.413 from its other family, this is generally utilised between 0400 and 1800, when 11.282 takes over.
from the Hawaiian Islands to Japan and points further South stays such that all trans-Pacific traffic stays in the former and all traffic from approximately 40°N to just South of the equator. The boundary between the North Pacific and Central West Pacific is from around 1800 the night-time primary becomes 2.932, the secondary being 8.951 until about 1130 and then 6.655 from then on, or sometimes 8.951 continues straight through; it is not totally unheard of for 5.628 to be used in place of 6.655 on rare occasions. From around 1000 the night-time primary becomes 2.932, the secondary being 8.951 until about 1130 and then 6.655 from then on, or sometimes 8.951 continues straight through; it is not totally unheard of for 5.628 to be used as a secondary for this period. The local early morning period is usually very quiet and any number of combinations of frequencies form 2.932, 5.628, 6.655 and 8.951 can be used, until 8.951 comes into use as an early morning primary around 1900, with 10.048 taking over around 2130.

### Central West Pacific

The Central West Pacific stretches from the Hawaiian Islands in the East across to the Philippines and the East coast of Asia, and from approximately 40°N to just South of the equator. The boundary between the North Pacific and Central West Pacific is such that all trans-Pacific traffic stays in the former and all traffic from the Hawaiian Islands to Japan and points further South stays in the latter. The two main stations in this area are Tokyo and Honolulu, the latter has two families for daytime traffic, 21.985 is used from 2000 for flights in ‘Guam Area’, which includes Islands as far East as the Marshalls. The frequency 13.300 is used from around the same time for flights between the Hawaiian Islands and Asia, mainly Japan. The FIR between Honolulu and Tokyo appears to lie along latitude 27°N and longitude 165°E, although one Reach flight was told to contact Tokyo while passing 21°N 150°E. Traffic from the Guam area usually passes to Tokyo’s control at a point called PD3111.

The other stations in this region are Naha (Okinawa, Manil and Port Moresby. Traffic bound for Australia is passed to Port Moresby at a point called Porec, 5°N 143°E or 4°N 132°E. The boundary with Manila seems to be at 130°E, possibly the same holding true for Naha? I would guess that flights Westbound towards the Philippines are handled on v.h.f. as they get within range and then on to 8.942 if they are continuing without stopping in the Philippines.

As stated above the daytime primaries of 2.198 and 13.300 generally start being used around 2000, although the latter especially can be used anytime from 1800. These two frequencies use the common secondary of 17.904, this can be used for a primary for an aircraft in either areas but it is not unusually. Around 0800 Tokyo moves from 11.384 to 8.903 and Honolulu then uses 11.384 as the night-time primary for both areas, in any case 13.300 is very quiet in the period 0600 onwards. The night-time secondary is 6.532 for both areas also, and from around 2.998 is used as a back-up for flights very close in. This can be used as a primary, mainly for flights to Honolulu, with 6.532 still being used as the secondary.

### Supporting Information

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>10.048</td>
<td>5.628</td>
</tr>
<tr>
<td>2000</td>
<td>10.048, 13.273, 17.904 or 21.925</td>
<td>Any</td>
</tr>
<tr>
<td>2200</td>
<td>21.925 and 17.946</td>
<td>17.946 and 21.925</td>
</tr>
<tr>
<td>0330</td>
<td>21.925</td>
<td>10.048</td>
</tr>
<tr>
<td>0400</td>
<td>10.048</td>
<td>5.628</td>
</tr>
<tr>
<td>0900</td>
<td>5.628 and 5.667 and 6.655</td>
<td>10.048, 6.655 and 5667</td>
</tr>
<tr>
<td>1600</td>
<td>5.628</td>
<td>10.048</td>
</tr>
</tbody>
</table>

Despite 8.951 being allocated to this region I have never heard Honolulu on this frequency and apart from the one night when 2.932 was used in lieu of 10.048 the same holds true for this as well. Tokyo’s daytime primary frequency is always 13.273, this is brought into use at any time from 2230 for inbound flights and remains as primary until about 0400, when 8.951 takes over. However, Tokyo is in no hurry to move traffic off 13.273 and traffic already on that frequency is left on until reaching v.h.f. range of the FIR with Honolulu, which may be as late as 0700. The daytime secondary is 10.048 and from 0315 this is used as a second primary for Japanair, United and Delta flights only, this remains until around 0600. 13.273 has lost its last flight, it is not totally used but one night Honolulu was having difficulties with Qantas and New Zealand flights and had to resort to using 8.903.

Tokyo’s daytime primary is always 13.273, this is started using 2.932 as the secondary for flights very close in. This can be used as a primary, mainly for flights to Honolulu, with 6.532 still being used as the secondary.

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>11.384 6.532 2.998 as back-up</td>
<td></td>
</tr>
</tbody>
</table>

Although allocated to the region, 3.445, 4.666 and 8.903 are rarely used by Honolulu. I would have said that they were never used but one night Honolulu was having difficulties with Qantas and New Zealand flights and had to resort to using 8.903.

### Time

<table>
<thead>
<tr>
<th>Time</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2100</td>
<td>11.384</td>
<td>8.903</td>
</tr>
<tr>
<td>2300</td>
<td>11.384</td>
<td>13.300</td>
</tr>
<tr>
<td>0800</td>
<td>8.903</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>3.455 or 4.666</td>
<td>4.666, 3.455 or 2.998</td>
</tr>
<tr>
<td>1200</td>
<td>3.455</td>
<td>2.998</td>
</tr>
</tbody>
</table>

Both Naha and Manil make a point of not using Tokyo’s frequencies, even as secondaries. During local daytime (2300 onwards) they generally both use 8.903 as primary and 13300 as secondary. If flights call on 11.384 they are generally answered by Naha or Manil and sent to 8.903. Both stations generally use the pairing of 4.666/8.903 during the night. It is not unusual for Manila to use South East Asian frequency of 8.942 as the daytime secondary.

Port Moresby is not heard often, but in the local evening (1000) they are on 8.903/6.532, and possibly 2.998. Seoul is also in this family of frequencies, however they seem to deal with traffic only from Koreanair flights. All flights to and from Korea seem to work Tokyo on v.h.f. whilst overflying Japan and do not seem to revert back to h.f. whilst flying across the Korean Strait. Seoul uses 13.300 during the local daytime.

### Phone Patches

Honolulu seems to use four frequencies for phone patches, namely 21.964, 17.946, 13.384 or 11.342 depending on the time of the day. San Francisco generally uses 17.904 or one of the frequencies in the third or fourth groups of frequencies listed above.
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All JPS DSP filters work off receiver audio so there’s no mods to be done to your rig - just plug into the speaker socket, hook up your headphones or an extension speaker and you are in business.

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<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS700</td>
<td>Discone 70 - 700MHz</td>
<td>£39.95</td>
</tr>
<tr>
<td>LS1500</td>
<td>Wideband vertical antenna 500kHz to 1300MHz</td>
<td>£37.95</td>
</tr>
<tr>
<td>LS1300</td>
<td>Wideband discone 25 - 1300MHz</td>
<td>£59.95</td>
</tr>
<tr>
<td>LSMOBILE</td>
<td>Wideband mobile antenna 25 - 1300MHz,</td>
<td>£19.95</td>
</tr>
<tr>
<td>LSMMAG</td>
<td>3.5&quot; dia mag. mount with cable &amp; PL259</td>
<td>£19.95</td>
</tr>
<tr>
<td>LSMMAG</td>
<td>6&quot; dia mag. mount with cable &amp; PL259</td>
<td>£24.95</td>
</tr>
</tbody>
</table>

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Bristol,
Tel 0272 315263

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

SOUTH COAST
27, Gillam Road,
Northbourne,
Bournemouth,
Tel 0202 577780

WEST
Mitford House
Newcastle Int'l Airport
Newcastle upon Tyne
Tel 0961 860418

SOUTH WEST
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St. Judes
Plymouth,
Tel 0752 607284

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Communications House
Chatham Road
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<table>
<thead>
<tr>
<th>Kit</th>
<th>Assembled</th>
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</thead>
<tbody>
<tr>
<td>AA2</td>
<td>£8.60 £13.90</td>
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<tr>
<td>AA4</td>
<td>£9.90 £27.90</td>
</tr>
<tr>
<td>AB118</td>
<td>£18.40 £25.90</td>
</tr>
<tr>
<td>SPA4</td>
<td>£15.90 £22.90</td>
</tr>
</tbody>
</table>

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ICOM R72E

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HF150

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Monitoring HF Transmissions To and From Aircraft
The How, What, Where and When of Monitoring Aircraft on HF by Colin Goodall

Outside Europe and North America the majority of aircraft reporting is done on the h.f. bands, this is basically because of the distances involved and the lack of local v.h.f. networks. Within Europe the best place to find h.f. transmissions is from Shannon, the Canaries and the Azores. However, outside Europe (and North America) the majority of communications are undertaken using s.s.b. on h.f. The types of transmissions fall into two categories; position reporting by aircraft and weather reports to aircraft. There is one other type of h.f. transmission and that is reports to and from the airline operator company agent.

S.S.B Transmissions

All of these transmissions are made using worldwide agreed blocks of frequencies between 2.5 and 21MHz using upper sideband mode. The nearest to us here in the UK are the communications to and from aircraft crossing the North Atlantic which are made from Shannon in Western Ireland. The North Atlantic is split into five areas for h.f. aircraft communications. It may come as a surprise to you but here in the UK you can monitor most of the world h.f. traffic using only simple antennas and a reasonably cheap radio. What you need is the ability to receive s.s.b. transmissions on the upper sideband and details of when to listen and which frequencies to monitor.

North Atlantic
Entry from Europe into the North Atlantic is controlled by the air traffic control centre at Prestwick in Scotland. Aircraft crossing the UK from east to west, having before take off submitted a flight plan, must make contact with Prestwick before reaching 02°W confirming their flight plan requested route and estimated time of entering the Ocean Control Area. This call is made on v.h.f. 123.95MHz for aircraft registered west of 30°W and 127.65MHz for aircraft registered east of 30°W. The actual tracks that aircraft follow depend on the weather conditions in the Atlantic and are agreed and disseminated by Prestwick a.t.c.c. each day. These routes are then advised to all operators via the a.t.c. telex network (AFTN) and also broadcast from 1130 to 1900 (local) on 133.8MHz. Both Prestwick and Shannon are referred to as Shanwick Ocean Control however, all v.h.f. broadcasts are dealt with at Prestwick and all h.f. broadcasts at Shannon.

From this you will realise that control of all aircraft entering the North Atlantic is undertaken by the a.t.c.c. at Prestwick but the h.f. to and from aircraft is undertaken by radio operators at the unit near to Shannon airport in Western Ireland.

Up until a few years ago, all broadcasts were made to and from the UK with the antennas situated at Birdlip in Gloucestershire. Now the v.h.f. transmissions are dealt with at the CAA sites in the UK and the h.f. transmissions at the Ocean Control Centre site near to Shannon airport.

Communication between Prestwick and Shannon is by direct link for both voice and computer.

Every flight plan received at Prestwick having been completed with the track for the Atlantic crossing is then available at Shannon for updating as each aircraft reports its position. Aircraft having received their Ocean Track clearance continue to travel west under the control of the a.t.c. unit at West Drayton (or Scottish Airways...
also located at Prestwick until they are handed over to the Irish a.t.c. (also at Shannon) half way across the Irish sea the transfer from UK a.t.c. to Irish a.t.c. is made transferring from 133.6 to 131.15MHz.

Depending on the track over the North Atlantic, aircraft use one of the agreed entry points situated around the UK and Ireland. The main entry points are 50°N 8°W called GAPLI; 48.5°N 12°W called OMKO; 44°N 10°W called ACKIL and a string of entry points from 49°N to 54°N all at 15°W. The area covered by v.h.f. by Shannon a.t.c. extends out as far as 15°W due to high power v.h.f. transmitters. A flight from London having transferred to Irish a.t.c. v.h.f. is finally handed over to Shanwick Oceanic control before reaching the entry point so that communication can be effected and the time for the entry point confirmed. The Irish a.t.c. unit give the aircraft the primary and secondary h.f. frequencies to use.

Frequencies

Controllers at Prestwick and the radio operators at Shannon use a range of h.f. families for communication with aircraft; these follow a simple system based on that part of the Oceanic Control Area being flown from and the origin of the aircraft. This allows a balanced loading across the frequencies which are:

<table>
<thead>
<tr>
<th>NAT A</th>
<th>NAT B</th>
<th>NAT C</th>
<th>NAT D</th>
<th>NAT E</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.016</td>
<td>2.899</td>
<td>2.972</td>
<td>2.971</td>
<td>3.476</td>
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<tr>
<td>5.598</td>
<td>5.616</td>
<td>5.649</td>
<td>5.675</td>
<td>5.682</td>
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<td>8.825</td>
<td>8.864</td>
<td>8.879</td>
<td>8.891</td>
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<tr>
<td>17.946</td>
<td>17.946</td>
<td>17.946</td>
<td>17.946</td>
<td>17.946</td>
</tr>
</tbody>
</table>

NAT A, standing for North Atlantic A, covers all southern routes for all aircraft; NAT B is for central and northern routes for aircraft registered west of 30°W; NAT C is for central and northern routes for aircraft registered east of 30°W and NAT D covers northern routes which are outside the NAT organised track system. NAT E is used in southern areas by New York and Santa Maria a.t.c. units only.

This means that on 5.649MHz for instance you will hear British and European flight crews mainly and on 5.616MHz you will hear American flight crews mainly. Fig. 2 shows these frequencies pictorially.

With this information and the knowledge of when aircraft actually travel across the North Atlantic we can easily see the best times to monitor the two way traffic.

Basically, aircraft travel across the Atlantic, from Europe to America from about 1000 to 1900UTC and from America to Europe from 0100 to 0800UTC. This is so that arrivals in America are during the day and departures from America can be made late in the day with arrivals in Europe early the next day; the so-called red eyes specials. Keep in mind that the time difference between the UK and the eastern USA is five hours and the average flight time from London to New York is 7.5 hours and the return flight is 6.5 hours, this is because of the western jet streams bringing aircraft to Europe more quickly.

As an example take British Airways flight BA215 from Heathrow to Boston which departs LHR at 1845 and arrives in Boston at 0010 (1910 local). This aircraft returns at 0200 (2100 local) arriving back at LHR at 0830. The transatlantic part of the flight is about four hours westbound and three hours eastbound from which we can expect to monitor this flight on h.f. between 1745 and 2145 outbound and 0400 and 0700 inbound. The remainder of the flight being under v.h.f. control by the UK, Eire, Canada and the USA.

Fig. 2: Shanwick frequency areas.

Which Frequency

As the radio operators at Shannon have to maintain contact with aircraft they do the work for us in selecting the best frequencies. Generally during daylight hours they use the 5MHz groups with the 8MHz groups in the evening and the 2MHz groups in the early morning. But, please remember, this is a general statement. Usually in the afternoon Shanwick will use 5.596, 5.616, 5.649 and 4.675MHz but as evening arrives they tend to change to 8.825, 8.864, 8.879 and 8.891MHz. In the early hours, flights are generally handed over from New York and Gander on the 5MHz group and Shanwick work the last part of the crossing on the 2MHz group.

Who Controls What

The North Atlantic is divided into control areas which are administered by Shanwick, Iceland, Santa Maria, Gander and New York. The areas are shown on the enclosed map. As a flight nears the crossover point, the aircraft reports its position to the controlling authority with a copy to the next area authority; for example, the BA125 going west reports at 15°W to Shanwick, reports at 20°W to Shanwick with a copy to Gander and reports at 30°W to Gander Radio. A further report is made to Gander Radio at 40°W and then at 50°W the report is made to Gander a.t.c. on v.h.f. 126.9MHz.

What is Reported

The crossing clearance previously given by a.t.c. at Prestwick, includes specific points for the flight to follow on the crossing depending on the track being flown for example; 52°N/50°W; 51°N/20°W; 50°N/30°W; 49°N/40°W; 48°N/50°W with landing at Newfoundland. At each of these exact points a report is transmitted from the aircraft to the controlling authority radio station which consists of:

Flight reporting number, flight level, position and time now, the position and estimated time for the next reporting point and the position for the following reporting point, followed if previously requested by a weather report.

EXAMPLE:

"Shanwick, Shanwick, this is Speedbird 215 on 5649" (Wait for Shanwick to reply) "Shanwick Speedbird 215; 52 north is west at time 18.20, flight level 350, 51 north, 20 west at time 18.55, 50 north, 30 west next"

This is repeated back by the Shanwick radio operator and as this is the first contact between Shanwick and BA215 the Shanwick operator will ask for the SELCAL code for check. The SELCAL code is a 4-character code that this transmitted from the ground to the aircraft and upon receipt causes a bell or a gong to sound on the flight deck thus warning the flight crew to call the ground station. This alleviates the need to keep listening all the time just in case your aircraft is called.

Shanwick will transmit the SELCAL code and provided that it is received correctly, then BA215 will report "SELCAL received, SELCAL watch". The flight continues westward.

Flight levels are expressed in thousands of feet but the last two digits are omitted thus flight level 350 is 35000 (thirty five thousand). Flight levels are controlled by a.t.c. Even numbered flight levels are used westbound and odd
Weather for Aviators

Flight crew need weather reports so that they can operate safely and on time to their destination.

Within Europe there are many transmissions on v.h.f. giving actual weather reports and forecasts for up to 12 hours ahead. These are all called VOLMET and for the North Atlantic there are similar broadcasts.

Shannon Volmet broadcasts between the hour and 25 minutes past the hour with repeats from 30 minutes past the hour until 55 minutes past the hour. These transmissions are now broadcast using a digitally recorded voice that puts together the appropriate words and numbers for each location reported. Two years ago it was a real person reading the reports. These transmissions are on 3.413, 5.505, 8.957 and 13.264MHz s.s.b. Actually, these broadcasts are a perfect guide to reception conditions.

There is also a New York Volmet and a Gander Volmet which are both broadcast on the same frequencies; 3.485, 6.604, 10.051, 13.270MHz also s.s.b. at these times, from 00 to 20 minutes past the hour - New York Volmet from 20 to 29 minutes past the hour - Gander Volmet from 30 to 50 minutes past the hour - New York Volmet from 50 to 59 minutes past the hour - Gander Volmet

The RAF transmit Volmet on 4.722 and 11.200MHz continuously which again is a good guide to reception conditions. There are other volmet transmissions that can be received here in the UK, such as those from Oakland, Hong Kong, Tokyo.

Company Traffic Reports

All airline operators like to know where their aircraft are which is easy within Europe as distances (and therefore journey times) are shorter and communications are very good.

Out over the major oceans of the world requires something extra in the way of keeping touch. The main method is (you guessed) h.f. using s.s.b., which, can be used from one side of the world to the other and is used in this way every day.

Some airlines (like British Airways and KLM) have their own discrete frequencies; others use commercial radio operators like Berne ASeradio, Stockholm Radio and Portishead Radio. These broadcasts tend to be departure and arrival data from aircraft and weather information to aircraft.

Charts and Frequency Lists

The next nearest area for us to monitor is Africa. Throughout this continent h.f. s.s.b. is used for aircraft reporting. Each country has an air traffic control organisation but only a few have v.h.f.; Egypt and South Africa being two that do have both v.h.f. and h.f.

As for the Atlantic, Africa is divided into geographical areas for which there are agreed frequencies in use. These areas are called Africa 1, Africa 2, Africa 3, Africa 4 and Africa 5. For this purpose Africa 1 is known as AFI 1 and Africa 2 as AFI 2 and so on. A map showing the five areas is at Fig. 3.

The African frequencies are:

AFI 1
AFI 2
AFI 3
AFI 4
AFI 5
3.452
3.519
3.467
2.878
3.476
5.530
5.652
5.658
5.493
5.634
6.673
8.894
11.300
6.586
8.879
8.861
13.273
12.298
8.903
13.306
13.357
13.294
17.961
12.294
17.951
17.961

Additionally, the frequencies for AFI 3 and AFI 5 are also used for the Indian Ocean, so you will hear traffic to and from India.

As most countries in Africa do not have telex facilities or fax systems, flight plans are disseminated over the very same radio frequencies by the radio operators.

For example, flights from Nairobi to western Europe all leave in the late evening and their flight plans can be heard being sent from Nairobi to Addis Ababa and to Khartoum about one hour prior to the actual flight reporting in.

The best frequencies to use in the evening are 5.658MHz for some African flights and a lot of Indian flights; 11.300MHz for most of African flights from south to north via the eastern side of Africa and 8.861MHz for West Africa, particularly flights to Europe passing through the Dakar control area and the Canaries.

This then is just an outline of h.f. aircraft listening which can be become a complete hobby in itself. I have heard of one person who monitors the SELCAL codes and thus knows where any individual aircraft is at any one time.

Try h.f. s.s.b. and you will be surprised at the distances from which you can hear transmissions both from the ground station and from the aircraft.
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- Lock out
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The Signal R-535

It is evident from readers' letters to Short Wave Magazine, and from the popularity of the Airband column, that one of the greatest areas of scanning interest is that of listening to the v.h.f. and u.h.f. aircraft bands. Bob Sayers reports on his long-term use of the R-535 and some modifications worth considering.

Listeners living some distance from a large city area with all it's p.m.r. and other signals, or from the coast with it's marine activity may hear few signals in those parts of the band. There are few places where some traffic cannot be heard on the aircraft bands. Indeed, in the case of the military u.h.f. band, it is often those most remote and unpopulated areas of the country which are the most active.

In the past, scanning receivers for the aircraft bands have generally been much of a design / perforomance / cost compromise. Even though the primary mode used in both of the bands is a.m., quite a number of the lower-cost hand-held receivers (normally identifiable by having a simple analogue tuning scale, with no scanning or memory features) cover the v.h.f. band and as an extension of the 88-108MHz f.m. broadcast band, leaving the user to try to receive a.m. transmissions via a f.m. discriminator. A further aspect of many so-called aircraft band receivers is their frequency coverage, or rather their lack of it. Virtually all of the models on the market only cover the v.h.f. band, which is used for navigation system transmissions (at the low-frequency end) and by civil aviation, and by light private aircraft. It is also used by military aircraft when operating in civil controlled airspace, and to a limited extent by military aircraft under military control. Most communications between military aircraft and military airfields, however, occur in the u.h.f. band.

Even scanning receivers providing a true a.m. facility may not give good results in the airbands, since the design of the a.m. circuitry, particularly the filters, will probably be chosen for the reception of a.b. business radio, or even broadcast signals. The choice of filter in an airband receiver can be fairly critical, since in many parts of the world where aircraft travel along a designated corridor or route, the 'ground' station may in fact have quite a number of transmitter sites along the route, all operating on the same apparent frequency. To avoid mutual interference between the stations, adjacent transmitter sites have their actual frequency offset either higher or lower than their published frequency. Thus, if the local ground station to which you listen is offset, a choice of filter which is too narrow is likely to result in hearing either the aircraft or the ground station, but not both, even though both maybe quite close to you. In addition, by international agreement, aeronautical users have now adopted a 12.5kHz channel-spacing scheme. Receivers not designed to provide this bandwidth will certainly be subject to adjacent-channel interference, and in areas of high aircraft activity may well be virtually useless.

The answer to these problems, if you're serious about the airbands, may well be a dedicated airband scanner. If so, there is little better choice than the models produced by the Signal Communication Corporation, of which the R-535 is the top-of-the-range model, used by many pilots and 'professional' users as a standby receiver. Although on the market for several years now, the R-535 is still regarded by airband enthusiasts as the best scanning receiver for the job. The receiver covers only the two aircraft bands, namely 108-142.975MHz and 220-399.995MHz, and has a search facility, plus sixty memories which can be programmed with any mixture of v.h.f. and u.h.f. frequencies. Channels can be locked out, or a selected range of memories selected for scanning, as usual.

A first glance at the receiver may be quite a surprise, since it resembles no other scanner on the market. A flat, off-white front panel approximately 165 x 50mm contains, in addition to the usual volume and squelch controls and antenna and earphone sockets, a narrow I.C.D. display and seven flush push buttons, with unfamiliar labels such as left, right, up, and down arrows. To anyone used to the normal scanner keypad, it is hard to believe initially that a frequency can be entered. Switching on, powers the set up in the 'manual' mode, which is a display such as 'MANU 56ch 276.050MHz' and the first impression is that the single line I.C.D. backlit in yellow, is very easy to read. On looking closer, it is possible to see that there is a cursor under the '6'. Using the up or down arrow key, changes the channel number up or down by one place, or by moving the cursor one place left first, by ten places. It is also possible to move the cursor further to the right, below the indicated frequency, and again use the up or down arrow keys to change that digit of the frequency. Once selected, the frequency can be programmed into the displayed channel by pressing 'SHIFT' and 'ENTER' simultaneously.

The 'MODE' key steps the receiver though the modes MANUAL, described above; SCAN, where a range of programmed channel numbers can be selected to be scanned automatically (and a most important point is that the R-535 scans particularly fast - even scanning through 60 memory channels which has just been heard), and a SEARCH mode, where the first display message asks for the 'Start' frequency, the next for the 'End' frequency and the third for the frequency step size. A final press of the 'Enter' key commences searching in the usual way. When programming any memory of search frequency, the left and right arrow keys have a dual function, in that when used in conjunction with the 'Shift' key, they switch the receiver between v.h.f. and u.h.f. bands. The whole process is far more difficult to describe than to actually carry out, it is extremely convenient in practice, and certainly contributes to the neat, uncluttered and compact front panel of the R-535.

The receiver, which is approximately 133mm deep, has a top-mounted loud speaker, and is supplied with an antenna which telescopes out of the top of the case, a switch in the rear panel selecting either this antenna and a SO239 socket on the rear panel, or the BNC socket on the front panel. A car mounting bracket is also supplied, and it is most important to only use the supplied screws to fit this bracket to the receiver - internal components are very close to the mounting, and the use of longer screws will almost certainly damage these. There is a further socket on the rear panel for the 12 volt supply, and a switch to lower the intensity of the I.C.D. backlight, which can considerably increase usage time when operating from the battery supply.
When talking of airband scanners the subject of batteries soon arises, since one of the main attractions of such a receiver is to take it along to the local airfield, particularly if there is an airshow on. The R-535 again differs from most small scanners, in that there is no provision for internal batteries of any sort. Instead, Signal Communications offer a rechargeable NiCad pack, which is the same width as the receiver itself, and bolts across the bottom of the scanner with two small supplied brackets. A soft vinyl carrying case is also available, along with a range of 110 and 240 volt power supplies, and a charger for the NiCad pack. If using the set portable, a helical whip antenna is much more convenient, and avoids damaging the supplied telescopic whip. If using a helical, however, be prepared to buy two for the two frequency bands - the writer's experience is that a helical that is efficient over the v.h.f. airband is usually almost as bad as no antenna at all on u.h.f., and vice versa! When the scanner is not being used portable, the supplied whip does an excellent job of covering the two bands, although a good external antenna mounted on a rooftop provides the extra coverage and signal strength that would be expected.

The receiver also has a port for external computer control, unfortunately requiring an additional interface to match signal levels to the required RS232 serial ports of most computers. Software for this application is also available, which enables choices of up to 60 memory channels to be stored as 'pages' in computer memory. This is a most attractive feature, since it means that the nest channels for a particular airfield or frequency-visited location can be stored in the computer, and loaded into the scanner when visiting there. On returning home, the whole 'page' of home frequencies can once again be loaded into memory. Examples of the programming commands are provided in the installation manual, making it very easy for the user who is familiar with a language such as BASIC to produce their own control program.

In Practice?

Here I must say that there is no quick magazine review - I have had my own R-535 for two years now, and it is in almost daily use. During the two years, I have taken the opportunity to compare its performance with a number of other airband receivers and wider-coverage scanners, and have still to find one to better it for airband use. There are a couple of small criticisms however, although none related to the receiver itself. The soft carrying case, which most readers will regard as essential, is no 'long' enough when the receiver has the battery pack attached, and does not cover or protect the front panel of the receiver adequately, and certainly does not protect the receiver from all the rain etc., when used portable. The NiCad pack, in spite of its relative size, does not power the receiver for a particularly long time, and needs to be used with care - at an Air Show, I always power the scanner from the cigarette lighter socket whenever possible, and use the battery only when actually away from the car. When the battery pack is fitted, rapid access to the 12 volt supply socket is also lost, which is annoying if the battery suddenly goes flat! The fitting of the battery pack also prevents convenient access to the external-control port, although given the small size of the scanner, this was probably difficult to avoid.

Sum Up?

If your scanning interests are principally airband monitoring, it is difficult to see how the choice of an R-535 can be beaten. It is compact, and offers a performance quality which is only matched by actual aircraft equipment. Many readers who are perhaps already satisfied with their own f.m. only scanner will probably be keen to add an R-535 to provide airband coverage.
### Modifications to the R-535 Airband Receiver

The Signal R-535 scanning receiver is generally though by enthusiasts to give the best combination of size, features and performance for aircraft band only use. In spite of the high regard with which it is held, there are however a few irritating faults, although none of these relate to the receiver itself, but more to the accessories. This article shows how these faults can be almost eliminated, at virtually no cost.

### The Soft Carrying Case

The soft carrying case, which most readers will regard as essential, is not long enough when the receiver has the battery pack attached, and does not cover or protect the front panel of the receiver at all well. The case van, however be 'lengthened' fairly easily, by cutting it and inserting a strip of material, the strongest and easiest to obtain of which is fabric tape. Before starting work, however, please read this article through completely, and decide whether you wish to make the changes as described. The dimensions below assume that you will be altering the battery packets, although it is easy to re-measure if you do not wish to carry this out.

Materials required are a fairly substantial sewing needle, a reel of black thread (not cotton) and a 500mm length of fabric tape, of a colour to match the existing case. The best tape is known as 'Petersham' which has sewn edges, and will not fray after use. It can be obtained from drapery shops or a drapery stall on a local market, in several widths, the 38mm (1.5in) wide tape being the best.

First of all, take your existing soft case, and cut it in half! The best way of doing this is to stand the receiver in it's case, upright on its end, on a table, and to measure and mark all round the case a distance of 70mm up the case (Fig. 1). Place a mark either side of this line on the inside of one side of the case, so as to ensure that the correct sides of the two halves line up once the case is put back together again.

Remove the receiver, and cut carefully all round the case with a pair of sharp scissors. When sewn together again, the tape with which the case is being 'stretched' will be on the outside. Although it might be thought that adding it on the inside might be better, this would leave the two cut edges of the original case showing which would look most untidy. In any case, the receiver fits it's case so snugly that there is insufficient room to add further material inside.

Take the bottom half of the case, and starting at one of the seems between a side and the bottom of the original case, sew the tape to the cut edge of the original case, overlapping it by about 5-8mm (Figs. 2 & 3).

It is best to 'tack' all round the join first to hold the two halves in place, and then sew it with neater stitches. There should be a continuous row of neat stitches all round the case, in order to retain sufficient strength.

The next step is to sew the other edge of the tape to the other half of the case, again leaving an overlap. You are aiming to attach the tape so that the cut edges will end up approximately 28mm apart. Again, tack the joint first to align it and then resew with neater, stronger stitches.

The receiver can now slide carefully back into the case and if, all is well, the front panel should now sit considerably lower down in the case, so that the panel, controls and displays are protected far more.

### Rear Panel Improvements

The R-535 has a large accessory NiCad pack, unique in that it attaches to the rear edge of the receiver by small brackets. Unfortunately, this otherwise convenient idea is rather let down by the fact that once fitted, the battery pack then obscures access to the external power and computer interface connectors on the rear panel.

With very little work, this can again be improved upon. You will require four nuts and bolts of approximately 3.5mm diameter, and a small piece of scrap plastics material. My cheque card was renewed just as I was about to carry out this work, and it would be difficult to find more suitable material! You will need a 2.5mm power socket with 'cut-out' contacts, and a right angled (this is important) 2.5mm power jack to fit the receiver socket. Undo the small screws that join the brackets on the receiver to those on the battery pack. Cut two pieces of cheque card 39mm by 29mm, and drill four small holes in them so that instead of the brackets being screwed together, each bracket is now screwed to the plastics, the original holes in the brackets now being 15mm apart (Fig. 4). The original screws can be used to screw the plastics to the receiver brackets, the four new bolts holding it to those on the battery. A further small piece of plastics or metal is formed into a right-angle, and attached to the other brackets on the 'power-socket side', of the receiver (Fig. 5). This should have a hole drilled in it to mount the 2.5mm socket, so that the outside edges of the socket is flush with the similar socket in the battery pack. Wire the plug and socket as shown in Fig. 6.

If you use the computer interface socket, then the power socket bracket should be made longer, so that a larger hole can be cut in the bottom of it to accept a 5-pin DIN socket. If you can obtain a PCB-mounting DIN socket with long pins, so much the better, since these pins can then be inserted in the original DIN socket in the receiver rear panel. If not, you will have to extend the DIN connections by using a DIN plug, the body of which will probably have to be discarded due to lack of room.

The final step is to mark the positions of all the new sockets you have fitted, and carefully cut holes in the soft case (a pair of small sharp pointed scissors are ideal). Try to centre the holes over the pin of the power connectors rather than the whole body, so that you can cut the smallest possible hole to insert the plug.

### Availability

I must thank Lowe Electronics of Chesterfield Road, Matlock, Derbyshire DE4 5LE for providing both my own R-535 and also the additional information for this review.
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Short Wave Magazine, March 1994
Antennas fitted to most airband scanners are, at best, a compromise between electrical performance and convenience of use. Peter Hirons G1CEI, looks at a cost effective way of improving the reception when home based.

The Problem

The smallest passive antenna that is electrically efficient is one quarter wavelength (λ/4) long. Unfortunately, even a λ/4 antenna for airband is around 600mm long - too long to be safely used with a hand-held receiver. Manufacturers are aware of the inconvenience factor and therefore fit most portable receivers with the well-known 'rubber duck' type of antenna which is, at best, a compromise with inferior performance to that of a λ/4.

The lesser sensitivity will not be a problem when using the radio outdoors close to airfields with relatively strong signals around. It is when we want to monitor airband signals indoors from home that the lack of sensitivity becomes noticable.

The Solution

As with domestic Band 2 radios and televisions in poor reception areas, one solution is to use an external antenna, mounted as high as possible. This requires a long length of coaxial cable, resulting in signal loss and noise pick-up. Amplifying at the receiver end of the cable also amplifies the noise, often resulting in little apparent improvement. Amplify the signal at the antenna, so that by the time it reaches the receiver there is still a significant improvement, is the answer to the problem.

What You Get

The Howes Communications AB118 Active Antenna kit covers the v.h.f. airband and gives a useful gain across the band. The circuit consists of a single-stage mast-head amplifier, using a high gain integrated circuit. Power is fed up the coaxial cable. The antenna is the well-known J-pole configuration constructed from a length of 300Ω ribbon-cable (provided in the kit).

The kit contains three circuit boards, although one only needs four pins soldering in. The next board contains the active amplifier and is directly attached to the bottom of the antenna. The third board contains decoupling circuits and the switched attenuator.

You will need to provide two lengths of coaxial cable - one to go from the antenna to the control board and one from the control board to your receiver, together with a suitable connector. Two lengths of wire and a power source are also required. For a permanent installation the instructions suggest mounting the antenna inside a 2m length of 40mm diameter plastics waste water pipe.

Construction

The components come neatly packed and checked out correctly. The well-presented and clear instructions were followed with no problems, although identifying the 0.125W resistors might prove difficult for those with less than perfect eyesight. Some of the solder pads were quite small and a soldering iron with a tip of no more than 3mm diameter is essential.

I would have liked terminal pins for the power connectors, rather than soldering the wires directly onto the pads, but this is not a serious problem.

Performance

It was not possible to measure the gain of the unit exactly, however using the S-meter on a Yupiteru VT-125 ii airband receiver showed a significant increase in signal. As a test, with the power disconnected, I shorted the input to the output and noted the signal level reading. Looking at the increase in level with the shorting link removed and power applied, and comparing this with the change in level when the 10dB attenuator was switched in or out would indicate at least 15dB of gain.

On air from my home near Winchester the antenna pulled in many signals from aircraft using Southampton and Bournemouth airports, plus some that I expect were routed in or out of Heathrow. While just letting the receiver scan through the end of band I also received an extremely strong signal in the 137MHz weather satellite band for a few minutes, obviously one of the 'birds' passing over.

Conclusions

I would have no hesitation in recommending this kit to anyone able to solder reasonably well. Those who cannot, or do not wish to, undertake construction of the complete kit can buy the circuit boards ready assembled, only requiring the cables fitting. If the antenna was finished as recommended by placing it inside a length of drain pipe and mounted as high as possible then some quite remarkable results should be achievable.

Thanks go to C. M. Howes Communications, Eydon, Daventry, Northants NN11 6PT. Tel:(0327) 60178 for providing the sample kit and to Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE Tel:(0705)662145, for the loan of the receiver.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>118 to 137MHz</td>
</tr>
<tr>
<td>Gain</td>
<td>≥ 15dB ±2dB over the range</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>&lt;3dB</td>
</tr>
<tr>
<td>3rd Order Intercept</td>
<td>+15dBm</td>
</tr>
<tr>
<td>Attenuator</td>
<td>Nominal 10dB switched</td>
</tr>
<tr>
<td>Power requirement</td>
<td>12 - 14V d.c. @ &lt;20mA</td>
</tr>
<tr>
<td>Price (kit)</td>
<td>£18.80</td>
</tr>
<tr>
<td>Price (Assembled PCB modules)</td>
<td>£25.50</td>
</tr>
</tbody>
</table>
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Short Wave Magazine, March 1994
Listening to the way pilots and controllers talk to each other by radio is confusing. Most of what they say seems to be coded as numbers! Godfrey Manning G4GLM hopes that, by the end of this article, it will all make sense to you.

You need no longer be bewildered by an exchange such as, "Speedbird 457, 25 miles to run, descend 3000 on 1012, report passing 40." answered by "457 leaving 60 for 3000 on 1012." The easiest way to get to grips with any subject is to break it down into sections, so here goes. Ready for departure?

Callsigns
The firm, clipped, experienced pilot's voice seems to become a habit that even affects their everyday speech if you listen carefully. In the same way that an accent can give away someone's origin, the subtle intonation with which pilots speak often makes them identifiable if you know what you're listening for. This comes about from the need to speak information accurately and concisely. On v.h.f. or u.h.f. the clear channels allow quite rapid speech to remain intelligible but h.f. is subject to interference and fading.

To make things easier, pilots worldwide use the same phonetic alphabet that radio controllers are supposed to. The 26 letters of the alphabet are each represented by a word that begins with that letter (Alpha, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu). "SWM" would be spoken as "Sierra Whiskey Mike." The words are more distinct than individual letters (try distinguishing "B" from "D" over the telephone)! and there are only 26 to choose from if clarity is poor. The intention was that these words remain distinct regardless of the speaker's accent.

When contacting a controller, the flight identifies itself by callsign. The registration would be simple enough, e.g. G-ASWM becoming "Golf Alpha Sierra Whiskey Mike." (no dash) or, when no confusion could arise, "Golf Whiskey Mike." Commercial and military flights are likely to have dedicated callsigns; flights are likely to have dedicated callsigns; Midland 294 is obviously a British Midland flight but Speedbird stands for British Airways, Shamrock for Aer Lingus, and there are other special cases. One cause of numbers is if the Midland flight just said "294" when answering that the controller had been received and understood. Another requirement is for the pilot never to say "Yes" or "No" (rather like a quiz game on TV many years ago) but instead to answer "Affirmative" or "Negative" (please, not the American "Affirm" - "A" as in "Hay").

Frequencies
Numbers also receive a little help. They are spoken as individual digits (the Americans transgress here) with the word "Decimal" indicating a decimal point. The pronunciation is exaggerated thus: Wun, Too, Tree, Fower, Fife, Six, Seven, Ait, Niner, Ze-Ro, Tausend. The emergency frequency is thus "Wun Too Wun Decimal Wun Fife" and nobody says "Megahertz" because they all know that's what they mean.

So immediately we come to our next number: the frequency of a radio station. When the controller says to "Call" or "Contact" someone on a number, then the pilot tunes the aircraft's communication radio to the given frequency. Readers of SWM will be familiar with this concept, as it's the same frequency that you would select on any radio set. Basically, the frequency ensures that the particular station as required is tuned in rather than some other unwanted station.

Squawk
Modern (secondary surveillance) radar is enhanced by receiving a signal from the aircraft's transponder. The radar sends out an interrogation pulse, and then switches to receive; if a transponding aircraft is in the line of the pulse's direction of travel, then it transmits a reply which appears on the radar screen.

Two numbers are coded in the reply: a four-digit identification (squawk) and the altitude. When a controller says "Squawk 4212" the pilot sets this code on the transponder; the code then appears alongside the correct target on the radar screen, and the controller is now sure which target belongs to which aircraft. To make really sure, the aircraft can "Squawk ident" in which case, in response to pressing a button in the cockpit, the radar image of that aircraft briefly flashes.

Where Am I?
Two numerical values help when establishing position and they are distance and bearing. Distance is easily quoted as so many miles (actually nautical miles where 1nm is now internationally defined as 1852m) from a particular geographical place, reporting point or beacon. During a radar approach, the distance to touchdown will not be along a straight line but the controller can nevertheless estimate it when watching the plan view on a radar screen.

Bearings are in degrees, familiar from the protractor you were made to use in school geometry lessons. A complete circle is divided into 360° but in our case there is one other thing to remember. Our "protractor" is always set with the 0° line pointing to magnetic North (so that makes due East at 90° from the centre of the protractor). The idea is to imagine a map, with the protractor placed on top. The centre of the protractor is placed at a fixed point (perhaps a beacon); 0° is pointed due North; and then a line is imagined from the centre of the protractor to the position of the aircraft. Where that line crosses the curved outer edge of the protractor, the bearing of the aircraft from the fixed point can be read off. Beacons that do this automatically are called v.o.r.s and in this case the bearing line on which the aircraft lies is called a radial.

You could also place the centre of the protractor at the aircraft's position and rule an imaginary line along the length of the
aircraft's fuselage; keep drawing this line until it crosses the curved outer edge of the protractor. This angle is the heading of the aircraft - i.e. which way (in degrees) the nose is pointing relative to North. Is the aircraft pointing to the South? Then the heading will be 180°.

**Altitude**

A typical report to Air Traffic Control consists of callsign, position, heading and altitude. So, I say "Shortwave 168, 25 miles to go to the Bovingdon beacon, heading 140, 2000 feet on 997" you will now understand all but the last bit. Altitudes require two separate numbers: what the altimeter actually reads (2000 feet in this case) and what it is set to (997). It surprises people that an altimeter needs setting at all. Visitors to my Museum are horrified when I hand them an altimeter, literally reading zero, and then change the reading just by turning a knob. And their feet didn't leave the ground! The trouble with altimeters is that they aren't - they're not able to measure altitude. Instead, they measure the air pressure outside the aircraft and convert this to altitude. We can get away with this trick because pressure varies with altitude in a known way: for example, climbing from sea level (zero altitude) to 18000ft halves the pressure.

The next problem with air pressure is that it changes slowly according to the weather. Put an altimeter on your desk and watch it change its reading over several days - just like a barometer. That's because it really IS a barometer! To set an altimeter correctly requires reference to a barometer as part of the pre-flight checks. The controller will give you a QFE barometer reading (spoken, of course, as "Quebec Foxtrot Echo") which is an aeronautical shorthand recognised internationally. Set this (e.g. "QFE 997") on the altimeter and it will read zero when parked on the apron - or it will read height above aerodrome whilst in flight (such as on final approach). The number is in millibars (mB); 1000mB = 1 bar = the pressure due to the weight of the atmosphere as found at sea level (= 29.53in Hg).

QNH is more useful, because when set on the altimeter it provides a reading of height above sea level (true altitude). Looking at a map, the nearest mountain-top is also shown with its height above sea level; so now you know if you have sufficient altitude to fly over it rather than crash into it! At great altitudes (over most of the UK, 3000ft is enough) precise altitude doesn't matter. Flights up here are too high to be bothered by the underlying terrain. What really matters is that aircraft don't crash into each other. If I'm at 5000ft, and you are coming towards me at 6000ft, I'll pass beneath you with a safe 1000ft vertical separation. Unless, of course, one of us has set our altimeter wrongly in which case we might unwittingly be on collision course! Above the 3000ft transition altitude, everyone sets the same on their altimeter so as to prevent this from happening and that something is 1013.25mB (which everybody forgets is called the QNE). Other countries now talk about hectopascals which sounds rather grand if not confusing; don't worry, these are exactly the same as mB. The only really different ones are - you guessed it - the Americans who set their pressures in inches of mercury (in Hg), the standard setting 1013.25mB being the same as 29.92in Hg. Whichever is set, we no longer talk about height or altitude: instead we round the altimeter reading to the nearest hundred feet and express the flight level (FL). So 24500ft is actually FL245 (or, if you prefer, 245 hundreds of feet).

When no ambiguity arises, pilots often cut corners by saying "Passing 90 for 60" meaning descending through FL90, on the way to the required flight level of FL60. Strictly, this is slack as the pilot should explicitly say "Flight level" where appropriate.

**Airspeed**

I know what you're thinking. This is going to be an easy one: it tells me the speed of the aircraft just like a speedometer tells me the same about my car. Sorry to disappoint you: wrong! Airspeed indicators display, would you believe, indicated airspeed. This is measured in knots (nautical miles per hour). The reading is produced by the headlong rush of the aircraft through the air. The faster the aircraft goes, the more the air is rammed down a forward-facing blind-ended tube (called a Pitot head). More ramming causes more pressure in the tube, so the airspeed indicator is in fact another sort of pressure meter! Indicated airspeed tells us how much effect the headlong rush through the air is having on our aircraft. Too fast, and the airstream will pull bits off the airframe. Particularly vulnerable are the undercarriage and flaps, but in extreme cases the wings or tail surfaces can be pulled apart! Close to the ground, indicated airspeed is a good estimate of actual speed through the air (true airspeed). High up, the air is thinner and has less effect for the same true airspeed. True can be calculated from indicated if the altitude and outside air temperature are known (this latter is measured in degrees Celsius).

Unfortunately, the air through which you are flying is itself on the move (it's called wind). Speed through the air may be quite different to speed over the ground.

Radar controllers see the movement of the aircraft over the ground, but there's no point in telling the pilot what groundspeed to aim for - there usually isn't a cockpit instrument that displays this! Instead, the controller will suggest an airspeed (and heading) and waits to see what happens to the movement of the aircraft relative to the ground. This gives a clue as to further alterations in airspeed and heading.

Now look back to the beginning of this article to see if it makes more sense now. If you have any questions, I would be delighted to answer them through my regular Airband column, which you will find elsewhere in this magazine.

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**Abbreviations**

<table>
<thead>
<tr>
<th>ft</th>
<th>feet</th>
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<tbody>
<tr>
<td>h.f.</td>
<td>high frequency</td>
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<tr>
<td>m</td>
<td>metres</td>
</tr>
<tr>
<td>nm</td>
<td>nautical miles</td>
</tr>
<tr>
<td>u.h.f.</td>
<td>ultra high frequency</td>
</tr>
<tr>
<td>v.h.f.</td>
<td>very high frequency</td>
</tr>
<tr>
<td>v.o.r.</td>
<td>very high frequency</td>
</tr>
<tr>
<td>C7k1110113</td>
<td>omni-directional radio range</td>
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</tbody>
</table>
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Short Wave Magazine, March 1994
Every time there is a Space Shuttle mission, the SWM office receives a number of calls asking for information on how to receive the communications between the Shuttle and Mission Control. Keith Mellor has submitted this article which should answer all your questions.

Short wave listeners who have a receiver with single sideband (s.s.b.) capability can share in the excitement and fascination of the Space Shuttle missions, through listening to the relay of the Shuttle and Mission Control audio by WA3NAN. This is the amateur radio station of the Goddard Amateur Radio Club (GARC) run by employees of the Goddard Space Flight Centre in Maryland, USA.

The relay of the communications begins approximately one hour before launch and apart from the occasional breaks, continues right through to the landing of the Shuttle.

You can hear all of the action as it happens, with a NASA official at Mission Control, Houston, providing explanations and additional information. It can be fascinating to listen to the astronauts as they carry out their work, such as deploying a satellite or performing experiment. Sometimes they can be heard describing their view of the Earth, the countries they are passing over and the location of electrical storms.

For full information on imminent Shuttle flights it is wise to monitor the news bulletins and Magazine Show programmes of the Voice of America, especially in order to be forewarned of the actual date and time of the next launch. Spaceflight magazine produced by the British Interplanetary Society is also a useful source of information.

### Pre-Launch Preparation

Your listening enjoyment can be increased by setting up a 'mission monitoring station' in your radio shack. The walls can be adorned with suitable space pictures, perhaps from the Space Shuttle itself, to create the right atmosphere and to provide visual aids to the full appreciation of the events taking place. Otherwise, books containing space photographs, perhaps from your local library, can be displayed.

Excellent NASA photographs and information brochures are sent free on request from the Kennedy Space Centre and Johnson Space Centre, addresses are given later.

If your receiver has memories then it is helpful to enter the relevant frequencies for quick recall and scanning, or at least have a frequency list readily available. WA3NAN transmits in upper sideband (u.s.b.) on a maximum of four of the following frequencies: 3.860, 7.185, 14.295, 21.395 or 28.650MHz. The 14 and 21MHz frequencies are usually the easiest to hear. A NASA Shuttle audio relay can sometimes be heard on one of 20.816, 20.189, 20.192, 20.198, 20.380 or 20.390MHz. Usually, transmissions are in lower sideband (l.s.b.) and the most recently active frequency was 20.198MHz (l.s.b.).

If you have two receivers, then whilst one is used to monitor WA3NAN, the other can be used to check for activity on the many NASA frequencies which are used for launch support ships and tracking stations. Listings of these frequencies can be found in several books dealing with utility listening.

Since various time standards can be quoted by Mission Control and others, it is useful to have a world time conversion chart and even to have two clocks in your radio shack. One time can be set to Universal Co-ordinated Time (UTC or GMT) whilst the other shows the Eastern Standard Time (EST) which is UTC minus five hours. Central Standard Time (CST) is UTC minus six hours. During the summer months remember to add the extra 'daylight saving' hour, so that EST becomes Eastern Daylight Time (EDT), which is UTC minus four hours.

Mission Elapsed Time (MET) is often quoted. A stopwatch which is started at the moment of lift-off and kept running throughout the mission will enable you to accurately follow the MET if the countdown function then the pre-launch 'T-minus' counting can be closely followed, but beware of the built-in holds, shown in Table 1.

If you have two receivers, then whilst one is used to monitor WA3NAN, the other can be used to check for activity on the many NASA frequencies which are used for launch support ships and tracking stations. Listings of these frequencies can be found in several books dealing with utility listening.

It is a good idea to keep a special notebook in which to record details of future Shuttle missions, such as payloads, crew members names and any other pertinent details. Such notes will also aid in understanding the Shuttle communications. A list of NASA acronyms is another handy item.

If you wish to record the full details of the Shuttle's ascent into orbit then have prepared a logsheet consisting of six columns headed respectively - MET; Event; Velocity; Altitude; Downrange Distance; Other Details.

Once your Shuttle monitoring station is set up you are ready for launch - just hope that there is no delay due to bad weather or technical problems, and that propagation conditions are favourable for you!

Tune to the frequencies of WA3NAN at least one hour before launch and apart from the occasional breaks, continues right through to the landing of the Shuttle.
A catalogue of dozens of space publications to purchase is available free of charge from - US Government Printing Office, Washington D.C. 20402, USA.

and parachute into the ocean, to be recovered and refurbished for reuse. Shortly before achieving orbit, the Shuttle's main engines cut off and the external tank is jettisoned to break up over a remote ocean area.

Propagation conditions permitting, the Shuttle voice communications can be monitored throughout the mission, apart from breaks in transmission due to the astronauts sleep schedule or Shuttle-to-ground communications blackout periods, which can last up to 30 minutes. Also, remember that the amateur station WA3NAN is manned by volunteers and so cannot guarantee continuous coverage.

Besides voice announcements, the callsign WA3NAN is sent in Morse code at regular intervals, which provides a useful indication that they are actually on the air. The GARC members are to be congratulated for the excellent service they provide for space enthusiasts. They welcome letters and listener reports are verified with a QSL card.

Occasionally, the amateur radio clubs other than NASA Centres also relay the Shuttle audio on short wave. So, it is worth checking for the Johnson Space Centre in Texas and the Jet Propulsion Laboratory in California on 3.840, 14.280, 21.280, 21.350 or 28.495MHz.

Many of the astronauts have amateur radio licences and during several missions have been heard contacting ground-based amateurs as well as cosmonauts aboard the Russian MIR space station. Such activity is called SAREX (Shuttle Amateur Radio Experiment) and the primary downlink frequency to monitor is 145.550MHz (narrowband f.m.). Sometimes, slow-scan TV and packet radio are also used.

Unfortunately, these v.h.f. amateur space transmission can only be heard in the UK when the Shuttle is in a high inclination orbit of around 57°, whereas most flights have a nominal orbit inclination of 28.5°.

The AMSAT nets are a good source of information regarding SAREX activity. Listen on Mondays and Wednesdays at 1900 local time on 3.780MHz, Saturday at 1000 local on 14.280MHz and Sundays at 1015 local on 3.780MHz.

If you have an orbital prediction programmed for your computer then it is possible to track the Shuttle using the Keplerian Elements which are transmitted periodically by WA3NAN.

Shuttle Landing

Although not quite as exciting as the launch, the landing of the Space Shuttle can provide much listening enjoyment. It is best to tune-in at least one and a half hours before the landing in order not to miss any of the action. If necessary listen to the news broadcasts of the Voice of America to learn of the scheduled landing time. It is helpful to have available a chart showing the sequence of events during the landing. Table 2 lists the main events but it will be useful to make a note whilst monitoring in order to be able to prepare your own more detailed chart for future reference.

For recording the full details of the Shuttle's descent from orbit, it is handy to have a prepared log sheet consisting of seven columns headed respectively - MET; Event; Altitude; Velocity; Range to Runway; Rate of Descent; and lastly, Other Details.

The Shuttle can land at Edwards Airforce Base, California, Kennedy Space Centre (KSC) or White Sands, New Mexico. KSC's landing facility consists of a runway 4.6km (15000 feet) long, 91m (300 feet) wide and 400nm (16 inches) thick at the centre. Runway 15 is oriented north west to south east and Runway 33 is the reverse direction. After the deorbit burn the Shuttle must make an unpowered descent, gliding into a perfect landing first time. The speed at touchdown is between 243 to 364km/h (213 and 226 miles per hour).

As there is a Shuttle flight planned for virtually every month, there is plenty of good listening to look forward to. Check Lawrence Harris 'Info in Orbit' section for the latest flight dates. With NASA's space station Freedom project on schedule and assembly in space due to begin in 1995, space monitoring can only become even more exciting in the future.

Table 1. Space Shuttle Launch Sequence

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-0:00:00</td>
<td>Begin Final Countdown</td>
</tr>
<tr>
<td>L-1:24:00</td>
<td>Astronauts return to their seats for landing preparation</td>
</tr>
<tr>
<td>L-1:17:00</td>
<td>APU restart</td>
</tr>
<tr>
<td>L-1:15:00</td>
<td>Go/no-go decision from Mission Control for deorbit, entry and landing</td>
</tr>
<tr>
<td>L-1:00:00</td>
<td>Manoeuvre to deorbit burn attitude (if is flying tail first)</td>
</tr>
<tr>
<td>L-0:55:00</td>
<td>Deorbit burn (lasts 2 - 3 minutes)</td>
</tr>
<tr>
<td>L-0:35:00</td>
<td>Atmospheric Entry begins</td>
</tr>
<tr>
<td>L-0:25:00</td>
<td>Communications blackout starts</td>
</tr>
<tr>
<td>L-0:15:00</td>
<td>Communications blackout ends</td>
</tr>
<tr>
<td>L-0:05:00</td>
<td>Autoland guidance begins</td>
</tr>
<tr>
<td>L-0:00:00</td>
<td>TOUCHDOWN</td>
</tr>
<tr>
<td>L+0:17:00</td>
<td>Orbiter stop</td>
</tr>
<tr>
<td>L+0:25:00</td>
<td>Astronauts leave the orbiter</td>
</tr>
</tbody>
</table>

Times are Landing ± h:mm:ss (hours:minutes:seconds)

Table 2. Space Shuttle Landing Sequence

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-0:00:00</td>
<td>Begin Final Countdown</td>
</tr>
<tr>
<td>T-0:30:00</td>
<td>Ground crew retires to fall back area</td>
</tr>
<tr>
<td>T-0:25:00</td>
<td>Voice check</td>
</tr>
<tr>
<td>T-0:20:00</td>
<td>10 minute hold (countdown clocks stopped to allow catch-up) on any behind-schedule activities.</td>
</tr>
<tr>
<td>T+0:16:00</td>
<td>Main Propulsion System (MPS) is pressurized.</td>
</tr>
<tr>
<td>T+0:09:00</td>
<td>10 minute hold (allows one last chance to catch up)</td>
</tr>
<tr>
<td>T+0:06:00</td>
<td>Auxiliary Power Units (APUs) start</td>
</tr>
<tr>
<td>T+0:03:00</td>
<td>Orbiter main engines gimbal to their launch positions</td>
</tr>
<tr>
<td>T+0:00:00</td>
<td>Solid Rocket Booster APUs start</td>
</tr>
<tr>
<td>T+0:00:46</td>
<td>1st Space Shuttle Main Engine (SSME) ignites</td>
</tr>
<tr>
<td>T+0:03:34</td>
<td>2nd SSME ignites</td>
</tr>
<tr>
<td>T+0:03:22</td>
<td>3rd SSME ignites</td>
</tr>
<tr>
<td>T+0:02:64</td>
<td>Solid Rocket Boosters ignite</td>
</tr>
<tr>
<td>T+0:03:00</td>
<td>LIFT OFF</td>
</tr>
<tr>
<td>T+0:02:00</td>
<td>Solid Rocket Boosters burnout</td>
</tr>
<tr>
<td>T+0:04:20</td>
<td>SRB Separation</td>
</tr>
<tr>
<td>T+0:03:00</td>
<td>Negative return call from Mission Control</td>
</tr>
<tr>
<td>T+0:06:30</td>
<td>Shuttle begins a long shallow dive to prepare for External Tank separation</td>
</tr>
<tr>
<td>T+0:08:38</td>
<td>Main engine cut-off (MECO)</td>
</tr>
<tr>
<td>T+0:08:54</td>
<td>External Tank Separation</td>
</tr>
<tr>
<td>T+0:46:34</td>
<td>Orbit achieved</td>
</tr>
</tbody>
</table>

Times are Takeoff ± h:mm:ss (hours:minutes:seconds)
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Building a Valved Airband Receiver

Many modern scanners do not allow free tuning across the Airband or direct display of the frequency. Ray Loveland G2ARU describes his solution to the problem.

### The Problem

Airband listening is one of my many radio interests. As listeners with a similar interest will know, it is often necessary to change channel quickly to follow the progress of a particular flight from one sector to another when the aircraft is giving a different frequency to call on. I have two different means of receiving airband transmissions here and on neither of these is it always possible to change channel quickly enough. One is a FRG7700 communication receiver with the FRV7700 converter and the other a realistic PRO2005 scanning receiver. Once the FRG7700-FRV7700 is set up, it is necessary to change waveband on the receiver, peak up the r.f. tuning on the converter and perhaps change band also on the converter. In the case of the PRO2005 it is necessary either to look up the channel number of the required frequency if it has been programmed into the scanner or to enter it if it is not in the memory. All of this takes time and often transmission from the aircraft on the new frequency has been made before the channel has been tuned in.

### The Solution

There appeared to be only one solution to the problem of rapid frequency change and that would be to acquire a variable tuned receiver which would cover the entire airband with one swing of the dial. I therefore decided to build such a receiver and, as I am a dedicated valve enthusiast, it had to be a valved receiver. Some thought was given to the project and it seemed that a double superhet would be essential to improve on the second-channel problems and also to have better selectivity than the portable receivers using only a single 10.7MHz i.f. Also it would have to incorporate digital read-out to be of any real use.

The receiver does not have to be a particularly complicated nor does it need to have an excessive amount of gain. My finished receiver consists of r.f. amplifier, first mixer (variable oscillator), one i.f. amplifier at 10.7MHz, second mixer (crystal oscillator), one i.f. stage at 455kHz, detector and audio stages as shown in the block diagram in Fig. 1.

This article is intended to encourage experienced valve minded constructors to have a go at building a similar receiver. I can assure them that the effort is well worth while and that excellent results can be obtained. No originality is claimed for any of the circuits used in the receiver as all are tried and tested circuits used in many published designs. There would be no point in providing a detailed description of my finished receiver as it contains many components which are no longer available. I hope that the following notes will be of some help to any like-minded experienced constructors undertaking a similar project who hopefully would have many suitable parts already of hand.

The circuit diagram of one version of my receiver is shown in Fig. 2 but some variations have been tried and these are discussed in the following paragraphs.

### First Mixer and R.F. Amplifier

The first mixer is really the heart of the receiver and warrants particular attention. I have tried two circuits: a pentode mixer with triode oscillator using the ECF82 valve and a double triode with the 12AT7. Both seem familiar in performance as a mixer but the pentode has better gain with consequent reduction in noise level and I favour this arrangement. In each case I used the triode in an ultra-audion circuit. This oscillator works satisfactorily over a wide range of operating conditions and has the advantage of only requiring a single un-tapped coil.

The tuning capacitor needs to have a maximum capacity of around 20pF to cover the required tuning range of 118 to 136MHz but can of course be a bit larger if that is all that is available. The effective capacity can be reduced by using a fixed capacitor in series. It must be appreciated that in the ultra-audion circuit the capacitor from grid to earth (C18) is actually in series with the tuning capacitor and can
be varied to get the required oscillator coverage. It is a good idea to make this capacitor variable to enable the frequency coverage to be adjusted. I used a Philips 3-30pF trimmer and this proved to be ideal but it may require a fixed capacitor across it to get the desired tuning range.

The oscillator can of course be 10.7MHz below or above the signal frequency. Either way presents some problems with second-channel interference. If it is below second-channel interference from f.m. broadcast stations may be heard on various frequencies whilst if the oscillator is above the signal frequency mobile radio and public service transmissions may be received. I have found that interference from any of these can be minimised by some simple circuitry and this is discussed further in the section on alignment. I favour the oscillator being on the lower side of the signal and I have made my receiver accordingly.

A slight amount of external injection from he oscillator to the mixer may be required depending on the layout used. This can take the form of two pieces of stiff wire connected to each grid pin or if more convenient of the fixed plate connections for the mixer and oscillator on the tuning capacitor and then brought into close proximity to make a small capacitive feed. The r.f. coil for the mixer grid (L2) needs to be about two turns of 18 s.w.g. tinned copper with slightly spaced turns and the oscillator coil (L3) four turns of 16 s.w.g. well spaced (for the oscillator on the low side of the signal), both wound on 9.5mm diameter rod. I found it better to make both coils self-supporting rather than use coil formers with dust cores. Any adjustment to the inductance needed can readily be made by squeezing or opening up the coils. In my receiver I mounted the oscillator coil on two solid pillars about 13mm high on the under side of the chassis. The mixer grid coil is best mounted above the chassis and wired directly to the moving and fixed vane connections on the tuning capacitor. Tuning drift can be a problem invalved receivers. In my receiver the frequency drift was downwards and I was able to effect some improvement by putting a 6.8pF N750 ceramic capacitor in parallel with C18 in the oscillator grid circuit. Each receiver built will have different degrees of drift and a cure of partial cure can be attempted by trying ceramic capacitors of different temperature coefficient and value in this position. The positioning of the capacitor nearer or further away from any warm spots can help.

For the r.f. amplifier I used a single pentode ahead of the mixer. The EF80 is ideal but doubt the EF91 would also be suitable. Although the EF80 is not a variable μ valve, a.g.c. is applied and helps to prevent overloading the mixer on very strong signals. The grid coil (L1) needs two or three turns of 18 s.w.g. copper wire wound on 9.5mm rod. Various positions of the antenna tapping can be tried and in my receiver I have this about three quarters of a turn up from the earthy end. A separate antenna coupling winding of one turn can be tried, but I found that the tapped coil gave a better transfer of signal. As in the case of the mixer grid coil, I mounted this directly on the tuning capacitor.

**Second Mixer**

The ECH81 triode-heptode makes an excellent second mixer. The triode oscillator is crystal controlled with a 10.245MHz crystal in Pierce circuit. The heptode grid is tuned to 10.7MHz and the anode to 455kHz by conventional i.f. transformers. This seems very satisfactory in operation and no other circuits were tried. Suitable crystals are available at reasonable prices from some crystal suppliers and from firms dealing in spares for the Pye radiotelephones. **IF Amplifiers**

One stage of i.f. amplification is used at 10.7MHz ahead of the second mixer and a further stage at 455kHz after with normal i.f. transformers. Many 465kHz i.f. transformers will tune to 455kHz but I did find some that would not and a small amount of extra capacity was needed across each winding.

I used the EF89 valve in both stages and this provided more than enough gain. I fitted an i.f. gain control by returning the earthy end of the i.f. and second mixer valves to a 5kΩ variable resistor and this enabled the gain to be controlled nicely.

I did not try to use any lower gain valves in the i.f. stages but this is something that could be considered. The EF92 would probably be suitable.

**Detector and Audio Stages**

All airband signals are a.m. and only therefore need a simple diode detector. A double triode valve was used, one diode being the detector, the other diode the a.g.c. rectifier and the triode and a.f. amplifier. The circuit is completely conventional and does not call for any particular comment.

A normal pentode was used in the output and can be almost anything that is available. I used one of the small valves - the EL91. A large audio output is not required and a valve of this class helps to keep the heat and h.t. current down.
**Meter and Squelch Circuits**

I found it useful to have a signal strength meter both for using the receiver and alignment. The meter is in a bridge circuit and gives a good indication even on weak signals. A 0-1mA, or more sensitive, meter can be used with appropriate alteration of the series resistor R26.

A squelch circuit is a very worthwhile edition. When the receiver is left running on one channel all background noise can be eliminated in the absence of a signal by adjusting the squelch control R39. When a signal is present the squelch circuit is opened and the audio circuit operates normally. Many types of diode D1 and D2 would be suitable. They should be selected to have a good back-to-front ratio with a low forward resistance.

### Digital Read-out

A receiver of this kind must have digital read-out if it is to be used seriously. Unfortunately we have to go into the realms of semiconductors and away from our beloved valves for this feature.

It is quite easy to make a suitable unit to provide direct read-out of the received frequency. The FC177 frequency display module is available from Cirkit and gives a read-out up to 3.999kHz and can be programmed for various offsets to accommodate different i.f. frequencies. In order to use it on airband frequencies, it needs to have the variable oscillator frequency divided by 100. This is easily arranged by means of a SP8629 i.c. with a single transistor amplifier. The transistor can be almost any npn type capable of working at the variable oscillator frequency.

As supplied the FC177 module will give a read-out for 10.7MHz i.f. when the oscillator is below the signal frequency. If the oscillator is above the signal frequency it is necessary to make a further connection as detailed in the data sheet supplied with the unit.

### Power Supply

The power unit needs to supply h.t. at around 200V and 6.3V for the valve heaters in the usual way from a conventional mains transformer. An h.t. line of 180 to 200V is quite adequate and helps to keep the heat down. If the mains transformer and rectifier used, produce substantially more than 200V it is worth putting a resistor in the h.t. line.

In addition stabilised supplies for the two oscillators and a 5V stabilised supply for the digital read-out unit are required. The supply for the oscillators is best provided a voltage stabiliser such as the VR105 or one of the smaller equivalents. In the interests of oscillator stability the h.t. voltage should be as low as possible and I used 70 volts in my receiver, but this may need to be increased in some cases. The 6.3V heater supply line is rectified in my receiver by a single diode feeding a 7805 voltage regulator to provide the 5V supply for the digital read-out unit.

### Construction

My first version of the receiver was made on a rather large chassis with the r.f. section, i.f. amplifier and audio section built as separate units so that the various circuits could be tried and satisfactory units developed. A second receiver was then built incorporating the proven circuits.

I favour the use of double-sided printed circuit board as a chassis for valve constructional work at v.h.f. and I used this method in the r.f. and i.f. stages. Earth connections are readily made and the board provides very good screening.

All r.f. leads must be kept as short as possible and run so that the input and output leads for each stage are well separated and screened from one another as far as possible. As mentioned before, the r.f. mixer and mixer grid coils are best mounted directly on to the tuning capacitor. If this capacitor is the type which has connecting tags on both sides the coils can be mounted on opposite sides and thus ensuring good screening. A small screen cut from thin printed circuit board fitted across the r.f. amplifier valve holder to screen the grid from the anode connections is worth doing in the interests of stability.

I need hardly stress that the variable oscillator stage must be solidly built. In my receiver I built the r.f. mixer stages into a small metal box and incorporated this into the main chassis. The inside of the bottom of the box being lined with a piece of circuit board so the recommended method of construction could be followed.

A good slow motion drive is essential for the tuning capacitor. I used a gear box...
type salvaged from a RAF R1132 receiver and fitted a large heavy knob to give a flywheel effect. Very useful when changing channel quickly. With digital read-out no conventional tuning dial is of course required.

If the r.f. and mixer stages are built as a separate unit as suggested, the first 10.7MHz i.f. transformer must be mounted on this unit or on the i.f. amplifier strip. In either case the lead from the mixer anode of first i.f. grid will be longer than normal and this can lead to instability. To overcome this I fitted a flying lead for the long connection inside the i.f. transformer and brought it out through the base. The miniature coaxial cable RF174A/U is ideal for this purpose. The use of the cable increases the capacity across the winding and the fixed capacitor may have to be reduced slightly to obtain resonance. The cable mentioned has a capacity of about 33pF per metre.

I find that the Philips Beehive trimmers are ideal for r.f. circuits. They can be fitted very securely fitted by soldering the stem to the printed circuit board.

The FC177 Digital read-out unit has connections which match the holes in 0.1 in Veroboard. I used the PC8 plug available from Cirkit (bending the pins carefully at right angles) to mount the FC177 unit to a small piece of Veroboard about 50 x 32mm on which the divider and transistor amplifier were built. This makes a very compact unit which can be fitted directly on the front panel.

**Alignment**

After completing the receiver and making sure that everything is apparently in order with voltages correct, alignment of the tuned circuits can be started.

The 455kHz i.f. stages must be aligned first as near to this frequency as possible otherwise the digital read-out will not be correct. As mentioned previously, most 455kHz i.f. transformers will tune to 455kHz but I did come across some that would not. It is essential to ensure that the windings are actually resonating by noting that resonance occurs at two settings of each dust core (always set the core at the outer position). If only one peak is found the winding is almost certainly not resonating as all this is happening is that maximum inductance is being reached before resonance. If this condition exists a small amount of extra capacitance across the winding is needed.

When the 455kHz stage is aligned, proceed to the 10.7MHz i.f. stages and complete the alignment at this frequency. The receiver should now sound alive.

Next set the tuning range of the variable oscillator to give a upper frequency of just over 136MHz and a lower one of just below 118MHz as indicated by the digital read-out. The upper frequency should first be set by adjusting the trimmer across the oscillator tuning capacitor C17 and then the lower frequency with the trimmer from the bottom end of the oscillator coil to earth C18. It will be necessary to check both these settings a number of times as both trimmers have some effect at each end but several checks each way should enable the correct coverage to be obtained. If this is not possible the oscillator coil L3 will have to be adjusted by compressing or opening up the turns as appropriate. This is an operation which should not be rushed and many checks at both ends of the tuning range will be needed to obtain the required coverage.

All that remains now is for the mixer grid and r.f. stages to be aligned. First try the trimmers to peak up the h.f. end and adjust the coils by bending if needed.

If any particularly bad second channel breakthrough occurs I have found that it can
About the HF-225. Letters from users all over the world and they tell you more than I can ever say:-

“...I am currently using the HF-225 receiver along with JRC NRD-535Ds and enjoy using HF-225 very much. The AM synchronous detector of the HF-225 is excellent and it is much better than NRD-535D’s. A mouse type of key pad is also convenient to operate...”

“...I have been a DX -listener since 1975 and a ham radio operator since 1988. In army service I used English made Racal and US made Collins. But I must say that my Lowe HF-225 is better than any Racal or Collins. It is better than any Japanese ones! It is so practical, simple to use, it is sensitive and selective, have a high dynamic range and so on. ‘A lot of jewellerys in a small box’ as we say in my country.”

“...I have now been a happy owner of an HF-225 for 8 months. Your proud statement ‘performance and still easy operation’ is indeed true. Everything is obvious and the keypad is a strike of genius. The audio is really good enough to motivate the suggested extra loudspeaker.”

“As a happy owner of a Lowe 225 I would like to tell you how satisfied I am with the receiver. Since 1928 I have been interested in SW listening and over the time gone, owned quite a lot of different receivers, i.e. Eddystone, Hammarlund, Collins, Yaesu, many of them very complicated to operate and needed a very good aerial. And here comes the Lowe 225 – a small, very sensitive and easy to operate on all bands. It really operates without problem in crowded bands, with strong signals. And it combines complete control of a necessarily complex piece of equipment with easy operation for the user. The Lowe 225 is a ‘Must’ and a great ‘Hit’ for every keen SW listener.”

In 30 years in this business I have never known products which have generated such enthusiastic mail from users as our own HF receivers. Demand constantly outstrips our ability to supply, but I hope we will soon put that right, so contact your own favourite short wave dealer and ask about the Lowe receivers, or simply write to me here at Cromford for details of your nearest dealer.

John Wilson

P.S. The “WireMatch” aerial is already generating enthusiastic reports, even though the depth of Winter is not the best time to be outside to erect aerials. If your dealer hasn’t yet received details, tell him to contact me for full information, or send a couple of first class stamps for “Leaflet No.3” which explains the “WireMatch”.

Send 4 first class stamps to cover postage and we will send your FREE copy of “The Listener’s Guide”, our ever-popular aid to LF, MF and HF listening. Ask for my leaflets (No1) “ATU or Preselector”, (No2) “What makes a Lowe receiver so good”, and the new (No3) “WireMatch Aerial” leaflet and we will include them in the pack.

Lowe Production Limited
Unit 23, Cromford Mill, Cromford, Derbyshire DE4 3RQ
Tel: 0629 826287 Fax: 0629 826263

Happy Listening
John Wilson
Front View: Controls left to right - RF gain, AF gain, Squelch, S Meter zero. The large vents on either side of the frequency read-out assist with the air circulation and help to keep the receiver cool. At the left the DIN socket is for a tape recorder connection.

be entirely or very substantially eliminated by putting a series tuned circuit from the antenna connection to earth in the r.f. stage. If breakthrough occurs at only one frequency a single stage circuit as shown in Fig. 3 can be used. When breakthrough is present on two or more frequencies a two stage circuit is shown in Fig. 4 will be needed. These circuits need to be tuned very carefully as they have a very sharp peak. In the case of the two stage circuit adjust one trimmer to the lowest breakthrough frequency and the other to the highest. This should then cover all frequencies in between. The v.h.f. f.m. transmitters at Rowridge put in a very strong signal here and this two stage circuit virtually eliminates all the spurious signals from them. The effect on the desired frequency range of 118 to 136MHz is negligible.

Conclusion

The development and construction of several versions of my receiver have proved to be a very interesting and absorbing project. Excellent results can be obtained and I can thoroughly recommend the construction of an Airband receiver to any valve enthusiast looking for a new interest.

Top Internal View: Shows RF-Mixer-Oscillator unit built in a separate box with the twin antenna filter mounted near back edge. The divide by 100 module can be seen attached to the back of the frequency display unit. The relay on the right was added after the article was written and is for the control of the tape recorder.

Underside View: Again this shows the RF-Mixer-Oscillator unit in a separate box with holes for access to the trimmers.

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By Ron Ham
Faraday, Greystfrars, Storrington, West Sussex RH20 4HE

My January column began with a reference to a letter I had from David Edwardson in Wallisend. David wondered if solar activity has any influence over the earth's weather. From my personal observations, for 16 years, with a solar radio telescope and comparing the results with other factors, I strongly believe it does.

Furthermore on this point, the Daily Mirror carried an interesting article (pages 4 & 5) on January 7 about the prevailing floods and snow under the heading 'Blame The Sun', by Don Mackay. It's always good to read another report on this subject and the piece includes an illustration of the sun and the earth, the path of the solar wind and the associated magnetic fields. Anyone wanting to add this article to their archives are still likely to get a copy of that day's paper from the Mirror's back-issues department.

Just before my deadline date for copy, I learnt from Ron Livesey (Edinburgh or Glasgow), using a 2.5in refractor telescope and comparing the earth's complex atmosphere, and the earth's weather. From my personal observations, for 16 years, with a solar radio telescope and comparing the results with other factors, I strongly believe it does.

Solar Reports
Routine observations in November by Ron Livesey (Edinburgh or Glasgow), using a 2.5in refractor telescope and a 4.0in projection screen, located one active area on the sun's disc on days 4, 9, 10, 14, 17, 19-22, 24, 26 & 30.

Patrick Moore kindly sent two sunspot drawings, Figs. 1 & 2, that were taken from his projection screen while he was in Florida Fig. 1 at 1830 on December 1 and from his home in Selsey, Fig. 2, at 0920 on the 26th.

Auroral
Our interest in auroral activity is two-fold, first, because it is caused by a happening on the sun's surface and secondly, that the aurora itself, when it manifests in the earth's polar atmosphere, distorts terrestrial radio signals between about 20 and 200MHz. In fact, the random ionisation of the aurora becomes a temporary reflector that has a strange effect on the tone of the signals reflected from it. While the display lasts and it's changing all the time, transmissions in Morse code sound like a 'rasp' and single side band broadcasts take on a 'ghost-like' voice. Should you hear either of these symptoms do compare the dates with the auroral events reported in this column.

The auroral co-ordinator for the British Astronomical Association, Ron Livesey, would also be pleased to hear from you at Flat 1/2, East Parkside, Edinburgh EH16 5XJ.

Propagation Beacons
As usual my thanks to Gordon Foote (Bristol), Henry Hatfield (Sevenoaks), Ian McDermid (Comrie), Ted Owen (Maldon), Ern Warwick (Plymouth) and Ford White (Portland) for their 28MHz beacon logs from which we learn a great deal about ionospheric conditions during the period. These logs enabled me to prepare the monthly chart, Fig. 3, of the signals heard from November 26 to December 25. Ern added the American beacons WA4SLT, on 28.249MHz and WB4WOR, on 28.281MHz, to the list this time. It's most likely that activity associated with the sunspot groups in Fig. 1 was responsible for the increased number of 'DX' beacons copied on that day.

Tropospheric
Although the bad weather almost certainly prevented any tropospheric 'DX' in Band II during December, details of the atmospheric pressure for the period November 26 to December 25 can be seen, along with other associated reports, in my 'Television' column elsewhere in this issue.
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Short Wave Magazine, March 1994
Christmas traditionally across the Clarke Belt brings seasons greetings from many news feed originators, BBC, Reuters, the EBU and others. France often goes better with a series of Santa + reindeer team, the sleigh moving across the sky and for me I enjoyed the informativity of the 47th Infantry Battalion now serving in a UN role near Beirut, Lebanon at their live Christmas Day service 1130UTC. With a downlink from the ITN, the Future TV CB unit of Beirut and Armstrong Satellite Facilities (Ireland) we saw shots of the camp, local countryside, the complete service and the soldiers relaxing after the broadcast. Particular emphasis was placed on showing the ‘boys’ for the benefit of the families back home. The Eutelsat II F3 (13°E) link was for me one of the pleasures of the 25th.

The holiday period is for many an excuse for excess alcoholic consumption and transponder observations at midnight December 31 suggested that most of Europe was involved in an outside broadcast somewhere simply getting drunk! Whilst Europe was celebrating ‘out with the old and in with the new’, Yugoslavia certainly was not celebrating. A live outside broadcast feed via the Intelsat 603 51°E up from the BCB was carried that night for the French M6 network. The peaceful classical music offering contrasted dramatically with the informal raillery across Europe, an odd offering perhaps with the death and destruction experienced outside of those very studio walls - the band fiddling whilst the rest of Yugoslavia burned! Interesting too the irregular mains consumption for ‘the boys’ from the BBC (Gardenview) the SABC have now voiced the press crush as they pressed him usually to come clean on Eutelsat II F2 at 1°W.

Several enthusiasts have bought new Diacs ‘Eclipse’ receivers, a hit-much many feature receivers a few years ago now being sold on the surplus market for around £100 each. Keith Marriott in Notts has equipped with an Eclipse, 1.8m dish and Echosphere triple 16dB noise LNB, results are truly excellent. In the warmer climes of Thailand, Alan Smith complains that the C Band Star TV service is downlinking programmes such as MTV, BBC WSTV and using audio on left and right channels, true stereo is not transmitted. He feels that Star are saving stereo for their ‘improved top quality’ Pay-per-View service via AsiaSat-2 launching later this year.

South of the Border into South Africa and Brian Williams (Gardenview) the SABC have now taken feeds of CNN, BBC WSTV and Sky News away from the BOP TV and radiate the programmes terrestrially during SABC downtime. NICAM stereo is about to start and the planned MMDS (Microwave distribution) has been dropped! A couple of readers asked what ‘IFB’ was, they had seen reporters rehearsing news feed inserts fumbling with earpieces and muttering ‘the IFB’s not working etc.’ John L advises that IFB is ‘interruptable foldback’ and is the TV station/studio output audio being sent as a cueing feed to the earpiece. We used to call this reverse clean feed and usually carries the station output LESS the contributing distant reporter (to avoid howl-rounds if the IFB is connected into a loudspeaker for use with a guest interview). Finally Sri Lankan DXer Bandula Guasekera advises the Gorizont bird at 17°E is now transmitting a new programme ‘Evan Sat. Television’, a new Indian private station at 3.875GHz 0700-1730 local going 24 hours this spring. The Ekran Malayalam u.h.f. TV channel is now transmitting up to 3 hours daily at 1754MHz. The Greek Orbita 1 programme continues at 714MHz, so advises Bindu Padaki from Bangalore who views the Ekran signals using a 14-element cross Yagi antenna system.

Satellite News

Intelsat moves in the sky. Soon to launch 702 will move in at 1°W, displacing the incumbent 512 that in turn moves West to 21°W. And 502 now at 21°W will be shuttled further down the road to a parking slot at 40°W. Clarke Belt slot changes in the coming years will show a general re-orientation of operational purposes. The existing 63°E will move slightly to 62°E, and other new positions will be 64, 157, 330, 338 and 349°E.

Late January saw the launch of Eutelsat’s latest series II bird, the F5 will slot at 36°E in March ’94 and provide coverage from Europe to beyond the Caspian and parts of the Arabian Gulf. Meanwhile on the Rock, Gibraltarians are awaiting details of dish planning legislation, restrictions similar to the UK are likely to be imposed shortly.

British Rail signal boxes may soon be sprouting satellite dishes! Several boxes in South Wales have already been used experimentally as a means of linking surveillance cameras back to a central security HQ in Nottingham. Information and data of train times, delays, etc., is back-linked to the local station for display on VDUs. At this time a tender has been released to equip 70 BR stations.

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

Short Wave Magazine, March 1994
Sitting down to write a piece on the first working day of the New Year always means starting a new story in the letters! On the other hand, it’s also time to acknowledge and thank you for all the cards.

How nice to hear again from Gerald in Swinton. Gerald would dearly love to get involved with Packet, but alas, the method involves in essence a radio station sending a signal saying “I’m switched on and ready to receive, my call is XXXX there for anything for you?”. This is followed by the other station saying “Yes I have some for you personally and some general”. The machines then go to work to exchange the data. Without that limitation, the bands today would be put to very good use and the answer is to pass both the Novice or the ‘big’ RAE?

Turning to Gerald’s lists we find him all-c.w. on Top Band, while on 3.5 MHz he was a mouthful of call to the operators from East Coast W and VE, EA6/D3ZZ, 9M8DB, 9K2MU, W6SSBZ/V5P, JAS, 4X1EL, ZC4KS, SB9/T, U3P from the phone, c.w. and RTTY. 7MHz wasn’t so quite so popular, but again all modes were taken from Europe, plus all continents save Oceania. The list on 14MHz shows all modes from Europe, plus phone from all continents and RTTY from Ws, VE, UHAA8B, 9K9G and V09W. Interestingly enough, the favoured time for both 14 and 21MHz is around lunchtime and afternoons, indicating the VK and 2Ls for example were short-path. Perhaps the plume on 21MHz was T87TMW4 on RTTY plus all parts of the American continents with 18MHz contributing east coast W/VEs, Y9BDA and 6AB. 24MHz offered the very occasional W on sideband, one on c.w., and as for 28MHz - zilch!

Harry Richards (Barton-on-Humber) reads the back numbers... back in April ’92 I said “in general forget Europeans”. Harry takes me to task for this, but one of the difficulties I am under is that the Editor (bless his little cotton socks; I’ve got to keep on the right side of him!) gives me a known amount of space, and he likes to have a picture or some copy to look up as well. Obviously European calls just mention a call if there is something of interest involved.

In Harry’s collection this time comes from the UK in Croatia and then 9AC4D, which as amateur prefixes aren’t in Harry’s Call Book. 9A does appear in the 1994 UK Callbook countries listings, BUT notice that the 9A series in the ITU column, is stated to be “for Marinol” Normally if you hear a call that isn’t in the Callbook as such, it can be identified with fair certainty from the ITU column. Just what will be the new radio when the dust finally settles in the parts of what was YU-land is anyone’s guess. As for W2DNV, he has always been one of the bigger signals from Stateside. The various Ukrainian stations may still have changed prefixes too beside Harry’s letter and you getting to read this piece.

At this point in writing the column, I received a bit of news that will change the amateur bands for ever. Lloyd Colin W6KG, passed away on the 14 December after a massive stroke at the American Hospital in Istanbul; Lloyd was 78. Lloyd and Iris Colin W6QL as chief operators of the Yankee Foundation, indicated a signal out from over 100 countries around the world, most of them ‘rare ones’. My first column appeared in 1966, and Lloyd and Iris had been stirring up this hare of DX for years even then. My sorrow and sympathy to Iris and her family.

Every so often, a catalogue laments a change of “the Amateur Band Handbook”. In effect you put yourself a second antenna!

Just one point though: no practical antenna is in free space, so, of course, the local terrain, buildings and so forth affect the response. If you are next door to and on the North side of a big gasometer, about the only African station you could hear was 9K21C from East Africa - gone right round the world to reach you from the north. That would need some good conditions!

New CIS Prefixes

New prefix blocks from January 1 seem to be European Russia (old UA1-3-4-5) now RAA-RIZ, UAA-UIZ; Ukraine (old UB, UT, UY) now EMA-EDZ, URZ-UZZZ; Byelorussia (old UC) now EUA-EWZ; Azerbaijan (old UD) now 4JA-4JZ, 4KA-4KZ; Armenia (old UG) now EKA-EKZ; Turkmenistan (old UB) to be EZA-EZZ; Uzbekistan (old UI) now IUJ-UMZ; Tadzhikistan (ex-UU) to EYA-EYZ; Kazakhstan (old UL) UNA-UNZ; Kyrgyzstan (old UM) to EZA-EZZ; Moldavia (old UD) to be ERA-ERZ. I’ve not heard them all as yet, but at least this gives a guide to the possibilities.

Often in these offerings one hears of someone who has a dipole, say, firing east-west and doing a good job, but not much is being heard from north-south. Two factors here. One is the sheer lack of activity in Africa and the Poles as compared with Europe or USA. The second is the directivity of the antenna, it just doesn’t respond strongly to stuff coming from north-south.

If you have an antenna tuner, one thing you can try is to unplug the dipole from the tuner, then make up the意味着 ‘strapping’ the outer and inner of the feeder. Now, connect an earth to the appropriate terminal of the tuner, and the ‘strap’ to the antenna terminal; receiver of course by coaxial cable to the appropriate point on the tuner. Now tune up and log the mid-band settings for each band. If you are lucky enough to possess a decent noise bridge that can give a near-total null, set it for 50Ω, connect to the receiver side of the tuner, and the receiver to the bridge detector terminals to obtain the settings. Your dipole can be turned into your vertical in such a way that it will give one’s own self a second antenna!

One practical antenna is in free space, so, of course, the local terrain, buildings and so forth affect the response. If you are next door to and on the North side of a big gasometer, about the only African station you could hear was 9K21C from East Africa - gone right round the world to reach you from the north. That would need some good conditions!

Slim!

He seems to be everywhere! The VK9MC claiming to be on Macquarie island is very definitely dead. There won’t be an amateur on there at least till the latter end of ’94. VR8B is Ducie Island Slim; of course another phonie - he couldn’t be on Ducie Island and anyway the prefix is wrong! 9DSCW was another Slim; claiming to be PY2CW on. In answer to a letter, Nagib wrote to GW3COP and pointed out that he had no gear and hadn’t been on the air for 22 years; and the Brazilian Embassy in Tehran wrote to say they knew of no Nagib Thame at their Embassy.

Expeditions

The latest news of the Pratas Island expedition is that it was to be on the air between 0300-0700Z on January 5. Signing four BV operators plus DH2BH. If they are doing to do it in four-hour stints, it’ll be a while before the demand diminishes. But if Marti has a foot in the door, he might just force it a bit more open.

For the Peter I effort, it is understood that the group leave UK on January 17, and it is hoped to give you the final details before this goes down.

Contests

Don’t forget the CQ WW WPX Sideband contest over the weekend March 26-27, this one always scours up some new prefixes and rare countries. Another one that you might look at is the ARL International DX Contest this phone weekend March 5-6.

Leighton Smart in Trelewes notes the GW Christmas Top Band QSO Party that started around 1930 and returned as QSO Party on Top Band, Leighton has been working on his Top Band antenna by getting it up in the air on one hand, and improving the ‘underside’ of the system. This has involved adding to the buried radials a quarter-wave counterpoise, and adding all the fencing to the property. As to what it has achieved, Leighton reckons he is hearing stations far better now.

It brings out a good point; just how can an s.w.l. evaluate an antenna? Usually, on any given band, there will be some signals that can be regarded as steady markers. Personally, I tend to go for various ‘locals’ several miles away, and for DX the VK ZL and 2S signals serve well. Log them all, carefully noting the signal strength and all control settings.

On the DX signals stick to a given (UTC) time each day for several days. Change the antenna, return the antenna tuner, and ditto repeat. Personally, I have two tuners; one for the reference and one for the antenna under test. Each is set to give me unity s.w.r. on its own antenna. Now, I can flip the switch from antenna to antenna instantly, thus removing the effects of changing conditions. In addition, one has to allow for ‘conditions’ - so I always make notes of when the DXV/CX beacon on 10MHzisky out conditions that day. If you can’t read Morse, then listen carefully to the GB2RS news on Sundays.

Finito!

That’s the lot for this time. Letters, as always, to Box 4 Newton SY16 1ZZ, to arrive by the beginning of the month.
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Although very little Sporadic-E and the predominantly wet weather made December a poor month for the reception of long distance (DX) television signals, on all bands, we still have some interesting items to discuss. Including the weather and the storage of photos on a CD-ROM.

Band I

Peter Barber (Coventry) made a special study of Band I throughout 1993. He used an ex-United States Navy Hallicrafters 'S27' communications receiver with a cathode ray oscilloscope monitoring its output and two multi-band TV receivers. Equipped like this he could hear and see as many television signals as possible.

As expected, he found a lot of Sporadic-E activity between mid-April and the end of August with many hours of openings in June and July. Peter kindly sent me a chart, Fig. 1, showing the results of his estimated 3000 hours of observations. Peter's dedicated effort has shown that there was a fair amount of 'out of season' Sporadic-E in January and February, a bit less in October and November and quiet in December. This work of yours is important Peter, because, it places facts about Band I openings on record and is a practical guide for our new readers and a useful log comparison for our 'seasoned' DXers.

During one of those rare December openings, on the 21st, Simon Hamer (New Radnor) logged pictures from Spain's TVE-1 on Ch. E2 (48.25MHz).

Meteors

On December 13, Simon Hamer, tuned through Band I while the Geminids meteor shower was in progress and, around 2245, he received bursts of unidentified pictures, via meteor trail reflection, on Chs. E2, E3 (55.25MHz) and R1.

Satellite TV

At 1700 on 25 December 1991, Peter de Jong received the NTA logo, Fig. 4, via Eutelsat II and says that it translates as 'TV Information Agency'.

Over the recent Christmas holiday, John Scott (Glasgow) received satellite TV pictures from stations in Dubai, Fig. 5, Finland?, Fig. 6 and Portugal (Lisbon), Fig. 7. However, on January 1, Simon Hamer saw the river Arun 'in full flow on one of the many German satellite channels. I'm not surprised Simon, Sussex rivers have been making the national news because the heavy rain in December, Fig. 8, caused them to flood and many roads to close. Around 1600 on December 30, I drove home from Chichester through the flood waters of the Arun and the Levant and, as I write this on January 12, it is raining and a gale is blowing. The BBC and IBA local radio stations have kept us updated on the situation and I have just heard that the Levant is again on 'Red Alert'. Up to 1700 today my weather log shows 4.81in of rain and when this is added to the December total, Fig. 8, it's no surprise that the south-coast waters are currently in flood.

Weather

During December I recorded 8.97in of rain, compared to 3.28in for the
same period in 1992. There were falls of over 0.60in on days 8, 12, 20 and 28 and heavy falls of 1.25in on the 19th and 1.95in on the 30th. This brings the year's total to 47.18in, Fig. 8, some 11.69in more than the total for 1992.

At 1920 on the 24th there was a large lunar halo in the atmosphere which, as we have seen before, is a sure sign of bad weather to follow. There were snow flurries on the 25th, mixtures of rain and wind on the 28th (0.65in) and 29th (0.53in) and the violent storms on the 30th. The relative humidity topped 80% on about 8 days, early morning frosts were reported on days 14, 26 and 27, rain fell on 19 days and there were strong winds on many others. I produced the bar-chart, Fig. 8, using the 'Chart' program in the Lotus Works software packed with my Packard Bell computer.

**CD-ROM**

While on the subject of computers, I recently fitted a CD-ROM drive into the spare 5.25in bay on the 'Bell's' systems unit. From the range available I decided on the Panasonic 562B 'drive only' that was supplied with two leads and the necessary software on a 3.5in floppy disc. One lead coupled the drive's audio output to the sound unit and the other, a multi-way 'flat' cable, connected to the interface on the sound card.

As my particular 'Bell' did not have its own sound system I purchased an Orchid 'Sound Producer Pro' that comprised the complex sound card, two matching speakers, the 'set-up' software on a 3.5in disc, a small microphone and a well produced handbook. The microphone is for adding voice comments to files and, a program called 'Monolog' will read an ASCII file to you with good clear diction.

In addition to other sound features, the Orchid card has an onboard interface for the Panasonic and other makes of drive unit. Both the drive and the card were relatively easy to fit. The four screws for the former were packed with the 'Bell' and the latter plugged into one of the computer's expansion slots. I have included this short review because I know that many of our readers have an interest in computers. Also, our TDXers may like to know more about the photographic reproduction capability of a CD-ROM drive that is 'Kodak PhotoCD Compatible'. Briefly, the Kodak software is supplied on a compact disc and includes 24 sample photographs that can be loaded into 'Windows' on command and then sized and shaped in a variety of ways. Because of the rapidly changing computer market and technology, you must make your own enquiries about a drive and sound system to suit your machine and pocket. Do shop around, because there is a wide range of good products to choose from.

A photographic dealer told me that a blank ROM disk holds up to 100 photos and costs about £5. This is then sent with your film to the 'developers' who return it with your pictures on it ready to run on your computer, along with the usual negatives and prints. I have not tried this yet, but it seems that the disk accompanies each film that you want processed in this way until it is full. A Kodak stockist can advise about the cost of this specialised work. More on this subject later. Folk who have had to do 'play', 'hit' Meanwhile, do let me know of any experiences that you have had in this field so that I can pass it on to readers in a later issue.

**Tropospheric**

Despite the poor December weather, which was no good for tropospheric 'DX', Tim Bucknall (Congleton) found reasonable conditions on the 8th and 10th when he logged colour pictures from Norway (NRK) Band III open on the 26th when he logged pictures from Norway (NRK) on Ch. E8 (196.25MHz). During December, John Scott noted that colour slow-scan television pictures were being transmitted by a 'G' station net on most days around 7.043MHz. He told me that the 14MHz band was also busy at times and, although pulses were audible from stations in America the signals were not strong enough for him to build up a complete picture. However, he did copy a calling caption from the UK, Fig. 10, an idnt from Italy, Fig. 11, the seasons greetings from Spain, Fig. 12 and a sign-off from Finland, Fig. 13.

John kindly sent me a video tape showing those, as he received them, in colour. He also added a selection of slow scan captions that he had copied earlier in 1993 from stations in Finland, France, Germany, Luxembourg, Sweden, Switzerland and the UK. Very often the transmitted captions include well-known Disney characters and photographs of the home, equipment and the operator. John uses a terminal program for his PC called STSV/COM that in turn controls his Robot 1200c via the RS232 port. 'I have all my slow-scan pictures saved on audio tape," said John, because to store via the computer uses a lot of memory even for one picture. I found that, the ‘TBK’ logo that I scribed on my computer for an earlier column took about 500K.
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37 from Dave G4KQH, Technical Manager.

Short Wave Magazine, March 1994
57
Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

DURING October, November and December the propagation conditions at night often proved to be excellent for the maritime radiobeacon DXing. Quite extensive logs were compiled by some listeners and there are many interesting elements in this chart.

The sky wave signals from some quite distant beacons reached the UK after dark. The Canary Island beacon at La Isleta (LT) on 291.1 and Punta Lanta (NA) on 291.9 were heard for the first time by several DXers. Two on the coast of N Africa were also heard: Caixine, Algeria (CX) on 287.0 and Table d’Oukacha, Morocco (AK) on 305.7kHz. Also logged were Mahón, Baleares (MI) on 290.5, Punta Spadillo, Sicily (PT) 302.5 and Punta della Panna, Italy (TL) 314.5.

Some sky wave signals arrived from a northerly direction. The iden (AB) of the Faeroes beacon at Akraberg was heard on 281. Several listeners picked up the signals from beacons around the coasts of Iceland. Even more distant, the Prins Christians Sund beacon (O2N) in Greenland, was logged by Steve Cannon in Squamish. Up in Iceland Geoff Crowley (Hafrnarfjörður) heard for the first time a beacon from a country that is the Rhbins of Islay beacon (RN) on 293. He says, "this country -

By using a directional loop ahead of his Lowy HF-225 receiver, Kenneth Buck has established that the beacon signal (WW) on 309 comes from a direction roughly at right angles to that expected for beacons in the Baltic region. Owing to interference from nearby TV receivers* he has been unable to hear (WW) on 312.5, but he was able to identify three Latvian beacons on that frequency (BT, BK & LB) and their signals did come from the expected direction.

Using a 312.5kHz band method is the 20th harmonic of the TV line timebase frequency of 15.625kHz. Although I have no official information to confirm that WW is part of the Baltic group on 312.5, this does seem likely. Several DXers logged WW on 309, but to avoid further confusion have not included them in their entries in the chart.

Some interesting logs were also compiled during daylight. Both Charlie Mogg (Wotton, IoW) and John Stevens (Largs) found that the ground waves from some beacons were weaker than they had received during the summer and autumn.

The listeners who send along regular reports for this series have been joined this time by John Eaton (Woking), Gary Haynes (Bushey Heath), Albert Moore (Douglas), John Stevens (Accrington), Ernie Warwich (Plymouth) and Peter Westwood (Farnham). Perhaps their logs will encourage others to try searching the band and then send along a report for the next article which will be published in the June SWVIM.

<table>
<thead>
<tr>
<th>Freq (kHz)</th>
<th>Call Sign</th>
<th>Station Name</th>
<th>Location</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>284.5</td>
<td>LT</td>
<td>Lizard Lt</td>
<td>S Cornwall</td>
<td>C.T.</td>
</tr>
<tr>
<td>284.5</td>
<td>MA</td>
<td>Cabo Minho</td>
<td>N Spain</td>
<td>D.O.</td>
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<tr>
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<td>NP</td>
<td>Cabo de Vero</td>
<td>N Spain</td>
<td>F.S.</td>
</tr>
<tr>
<td>284.5</td>
<td>DF</td>
<td>Cape Finisterre</td>
<td>N Spain</td>
<td>F.S.</td>
</tr>
<tr>
<td>284.5</td>
<td>AL</td>
<td>Almavert Lt</td>
<td>Switzerland</td>
<td>C.T.</td>
</tr>
<tr>
<td>284.5</td>
<td>TE</td>
<td>Cap Frehel</td>
<td>France</td>
<td>C.T.</td>
</tr>
<tr>
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<td>TK</td>
<td>Cap Frehel</td>
<td>France</td>
<td>C.T.</td>
</tr>
<tr>
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<td>WI</td>
<td>Pointe du Raz</td>
<td>France</td>
<td>C.T.</td>
</tr>
<tr>
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<td>BR</td>
<td>Praia de S. Lourenco</td>
<td>Portugal</td>
<td>C.T.</td>
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<tr>
<td>284.5</td>
<td>BT</td>
<td>Brixham Pt</td>
<td>England</td>
<td>C.T.</td>
</tr>
<tr>
<td>300.5</td>
<td>JA</td>
<td>Jersrostad</td>
<td>Poland</td>
<td>E.O.</td>
</tr>
<tr>
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<td>BK</td>
<td>Bolshoy</td>
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<tr>
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<td>Le Reizh</td>
<td>Poland</td>
<td>E.O.</td>
</tr>
<tr>
<td>300.5</td>
<td>OA</td>
<td>Old Head of Kinmel</td>
<td>England</td>
<td>E.O.</td>
</tr>
</tbody>
</table>

*See also the latest R.M.I. logs.

Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS
Graham Tanner, 42 David Close, Harlington, Middlesex UB3 6EA

I've just seen the January edition of this column, and it is full of gibberish! My spelling-checker had run amok and the text doesn't quite make sense. Rather than re-do the whole column with corrections, if you want a corrected copy, please send me a s.a.e. and I will send you a copy. My apologies to Michael Schulsinger whose name was changed as a result of the spelling check.

Letters

Stuart M writes from Surrey with details of how he rediscovered his interest in short wave listening. He started with a Lowe HF-150 and a random wire, and quickly moved up to a full blown SDR and Glass II a.m. Next came the Lowe AT-150 computer interface that makes the HF-150 easier to use. The 'computer to drive the HF-150 is a Psion program specially written by himself. His log covers some interesting items heard during the past year, and some of these are included later in the Traffic Log.

Stuart asks if there is any chance of a feature on either the British Army or RAF (or both) and their use of h.f. communications in running this feature so far, as once I produce a list of frequencies they are sure to change them. Finally, Stuart asks if I use any bulletin boards - yes I do, I regularly check into the Fidonet Shortwave Echo available on the Packet BBS (081-547 1473) in south west London. This contains a lot of interesting information on the broadcast bands and a few interesting 'utility' items.

Mrs Reed from Cheltenham writes and asks that I publish more information on shipping and maritime traffic. She lists to the Traffic Lists transmitted by Niton and Stonehaven, and asks if anyone has heard the Q2 or any of their frequencies. Although I have not managed to hear that particular ship, I do know that the callsign for this is GBTT. Has anyone heard the Q2 or any other interesting ships on the maritime bands?

Donald Robson writes from Scotland with an impressive log of aircraft traffic heard on the aeronautical bands. This includes aircraft operating in Africa, Africa, Caribbean and the Far East; perhaps the most interesting is his logging of Viteavaine in Laos on 8.942MHz amongst numerous entries for Bangkok, Hong Kong, Manila and Singapore on the same frequency. When I mention that Donald's antenna is just a 20m long end-fed 'inverted L', Donald is another delighted user of the Lowe HF-150.

Answers

The report by Geoff Halliday of Signals from Qatar has been partially answered by Lee Taylor, Craig Otley and Ray O'Keefe, who point out that the callsigns 'Mary 2' and 'Mary 3' are really 'Amiri 2' and 'Amiri 3' respectively. The aircraft concerned are operated by the Government of Qatar from Doha, but used by the Royal Flight. 'Amiri 1' is a Boeing 707, 'Amiri 2' is a Boeing 727 and 'Amiri 3' is another Boeing 707. There are also two Falcon 900s - Amiri 4 and 5. Craig says that he has heard 'Amiri' aircraft asking Speedbird London to ask their Ops to listen on their frequencies.

From this issue onwards I would like to present each month a selection of items from the logs that I receive. These will give you an idea of the sort of details that others are listening to, and also the amount of detail that others provide in their reports. I would like to expand this section, so I am relying on your reports.

Traffic Log (frequency in MHz, all u.s.b. unless indicated BVI = Broadcast V.H.F. Internationl Radio)
Newcomers are not the only readers to be confused by the jargon of flight. Because information is repetitive and has to be conveyed quickly by radio, so much relies on abbreviations and context. Elsewhere in this special aeronautical issue you'll find an article that I have written to try to disentangle all those numbers with which pilots fill their speech. Questions and feedback via this column please.

Help Please!

Peter Wide (Sevenoaks) is better known for his contributions to the satellite imaging columns. He sent a copy of Remote Imaging Group Journal (No. 35) in which David Watson (University of Leicester) describes a strange appearance on two consecutive pictures from NOAA 11, early afternoon, 15 April 1993. Despite cloud cover elsewhere in the picture, the south-eastern corner of England is distinctly visible. Stretching from the Thames Estuary, along the east coast to Great Yarmouth, and then continuing onwards as far as gain over the North Sea, is a helical pattern. The pattern is more distinct over the sea, tending to break up over the land. Between the two pictures (100min apart) the pattern changes slightly and drifts south-east at 8kt.

What is it? Two aeronautical theories are vortex wake and condensation (vapour) trail. Assuming that this pattern was made at trailing altitude, comparing its projection on the ground with feature known as 'The Wash', and by the method of similar triangles, I estimate one turn of the helix to be over 21nm in diameter. This is vast when compared to a vortex wake (the latter being contained within a few hundred metres at the most).

At jet aircraft speed, one turn would have taken over 8min to produce; 10 distinct turns are simultaneously visible over the sea alone. By the time an aircraft reached the terminus of the pattern, vapour deposited at the beginning of the trail would usually be long gone. I'm surprised that so much is still visible 100nm later in the next picture. David Watson thinks that conditions were specially favourable for trail persistence on that day. Adjustment of the picture contrast shows other linear tracks that could also be long-lived trails from other flights. What are your theories?

Follow-Up of a Foul-Up

In February, 'Airband' reported another instance of an arrival landing on taxiway 2 at Gatwick when the northern standby runway was in use. In fact, according to the official source (AAIB Bulletin 12/93, ref: EW/C/310/4) 9H-ABA was cleared to land on 26R and, despite correct aerodrome lighting, the experienced crew still managed to convince themselves that the taxiway was the place to aim for. No harm done - this time.

A reminder to all. Runways have bright white lights; combinations of edge and/or centreline lights are found at airports of varying sizes. Taxiways have green centreline and blue edge lights. Always. Runways - never! In order to gain from the experience, the authorities are investigating what further improvements can be made to Gatwick's runway lights in order to prevent a recurrence. That's what accident investigation is all about.

You Write

Accident prevention is, of course, better still. The local airfields near John Fogg G3PHZ (Leighton Buzzard) are Dunstable and Cranfield. Both have giding activity. John warns of the hazards of flying on such aerodromes without clearance. The trouble, John, is that the launch cables aren't easy to see when flying in the grass. The winch is at one end of the field, the glider at the other. Imagine what could happen if a vehicle drove onto a cable just as the still-distant glider lifted off!

Lockheed SR-71 Blackbirds were once flown on high-altitude spy missions. Darren Bruton (Birmingham) will be interested to know that their engines were a cross between a conventional jet and a rocket, enabling high-speed flight in rarefied air making it harder for the 'enemy' to detect them. Many have ended up in museums in the States, but does anyone know of one over here? Readers in Darren's area would find a visit to the RAF Museum, Cosford, of interest and you can ring for details on (0902) 374112.

In order to rescue troops (or downed pilots) from enemy territory the USAF operate low-flying helicopters. In peacetime they still keep in practice. Philip (RAF Retired, Northants) notes that they've been doing this at night in his area - and some residents have voiced their disapproval in a local paper.

Low-level sorties generally keep radio silence for security - and anyway, they are too low to transmit any distance back to a controller. Navigation is visual, by self-contained inertial references, or satellite Global Positioning System (GPS) involves receive-only by the aircraft. Night-flying without lights should normally only take place in assigned danger areas, of which there are none near Northampton.

Temporary restricted airspace might have been used instead but I didn't see any promulgated by AIC. Perhaps it was NOTAMed? The justification for training in Britain (rather than the USA or Canada) is, I believe, its closer similarity to other parts of Europe where real hostilities might occur. I'm concerned about the Eastern Bloc, however, appears to have subsided.

Anne Reed G2016/RS8771 (Cheltenham) reports a non-event. A Concorde was scheduled to circumnavigate the globe in record time starting on New Year's Eve, routing from Paris to Bahrain, Bangkok, Guam, Honolulu, Acapulco, Bermuda and back to Paris. One advantage is that is a New Year's celebrations but the price of nearly £17000 is a little daunting. In the end there were too few takers and the trip was cancelled.

One important point. Anne received information from the Concorde Society, run by Goodwood Travel Ltd. of Canterbury. Membership was by annual subscription. I am now told that this Society has been disbanded, although I don't know what effect (if any) this might have had on the travel company.

DC-10 in the tanker role. Taken at Mildenhall Air Fete 1993 by Christine Mlynnek.

Information Sources

Tim Christian (157 Mundersley Road, North Walsham, Norfolk NR28 0DD) presents his thoroughly-researched booklet World HF Aeronautical-Mobile R Frequency Allocations that is brought up-to-date with a 1993 appendix. All known allocations are listed in frequency order and a map of the h.f. circuit areas is included. Existing purchasers can update by buying the appendix alone (£2.00) or you can have the whole work for £6.99 (prices include UK postage, cheques payable to Lylethics). For overseas postage I suggest you add an extra £3p (appendix only) or £1.57 (whole book).

For more details on flight arrival information as transmitted by satellite teletext services, take up the offer of Ian Doyle (114 Barton Lane, Eccles, Manchester M33 0PS). A stamped reply envelope plus remittance of £2.00 will get you Ian's information on the subject. I briefly mentioned this service last month and also in past issues.

VFR in the London Zone

There are so many light aircraft flights in the London zone that L Meadows (Chiswick) is getting worried as to how they are all controlled. Some of those proliferating local radio stations want their own observation flights to bring up-to-date traffic reports. Genuine emergencies are assisted by medical evacuation helicopters and police helicopters also perform various duties.

These flights are handled just as any other light aircraft in the area. Penetration of the Control Zone itself is possible by calling Special VR, a radar service on 119 MHz. The problem is that clearances are for low levels, often not above 1000ft altitude, and this restricts where single-engined aircraft can go. They must be near...
open country for a forced landing in the event of engine failure. Just outside the Zone, these flights often work Thames Radar 132.7MHz. When medical evacuation helicopters operate near light aerodromes, a courtesy call is also advisable. An example is the helipad at the Royal National Orthopaedic Hospital, Stanmore; when bringing in spinal injuries etc., a call to Elstree on 122.4MHz is helpful.

Low operations are possible under the Heathrow approaches, as long as the helicopter doesn't interfere with the 3° glide slope. Remember that this rises 300ft relative to the ground for each nautical mile away from the threshold.

I'm not sure what frequency L. Meadows intends by 119.7 as Heathrow is on 119.725MHz. In general, could readers refer to facilities by name (e.g. Heathrow Tower) as well as frequency - otherwise I can't tell which station you mean! Now, there's a new national frequency for helicopters and I'll explain all about it.

Frequency and Operational News

AIC 171/1993 from the CAA introduces a new concept: Departure Communication or DEPDCOM for helicopters (122.95MHz). The advantage of a helicopter is that it can land at small, remote sites, not intended for aeronautical purposes and certainly not equipped with a ground radio station. At such locations, helicopters may transmit their departure intention on the frequency in case another machine is about to arrive. Arrivals should listen out on the frequency but may not transmit.

With the closure of the air base, the Upper Heyford Mandatory Radio Area ceases. This was an anomaly, not exactly controlled airspace but requiring co-ordination by radio. Some light airfields were enclosed in the area, and there were even exceptions made by way of access lanes to certain of these. Will they also remember to remove the road signs that are found all round the area and warn you of low-flying aircraft?

The next three deadlines (for topical information) are March 11, April 15 and May 13. 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 5153 (before 2130 local please).

Abbreviations

AAIB Air Accidents Investigation Branch
AIC Aeronautical Information Circular
CAA Civil Aviation Authority
ft feet
h.f. high frequency
kt knots
MHz megahertz
min minutes
nm nautical miles
NODTAM NOTice to AirMen
R/T radiotelephony
USAF United States Air

Chevron microlight at the PFA Rally, Wroughton 1993. Taken by Christine Mlynek.
My thanks to all those readers who have written in for further information on the subject of Radio and TV outside broadcast communications. Jack Mullen of Surrey pointed me in the direction of a DTI Radio Communications Agency Information leaflet (RA135) entitled Ancillary services for independent programme making. Information Sheet: General. This describes the frequencies available for various radio devices used in programme making for radio, television, films, advertisements, videos and other events allied to the entertainment industry. These can include equipment for talkback, cueing, advertising, video links, radio microphones, data and remote control links.

The frequencies mentioned in the leaflet are administered on behalf of the DTI by a company called ASP Frequency Management Ltd. They co-ordinate the use of the limited number of channels available and issue the licences. Users of these frequencies are likely to be independent production companies making programmes for the national networks (for whom many employees of the new companies used to work). This usually entails only short periods of work on location, which could be almost anywhere in the UK or Europe. For this reason, the frequencies tend to only be used for a limited period before they are reallocated to another company.

On the other hand, the BBC and major independent radio and TV companies have their own separate blocks of frequencies that tend to be allocated on a shared basis with other users such as the MoDo, this is because they have a continuous requirement for radio communications and are generally confined to fixed geographic locations.

Another reader with an interest in outside broadcasts is Allen Foss of Birmingham. He often hears the BBC setting up television outside broadcast links over a very wide area using what he believes to be a base station at Sutton Coldfield operating on 76.225MHz. He also sent me details of frequencies (obtained from a Packet Radio BBS) that are used by the BBC for local radio station outside broadcast links, which he notices have gradually moved away from u.h.f. to segments of Band III, presumably because of pressure from commercial users.

Bert Tisbury of South Yorkshire and A Johnston of Humberside both enjoy listening to horse racing commentaries from many race courses within monitoring distance. The 455MHz band seems the most popular choice for this purpose but occasions in the 141 and 786MHz channels can be heard. Bert comments that he has yet to hear any inside information that could be used to advantage! But he does find the off-screen comments between the director, camera operators and commentator amusing at times.

Flying Saucers
You may remember some time ago I mentioned a story about the police in Cheshire setting up a fake UFO landing in order to catch scanning enthusiasts who were monitoring their transmissions (the police not the aliens). Well, those little green men have been sighted again, according to a report in the Guardian newspaper, which was subsequently repeated with additional errors on Ceefax. This time the Yorkshire police have been credited with trapping several scan fans, who during 'Operation Marconi' were lured to a remote area by fake radio reports of crashing objects and high levels of radiation. It sounds to me like anyone turning up at such a scene needs locking up for their own safety!

Now you may call me sceptical, but this story has resurfaced several times during the past year, including fake sightings in Holland and Lincolnshire. A very similar story line featured in one episode of the TV series Harry. I would think that this story will re-appear at least one more time, so keep your eyes on the heavens and the pages of your local newspaper for the next sightings, and don’t believe all you hear (or read).

Marine Communications
Jeff Dryburn of Dorset is a keen sailor and often monitors the v.h.f. marine band. Whilst looking through one of the frequency guides he spotted an international u.h.f. allocation for on-board ship use at around 467MHz. He has never heard any activity on the channels listed and wonders what they could be used for.

Well, this one does seem to be a bit of a mystery. I have asked a few people with maritime connections, but none of them were aware of the frequencies. However, I think the origin of the allocation is probably American as an old US frequency listing I have features the same channels, with a few additional ones either side, as being used for dockside and cargo handling purposes. It may be that the channels were originally used for cargo handling operations on-board ship but this may now have been extended to security/safety locations personnel on large passenger vessels such as cruise liners, where it may be confusing to use the normal v.h.f. marine band in situations such lifeboat drills, etc. I know that the frequencies have been used in the UK at some stage because once bought a box full of u.h.f. hand-held transceivers operating on these channels at a marine auction.

Are there any sailors out there who can shed further light on the mystery?

Keeping Track
Andy Middleton has sent me details of an interesting piece of software he has written to run on the Atari ST. The program is aimed at scanner users who just tend to monitor one type of radio traffic such as airband or marine communications. The purpose of the program is to help keep track of callsigns, times and movements. For example, when you hear a particular callsign being used you can enter it into the program along with any comments, for example: Concord 3, 1137, Oceanic Clearance. This quickly builds up into an extensive operational log of callsigns. This is great if you are an aviation enthusiast, but I am equally sure that other scanner owners will find additional uses for it. If you own an Atari ST and would like a copy you can send £5.00 to: Andy Middleton, 89 Crediton Road, Okehampton, Devon EX20 1NU.

Selection of antennas used during a Radio One Roadshow

What Is It?
As a result of mentioning the increasing number of digital transmissions appearing throughout the radio spectrum, several readers have asked me to try and identify strange signals that they have heard. The first request for help comes from Frank Holton of Merseyside. He has monitored strange melodic tones at various times of the day and night on frequencies around 403MHz. Attempts at direction finding have proved difficult and he wonders if it is some sort of satellite he is hearing.

Well I don't think so Frank, but you are nearly correct, I believe what you are hearing is a meteorological sonde. These are small low power transmitters that are attached to helium filled balloons. They tend to be launched at regular intervals from various locations around the UK such as the meteorological office site at Hembsy in Norfolk. The progress of the balloon can be tracked by radar as it also carries a light-weight reflector as well as the active electronics module.

Radar plots can be used to determine wind speed and direction at various heights, whilst other parameters such as air pressure (and height), temperature and humidity are signalled back by means of the audio tones you can hear. As the balloon increases its altitude, the helium pressure inside the balloon expands the envelope (because of the reduction in the outside air pressure) to such an
extent that the balloon bursts. A parachute ensures that the transmitter gently falls to the ground - where some lucky person obtains a gift from the gods.

A Smith of West Sussex has been hearing strange chattering noises in various places in the u.h.f. band, he thinks that they may be coming from the continent but he can't think what sort of purpose they could be used for. The most likely answer is that the signals are part of a French position fixing system called 'Syledis'. This uses synchronised pulsed signals transmitted from several fixed locations to provide accurate positional information for mobile stations.

Typical 'Syledis' centre frequencies include 408, 419, 432, 438, 442.25 and 445.25MHz and the main users of the system tend to be oil exploration companies who need to know where they are to a high degree of accuracy. The system does have one major disadvantage however, which is that the transmissions being of a pulsed nature tend to spread over quite a large frequency range. This can cause interference problems to other communications systems, and UK radio amateurs in particular are well aware of 'Syledis' operation within the 430MHz amateur band.

Fortunately, the system is now starting to be phased out in favour of satellite navigation or more accurate land-based microwave beacon networks.

John Gebbie of Cumbria has sent me a cassette recording of sounds similar to random notes on an electronic organ with 'pip' tones between groups. He has heard these on frequencies around 8742MHz and wonders what they are. I'm not too sure about this one but my first guess is that they form part of a radio linked telemetry system. The block of frequencies they lie in tend to be used by local councils or community nurses so it could be some form of wide area radio alarm or paging system. Does any one out there have any better ideas?

Once again my thanks to all those readers who have contributed to the column. If you have a question or information you would like to share why not drop me a line. Until next month - Good Listening.

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Once again my thanks to all those readers who have contributed to the column. If you have a question or information you would like to share why not drop me a line. Until next month - Good Listening.

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OPENING TIMES: Tuesdays to Fridays: 09:00-17:00 & Saturdays: 09:00-16:00.
During both December and January, weather remained a prime talking point. In common with many 'Info' readers, I spent a considerable time monitoring UK weather (we were suffering excessive rain) and that of Australia (drought and fires). I used the animation facility on my software almost daily, monitoring bands of rain clouds as they came off the Atlantic, one after the other. It does appear that the short-term forecasting one can do from two or three METEOSAT pictures can sometimes be more accurate than official forecasts. On occasions, national TV forecasters have shown Devon under heavy rain - while we were actually enjoying a rare sunny day.

This month sees the start of a new regular feature - PDJS and h.r.p.t. - the ultimate in WXSAT images. I will be interested to hear readers' comments, views and suggestions. A few correspondents have asked for construction projects to be provided. I'll bear this in mind.

Current WXSATS

The CIS WXSAT METEOR 3-5 continued to transmit visible images on 137.20MHz during its morning ascending passes over Britain in January. As these passes became earlier each day, the WXSAT eventually ceased transmissions, even before passing over the UK. Because it was travelling south to north, it might be of interest. Frank Slater of Spalding sent Fig. 1, a re-transmitted WEFAX infra-red GMS A-format image. This features typhoons near China, Korea and the Philippines as seen on December 7.

Frank Slater of Spalding spotted Fig. 2, reproduced here with kind permission. It shows the moon on a GMS-4 image on January 2 and sent me a copy of the image. He wondered whether such things are normally edited out before transmission. I believe that only ESA METEOSAT images are edited in this manner. Chris had originally been monitoring typhoon activity in Australasia, using the autosave facility to store the GMS images.

Beginners

I receive many letters from new readers of this column, requesting basic information on receiving WXSATs. At the risk of sending those with more experience on to the next column, perhaps this piece will provide some guidelines.

The Bands

Almost everyone has a domestic radio. Such receivers often have a number of bands, ranging from short wave up to fm. (88 to 108MHz). Each contains broadcasts of similar type, from RTTY and other utility transmissions, (that are heard all over the lower frequency bands) up to the high quality radio broadcast bands, that have wide bandwidths, positioned in the 88MHz region.

Situated a little further up the radio spectrum, is the first part of the WXSAT band - that between 137 and 138MHz. Any receiver that can tune to this band, and has some form of external antenna - even a long wire - will be able to hear several WXSATs when they pass above the local horizon. There may be up to four American WXSATs and perhaps two CIS WXSATs in operation during the day (see frequencies).

We can easily monitor WXSAT operations without any further decoding of the signal. Just wait, preferably outside, with a hand-held scanner fitted with a rubber duck, and along they will come! If you are lucky enough to run on your computer you can predict arrival times for each WXSAT. Be warned - this becomes addictive. Suddenly you are able to positively identify each transmission, and perhaps even estimate when the CIS satellites will switch off!

At this stage you can listen carefully to the signals and experience fades. You then notice certain parts of your local horizon restrict the signals. You may hear characteristic types of interference. A conventional receiver is not designed to reject page QRMs, so you will hear this at regular intervals. Such simple monitoring using "already-to-hand" equipment can allow you to acquaint yourself with the WXSAT scene.

Several readers, including John Fitzsimons of Sligo (Republic of Ireland) have monitored satellites in this way for a long time. John's scanner is fed by a Discine, and he can monitor MIR, amateur radio satellites, the NOAAs and METEORs and all of the NAVSATS in the 145MHz band. John tells me he was with Martin EG9I last September when they had a two-way contact.
crossed-dipole antenna feeding a Cirkit receiver. He uses Timestep's VGASAT4 software. Andy has found the infra-red pictures to be satisfactory but mentions the low light level of the visible winter images. He sent me Fig. 3, a NOAA 12 image of Britain and Europe, taken at 0812UTC on November 25. He used histogram equalise to raise the image brightness before screen photography.

At the time of writing, Andy noted the few METEOR transmissions that were available. As mentioned at the beginning, recent transmissions have only been during sunlight passes, so have been limited. Geoffrey Chance of Redruth comments on the difficulty in buying a high quality bubble-jet printer without having the opportunity to try it first. I believe that certain stores may allow you to try such equipment before purchase - may I mention Argos?

Post for this column falls into definite categories; several dozen requests for Kepler elements arrive each month, mostly for the WXSATs and MIR; several more request elements for other satellites. All these are dealt with within a day or so. The next group are those requesting simple information, and (where an s.a.e. is enclosed) are dealt with almost immediately. A few provide a long list of questions which, if dealt with individually, would take me a day to reply usually incorporate these into the column when appropriate.

BBS

In addition to those BBS (computer Bulletin Board Systems) that provide Kepler elements for WXSATs, and have been mentioned in previous months, I have been asked to mention Prometheus, a Viewdata-protocol BBS dedicated to astronomy and space-related material. The number is 081-300-7177. Unfortunately I have been unsuccessful during attempts to log on to this board. Maybe others will have more luck.

Fig. 3: Britain and part of Europe from NOAA-12 November 25 from Andy Freeman.

PDUS and HRPT

Primary Data (PD) from METEOSAT and high resolution picture transmissions (h.r.p.t.) from the NOAA WXSATs form the top end of direct image reception and monitoring available to the amateur. From this edition, I hope to produce a guide for these two technologies so much to vitiate the palette, but really to keep readers up-to-date with developments.

I operate a Timestep PDUS system myself and know of others who use either this or other hardware. At least one reader built his own system. Where appropriate I will give pricing or contact information.

Primary Data User Station (PDUS)

A glance at the transmission schedule issued by ESA shows that WXSAT-4 uses two WEFAX frequencies for disseminating image data. WEFAX transmissions are mainly on 1631MHz, with a few extra transmissions also disseminating on 1805.5MHz. This latter carrier frequency is used mainly for transmitting digital (primary) data. In my view, the visible-light image showed it to be of high quality.

My first unit (a down-converter) contained a faulty crystal so for many months I did not know that reception of whole disc images (the DTOS, etc.) was possible. WEFAX reception is discussed regularly in the column so this section will concentrate on Primary Data.

Our interest is mainly in decoding but it is worth appreciating that METEOSAT also provides a number of meteorological services using other frequencies. These transmit encrypted data for the professionals, and as many readers know, encryption is slowly creeping up on us all.

Although both WEFAX and PD use similar equipment, i.e. a dish, pre-amp, receiver and decoding board (that fits in the computer), the true resemblance is minimal. The equipment specification for quality reception of primary data is of a much higher level.

Specifications

We should look first at the official specifications. EUMETSAT states that an SDUS (secondary data - WEFAX - user station) requires a 'basic performance figure (G/T) of 2.5dB/K, with 10.5dB/K for PDUS equipment.

Using more easily appreciated terms, the minimum specified dish sizes are 1.8m for WEFAX and 2.4m for PDUS. These sizes allow for a nominal received signal strength from the WXSATs, and also for a specified antenna beamwidth. Further explanation is needed!

Currently METEOSAT-4, is transmitting at a higher power (signal strength) than its nominal value, so smaller dish sizes can suffice. On some occasions, such as during late January, both METEOSAT-4 and 5 or 6 were transmitting carriers using identical frequencies. If your dish is below the specified size, it will receive both signals only within the beamwidth, and therefore some interference will be experienced. In practice I would be surprised to hear of anybody who actually operates a dish larger than 1m for WEFAX reception. My own PDUS dish is about 1.8m diameter.

It is sometimes helpful to bear these specifications in mind for the future. The progress of digital electronics should ensure that even below-specification dishes can provide satisfactory results for most of the time. I could not accommodate a full-size PDUS dish in my back yard!

Kepler Elements

There is an interest in monitoring many different types of satellite. Following several requests for disk files I am now offering a new service to provide Kepler elements on disk for those who wish to input data without the need for typing entries. If you wish to receive data in this form please send me a disk with £3, and I will provide the ASCII file. Following a request for WXSAT elements, the other containing a large list of regularly available satellites. All data is in NASA two-line element format. Alternatively, I can 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 transmission frequencies if operating. All data originates from NASA.

Late News

Early in February we heard the first signals from the new CIS WXSAT METER 3-6, transmitting good quality (reversed grey-scale) infra-red data on 137.30MHz. This suggested a southbound pass, because it was obviously coming over the dark north pole. Within a minute or so of the pass, an imagery, a stable picture, on a far easier pass, so probably the first of the day.

The second pass, around 1320UTC, was at a much higher elevation and careful examination of the visible-light image showed it to be of high quality.

I was about to construct a "dummoker" Kepler elements for the WXSAT when a call from Timestep Weather Systems informed me that they had them on their BBS! Well done! (Timestep's BBS can be accessed 24 hours a day by anyone with a telephone modem on (064) 320202 using the standard 8-2-1 settings. Licensed Amateurs can also retrieve Kepler sets from Packet Radio BBSes.)

Frequencies

NOAAs 9, 11 a.p.t. on 137.62MHz; NOAAs 10, 12 on 137.50MHz; NOAA beacons on 136.77 and 137.77MHz; METER 3-4 or 3-5 on 137.30MHz & METER 2-21 on 137.5MHz.
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A full range of separate Antennas, Pre amplifiers, Cables, Receivers and accessories are held in stock.
Egbert Hertsen of Mechelen in Belgium is just getting started with utilities and would like to use his ageing Commodore C-64 computer. The main source of software for the C-64 is through programs developed for amateur radio. A good starting point is J & P Electronics, Unit 45, Meadowmill Estate, Dixon Street, Kidderminster DY10 1HH, Tel: (0552) 753883. Not only can they supply software for the C-64, but they have packages available for Spectrum, VIC20, C-16, +4, Amstrad 48K/828, MSX1, BBC B, Dragon, Atari 400/800 and Atari ST/STE. All of these packages are very reasonably priced. If you have any information regarding software for some of the less common computers please write with the details.

Wilson Convery of Norwich uses an old Creed teleprinter to receive RTTY broadcasts. The only problem being that he gets through large quantities of paper whilst trying to find 50 RTTY signals. He has written to ask if I know of a device that can monitor the received signal and indicate the baud rate of a signal. Other than using a computer with its own RTTY program, I don't have a simple solution - can anyone out there help? If so please drop me a line to the address at the head of the column.

AMVER?

Last month Mr M Cox of Wigan wrote asking for an explanation of the word AMVER that's often to be found when monitoring American c.w. stations. Having made the appeal through the column, several of readers have written with the answer. One from a regular contributor is a comprehensive answer.

AMVER is in fact an acronym for Automated Mutual assistance Vessel Rescue system. The system is operated by the US Coastguard and is designed to help coordinate search and rescue operations. Vessels involved in the scheme send details of their movement plans to the US Coastguard in New York via co-operating coast stations. The stations involved in the scheme can be recognised by the phrase "OBS AMVER" included in their ID tapes. You may also catch the ship transmission giving an AMVER report. These can be recognised as the message is preceded by AMVER/RP/. The messages generally use the following basic structure:

A/ Vessel name and callsign
B/ Date and time (UTC)
C/ Lat and Long

E/ Course (3 figs)
F/ Average speed (3 figs = knots and tenths, no decimal point)
It may also give:
G/ Point of departure
H/ Point of destination/ETA
I/ Route information (e.g. rhumb-line from X to Y)
J/ M/ Coast station being monitored

All the information received from AMVER reports is passed to the USCG computer that keeps dead reckoning positions. Should any vessel meet with a problem, the computer can be used to ensure any search and rescue operation is directed to the right area.

Apparently UK coast stations used to accept AMVER messages free of charge but the government stopped paying the fees last year so now the ships have to pay. The only other European system that you may find on the h.f. bands is the Italian ARES or Automated search and Rescue System. Just to illustrate the point here's a sample ARES message received during January from the vessel Jemima-M using callsign CBMF:

231530/JM JEMIMA-M/F0 DIFMAR/BT/ARES/08/MOD/01/199 4//
A/CBMF/JEMIMA-
M/BAHAMAS/B/231530/C/4045N/0 943W/
L/ 34111/000W/L/4830N/0517W/L/49 50N/0250W/AR

Messages for this system are addressed to DIFMAR using Italian coastal radio stations.

Moving wider afield, the Japanese have JASREP, India have INSPIRES and Israel use MOT. If you have any sample messages or have details of the formats used then please drop me a line.

Utilities - Getting Started

Following my offer to supply readers with free copies of the FAX program JVFAX I've received a number of letters from listeners who see the JVFAX program as a cheap and easy way to dip a toe in the black art of utilities!

The majority of these letters ask a wide range of basic, but very sensible, questions. The problem is there are no publications that really give a beginners view on how to start up in this game. The situation is further complicated as the range of decoding systems and information being transmitted is constantly changing. It's at this point that I'll try and lend a helping hand with a topical view of the utility scene today.

One of the first issues to tackle is that of the difference between h.f. and v.h.f.u.h.f. as many listeners have interests that span the complete radio spectrum. It's important to realise that there are a number of very distinct differences between h.f. and the higher frequencies and they can almost be considered different mediums, both in terms of the type of transmissions and the reception techniques. As a general rule the v.h.f. and u.h.f. bands are only really suitable for line-of-sight communication links and so give access to primarily local information. The only reliable exception to this is when receiving signals from satellites. In this case the link is still line-of-sight, but the distance to the satellite can be as much as 28000km for geostationary satellites such as those used for TV and the popular Meteorosat.

It's also worth noting that the v.h.f. bands can give rise to transmission over much greater distances under favourable weather conditions. A typical example of this is the enhanced propagation that occurs during periods of high pressure in the summer. This is when we find our TV pictures suffering interference from foreign stations. Many listeners look out for these conditions so they can receive transmissions that are not normally accessible. For more details on this you need to keep an eye on Ron Ham's 'Propagation' column.

The h.f. bands on the other hand are used for much longer range communications and can reliably circle the globe.

From the point of view of receiving signals from h.f. and v.h.f.u.h.f. as many listeners have interests that span the complete radio spectrum. It's important to realise that there are a number of very distinct differences between h.f. and the higher frequencies and they can almost be considered different mediums, both in terms of the type of transmissions and the reception techniques. As a general rule the v.h.f. and u.h.f. bands are only really suitable for line-of-sight communication links and so give access to primarily local information. The only reliable exception to this is when receiving signals from satellites. In this case the link is still line-of-sight, but the distance to the satellite can be as much as 28000km for geostationary satellites such as those used for TV and the popular Meteorosat.

As a result, most people use a very simple h.f. antenna system known as the random wire (or incorrectly the long wire) antenna. This is just as long a length of wire as you can muster run over as much space as you can. Although it works best if kept in a fairly straight line, it's not unusual to find these antennas circling the garden or even the loft. The one golden rule is to keep the antenna well away from sources of interference such as TV antennas or mains wiring. If you're
faced with a long lead-in to get from the antenna to the receiver you might like to consider using the Love Magnetic Longwire Balun (£39.95). This compact device provides the necessary coupling to enable your long wire to be fed with coaxial cable and so help reduce the risk of interference.

Moving on to receivers, there are a few that successfully cover both h.f. and v.h.f. from a utility point of view. This is due to technical compromises that have to be made to give such a wide coverage. Most of these receivers are designed to offer this extensive coverage are really optimised as v.h.f. receivers with h.f. as a bonus. For h.f. reception there are a number of smaller receivers appearing on the market that are particularly suitable for those new to utilities. Typical examples are the excellent Love HF-150 and the Yaesu FRG-100, both of which have been reviewed in SWM.

The important characteristics are frequency coverage from at least 700kHz up to 30MHz, with minimum tuning steps of 10 to 15Hz. In addition, the receiver must have excellent frequency stability (especially for FAX) and be able to recover, u.s. or u.c. A further point to consider is that of computer control. When listening to a wide range of transmissions it can be very useful to use your computer both to control the receiver's operation and store your favourite frequencies. Particularly neat combination can be found with the using the HF-150 with the Modemaster decoder. This set-up brings the decoder and receiver into one co-ordinated package to give computer control.

Before I look at the various decoding options, let's just take a look at the type of information you can expect to be able to receive.

PCs: There is a wide range of radioteletype (RTTY) press services operating throughout the h.f. bands. Most of these originate from Marconi and eastern Europe with just a few from the Far East. Most of the more developed countries have now converted to satellite based distribution systems. In addition to RTTY services there is just a few press FAX transmissions that send news photos. Most of these currently originate from South America.

Aeronautical: There are a few stations transmitting flight plans, some of whom use standard RTTY whilst others use more complex TNC modes. These advanced modes are only available when using top-of-range decoders.

Meteorological: There is a vast range of information available from a limited amount of plain language forecasts to masses of Synoptic coded data. The Synoptic data can be decoded into plain text using systems such as the Synoptic decoder from ERA or Skyview Systems. There are also a very wide range of weather FAX images available from all over the world. These can be decoded very easily using a number of FAX reception packages.

Military: Although there are loads of these transmissions spread throughout the h.f. bands few can be decoded by the amateur. Many of the more modern systems use complex pseudo-random transmission modes that cannot be decoded with any of the amateur decoding systems on the market today. These transmissions do however, cause a lot of bother with utility listeners as they sound for all the world like normal RTTY. The other snag with military transmissions is that even if you are able to decode the transmission system you may well find that the message itself is encoded!

Diplomatic: Many of these transmissions can be further decoded using the more obscure modes. Like their military counterparts, message encryption is used extensively.

Maritime: This is perhaps one of the more popular transmission types and there's lots to decode. Transmission modes include c.w., RTTY and ARQ and primarily handle basic ship-to-ship communications.

Decoders

For decoding these signals you need to decide whether you want a stand alone unit or would prefer to use your own computer. For stand alone decoders, the units from ERA and Momentum Communications represent very good value and provide access to the most of the more popular modes. For more advanced stand alone units, take a look at the Universal range from Martyn Lynch. I recently reviewed most of the range and they proved to be very capable decoders. Another model worth investigating is the Wavecom V4040, though I'm not sure who's handling it now. If you prefer to use computer based decoding there are a wide range of systems available. By far the most popular computer is the IBM PC or clone but these can be picked up at very reasonable prices. The PC is very well supported through specialist packages from companies such as Comar, ICS, Love and Grovesnor.

To help you give a better idea on how to put together a station, next month I will include details of a variety of readers stations.

JVFAX -Update

My offer to supply copies of this excellent FAX and SSTV package has, I'm pleased to report, proved to be overwhelmingly popular - for the first few weeks I've been bashing out copies at the rate of a hundred a week! Just so that I can keep my sanity, I can ask that you make sure you send formatted disks - I can handle 720K or 1.44Mb. It is also not a good idea to send old or cheap disks as they often fail - I make every effort to ensure you get your own disk back so you won't lose out by sending a good disk.

Some readers have been using the program with mobile computing and running into a few problems when trying to receive the higher resolution FAX pictures. The solution is to alter the interrupt frequency using the configuration menu. By reducing this parameter you limit the number of dots per line and so reduce the demands on the processor.

Next is to make sure you set the Demodulator to '4-7 bits Comparator' using the configuration menu. Many newcomers make the mistake of setting the Demodulator too small when using the simple interface.

Don't forget, JVFAX includes a host of amateur SSTV transmit and receive modes, but more of that later.

JVFAX Interface

One of the problems facing newcomers to JVFAX is getting hold of a suitable interface. If you are able to use a soldering iron and have some basic skills you will find that the simple comparator interface is quite easy to build. However, I know from experience that many listeners don't have any facilities for even simple construction. You will be pleased to know that help is at hand from a High Wycombe based electronics company.

Pervisell Ltd are now taking regular adverts in SWM and have sent me a sample of their JVFAX interface. This is an updated version of the JVFAX simple interface and features a faster Op-Amp to enable higher definition. Having tried the interface I can confirm that the performance is excellent with a noticeable, if not remarkable, improvement in resolution.

I also took the interface apart to check the build quality. I have to admit I was very impressed as the unit uses modern surface mount technology based around a high quality glass-fibre p.c.b. that mounts directly onto the 25-way D connector. This connector and the 3.5mm jack were very good quality and the connecting cable was securely attached to the plugs. Perhaps the most amazing thing of all is the price - just £16.99 inclusive of VAT and postage! The only reason they can achieve such competitive prices is by combining the interface production with their main commercial operation, which is the manufacture of high density chip microcontroller products for a major international companies.

An added benefit is that the JVFAX interface passes through the same quality check processes as their main core products. In fact the performance and quality is so good it's almost not worth building your own! The latest news is that they also have plans for a sophisticated interface that will give access to high resolution grey scale images. For more details contact Pervisell Ltd, 8 Temple End, High Wycombe, Bucks HP13 5DR. Tel: (0494) 443033. My thanks to John Perkins for the supply of the review sample.

Special Offers

I can offer a number of services that are designed to make life easier for the utility listener.

Perhaps one of the most popular is JVFAX v6.0. This software package for IBM PCs and compatibles gives access to the world of FAX and SSTV for very little outlay. For your copy just send me a blank, formatted 1.44MB diskette (720K or 1.44Mb), sticky return address label and three first class stamps. You don't need to send return mailers as disks are sent out in a padded envelope. If you just request a copy of the program then the turn-round time is usually only a day or two, but if you ask questions in the letter please be prepared to wait about three or four days because I can't always answer the queries instantly.

Next in line comes the Day 300, 3030. This Frequency Spectrum Analyser that has just been updated to version 1.9. I can also offer the latest Decode list of stations reported by regular readers. For either of these lists just send three first or second class stamps and a sticky return address label to the address at the head of the column.

Of course, your logs and pictures are always welcome, they're what keeps the column going.

PIAB Schedule

Werner Merz of Colchester has sent me an interesting schedule for the German press station PIAB Bonn. This station uses the FEC-A transmission mode running at 9600 baud and will only be available to those with the more advanced decoding systems.

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### Long Medium & Short Wave Chart

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

#### Short Wave

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#### Medium Wave

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</table>

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

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**Note:** Entries marked "were" were logged during SUSA. All other entries were logged during daylight or at dusk/break.

---

**Reference:**
- Short Wave: Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS
- Medium Wave: Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS
- Long Wave: Brian Oddy G3FEX, Three Corners, Merryfield Way, Storrington, West Sussex RH20 4NS

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**Listeners:**
- K. Ronald Kipper, Co Lendrum.
- R. Ted Barby, N London.
- B. Ross, Sunningdale.
- N. H. MC-V, Schooner St.
- J. R. L. Stanton, Bingham.
- E. J. John, Fulham.
- M. E. K., Wintergreen.
- J. R. B., Kenley.
- D. S., Markfield.
- J. R. D., Hove.
- J. H. H., Ilfracombe.

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**Note:** I & M: frequencies in kHz; s.w. in MHz; T.C.: Tunes in Cents; Unless stated, all logs compiled in the week period ending December 31.
Although the time system used in the UK changes from Greenwich Mean Time (GMT) to British Summer Time (BST) on March 27, listeners should not alter the clock by their receiver.

International broadcasters refer to the times of their transmissions in Universal Co-ordinated Time (UTC), which for most practical purposes is the same as GMT. All times quoted in LMC columns are given in this system, so when sending your contribution please be sure to state the times in UTC and not BST.

### Long Wave Reports

The broadcasts from nine I.W. stations in Europe and N Africa reached Canada at night over the International Date Line On December 20, Alan Roberts (Quebec) heard the BBC shipping Long Wave Reports contribution please be sure to state the times by their receiver.

Indicated poor reception of their signals that morning, yet remarkable SI0555.

The report from Ted Bardy in N London also reported a remarkable SI0555.

Co Fermanagh, he found conditions less than perfect for the first time by Darran Taplin in Brenchley.

It was just audible at 2250 but an ident could not be obtained until 0345. By that time it rated much of the N Atlantic path is still in darkness at 1152

England.

Other transatlantic signals was compiled in Alan Roberts (Quebec) heard the BBC shipping Long Wave Reports

### Medium Wave Reports

Although an impressive list of m.w. transatlantic signals was compiled in December by Paul Logan in Limassol, Co Fermanagh, he found conditions less than perfect for the first time by Darran Taplin in Brenchley.

In the morning the occupants of this band found they were still audible one hour after sunrise.

Ron Galliers (Islington) listened to a New Year party on 90kHz and suspected it was from CJVY, but it proved to be CBBC in St John's, Nfld at 0108, which was 32232 and peaked 43323 later. CBBC was also heard for the first time by Darran Taplin in Brenchley. It was just audible at 2320 but an ident could not be obtained until 0345. By that time it rated 33333. He says, "One thing I cannot understand is why I did not hear CJVY on that frequency".

Good signals from WBBR in New York on 1130 were noted by several listeners. Gerry Haynes (Bushey Heath) logged them as 34422 SI0444 at 1200 by Tom Smyth in Edinburgh.

In the morning the occupants of this band found they were still audible one hour after sunrise.

Several listeners in the UK picked up the sky wave signals from stations in N Africa and the Middle East after dark, see chart.

BBC R Sussex and BBC R Surrey have formed a new station called BBC R Sussex and Surrey. It is based in Guildford so that new status can be obtained by advantage. The Brighton premises are to house a bi-media news bureau. Offices in other Sussex towns will be opened later.

### Short Wave Reports

The 25MHz (13m) band is still used by four transatlantic signals was compiled in Alan Roberts (Quebec) heard the BBC shipping Long Wave Reports contribution please be sure to state the times by their receiver.

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* Bring & Buy stand
* Amateur Computer stands
* RSGB stand and book stall
* Construction competition
* Organised by over 50 clubs
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1900-2000 44444 at 1905 in Oxted; R Nederland via Bonaire 17.05 (Eng to W Africa 1930-2025) 42323 at 1930 in Newry.

Good reception from many areas was noted in the 15MHz (19m) band in the UK. R Nederland on 15.565 (Eng to S Asia 1100-1300) was logged as S10444 at 1230 by Philip Ramboach in Macclesfield. Their Commercial Broadcast to N Asia on 15.170 (Eng, Chin 0900-1400) was also 13444 at 1348 in Branchley; R Nederland via Fluo 13.700 (Eng to S Asia 1300-1629) 22222 at 1547 in Rugby; R Nederland via Pari 11.700 (Eng to S Asia 0900-1030) 44444 at 1033 in Oxted; M East 1600-1830 45233 at 1606 in Newney, WWCR, Newcastle 13.845 (Eng to USA, 1200-1600) 31333 at 1758 in Macclesfield; VQA via Salleh-Phsil 1930-1945 to Africa 1800-2200 35444 at 1902 by Tim Allison in Middlesbrough,

Several of R Nederland's 11MHz (25m) outlets have been heard in the UK. 11.700 via Brandon (Eng to Pacific 0900-1000) was 25425 at 0859 in Wallsend; 11.660 (Eng to S Asia 1430-2035) 43323 at 1430 in Sladebridge & 1835-2130 55444 at 2130 in Branchley, both via Nanol; 11.595 via Shepperton (Eng to Pacific 1430-2055) 21223 at 1519 in Islington; 1

Also received were KTWR Agana, Guam 11.805 (Eng to Pacific 0845-1100), logged in Guam as 0845-1100 in Morden; HCBQ Juito 11.925 (Eng to S Pacific areas 0730-1130) S10444 at 1120 in Edinburgh & Eng to Caribbean 1130-1230) S10333 at 1230 in Newry.

Voice of the Mediterranean 11.925 (Eng, Ar to N Africa 1400-1600) 44333 at 1403 in Sunderland; R Pakistan, Islamabad 11.570 (Eng to UK 1930-2100) 54444 at 2100 in Rotherham; SRI via Sottos 12.035 (Eng, Fr, Ger to Africa 2000-2200) 24323 at 2000 in Oxford; R Sауrhia, Porto Allegro, Brazil 11.915 (Porto 2000-2100) 2000-2200 in Shepperton, Brazil 11.780 (Por 0900-2000) 34222 at 2000 in Bridgend, R Bandeirantes, Sao Paulo, Brazil 11.925 (Port 0700-0650) 34344 at 0025 in Kilkeel.

Programme for European listeners were noted from R Romaria, Bucharest 11.940 (Eng to 1430-1535) 55555 at 1300 in Radio 119.205, (Eng, Clare Pinder while in Appleby; Polish R, Warsaw 11.815 (Eng 1300-1535) 55555 at 1320 in Newry; RCI via Sines 11.815 (Eng 1430-1500) 54545 at 1400 in Russian and via 11.205 (Eng to Africa 1800-1945) 34344 at 1935 in Stirling, also 15.400 (Eng to Africa 1500-1755) 34333 at 1703 by Vera

Brindley Woodhall Spa.

Later, RNB Brasilia, Brazil 15.285 (Eng, Ger to 1800-2055) 34334 at 1800 by Ross Lockley in Stirling; HCBQ Juito 15.270 (Eng to 1900-2000) 44233 at 1905 in Oxford; SBC via Ascension is 15.150 (Ha to Africa 1800-1945) 34344 at 1935 in Storrington, also 15.400 (Eng to Africa 1500-1755) 34333 at 1703 by Vera

Brindley Woodhall Spa.

Also, heard in the morning were

1. KSDA Agat, Guam 13.720 (Chin to Asia 0900-1400) at 0943 in Wallsend; 11.660 (Eng to S Asia 1430-2035) 43323 at 1430 in Sladebridge & 1835-2130 55444 at 2130 in Branchley, both via Nanol; 11.595 via Shepperton (Eng to Pacific 1430-2055) 21223 at 1519 in Islington; 1

Also received were KTWR Agana, Guam 11.805 (Eng to Pacific 0845-1100), logged in Guam as 0845-1100 in Morden; HCBQ Juito 11.925 (Eng to S Pacific areas 0730-1130) S10444 at 1120 in Edinburgh & Eng to Caribbean 1130-1230) S10333 at 1230 in Newry.

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Brindley Woodhall Spa.
Tropical Bands

<table>
<thead>
<tr>
<th>Station</th>
<th>Country</th>
<th>Time (UTC)</th>
<th>Difer</th>
</tr>
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<tbody>
<tr>
<td>4.400</td>
<td>R.Syphonaea, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
</tr>
<tr>
<td>4.400</td>
<td>R.Ticheli, Cebu</td>
<td>0200</td>
<td>D.I,F,P,U</td>
</tr>
<tr>
<td>4.400</td>
<td>R.Calvaria, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
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<tr>
<td>4.400</td>
<td>R.Bondia, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
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<tr>
<td>4.400</td>
<td>R.Tinguia, Cebu</td>
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<td>C.I,F,K,S</td>
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<tr>
<td>4.400</td>
<td>R.Solavia, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
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<tr>
<td>4.400</td>
<td>R.Acanthia, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
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<tr>
<td>4.400</td>
<td>R.Longia, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
</tr>
<tr>
<td>4.400</td>
<td>R.Cordiformis, Cebu</td>
<td>0200</td>
<td>C.I,F,K,S</td>
</tr>
</tbody>
</table>

Some broadcasts to other areas were also heard: Voice of the Mediterranean, Malta 9.765 (Eng, 0600-0800) 44444 at 0640 in Morden; JVR, Guangzhou, China 7.965 (Chin to Hong Kong) 53222 at 1149 in Macclesfield; AIR Delhi 9.810 (Eng) [News] 1930-1945 44444 in Penang; MBNC, Omdurman, Sudan 7.810 (Eng) 1900-2100 55444 at 1906 in Co Londonderry; Voice of Greece, Athens 8.425 (Gr, 2155) Port, Sp to C/S Am 2200-2300 34444 at 2345 in E Bristol; Voice of Turkey, Ankara 9.444 (Eng) 2200-2300 44444 at 2230 in N Bristol.

Some notes were heard: Voice of the noted came from AVR Fori, Italy 7.230 (Eng 0700-0800) 34444 at 0724 in Bournemouth; AFR Transamazdnica, Brazil 8.375 (Eng, Fr 1900-2200) 55555 at 2333 in Stirling; BBC via WSCN 7.510 (Eng 2100-0000) also to Africa 44444 at 2147 in E Worthing; R Uganda Int, Kileu 7.195 (Eng 2200-2300) 53443 at 2200 in Co Londonderry; Voice of Spain 7.725 (Cap 2000-2100) 44444 at 2232 by Robin Harvey in Bourne.

Although intended for other areas, KTBV, Salt Lake City 7.510 (Eng to USA 2100-0000) 55555 at 0715 in Islinton; WJCR, Upton, 7.490 (Eng to E USA 2100-0000) 33333 at 0900 in Morrisville; WIVM, Birmingham, 7.315 (Eng to E USA 0000-1200) 53443 at 1000 in Rotherham; R Australis via Carnarvon 7.260 (Eng to Australia 1430-2130) 44444 at 1830 in Penmaennarw and 45444 at 1819 in Woking; VOA1 via Seliebi-Phikwe 7.415 (Eng to Africa 1900-2200) 53443 at 1905 in Co Londonderry; Voice of Nigeria, Ikorodu 7.255 (Eng, Fr) to Africa 3232 at 2312 in Bridgewater.

While broadcasting to Europe in the 6MHz (49m) band, HJCQ Buoy 6.205 (Eng 0700-0830) 55555 at 0700 in Appleby; WENV, Birmingham, 5.515 (Eng 2000-0000) 44444 at 0700 in Business; R Pyongyang, Korea 6.576 (Fr 1800-1830, also to 14 East) 34553 at 1805 in Dundalk; R Scotland via Karlsborg 6.065 (Eng 1830-1955) 54444 at 1830 in Co Londonderry; R Finland via Porvoo 5.310 (Eng 2020-0000) 53443 at 1934 in Middlesbrough; China R Int, Beijing 6.250 (Eng 2000-2000) 44444 at 2035 by P Gordon Smith in Kingston, Moray, R Burdanka, Russia 6.110 (Eng 2200-2300) 44444 at 2200 in Stirling; WWCHR, Nashville 5.810 (Eng 0000-0800) 34444 at 0153 in Woodford Hall.

Some areas were also heard: Voice of the Mediterranean, Malta 9.765 (Eng, 0600-0800) 44444 at 0640 in Morden; JVR, Guangzhou, China 7.965 (Chin to Hong Kong) 53222 at 1149 in Macclesfield; AIR Delhi 9.810 (Eng) [News] 1930-1945 44444 in Penang; MBNC, Omdurman, Sudan 7.810 (Eng) 1900-2100 55444 at 1906 in Co Londonderry; Voice of Greece, Athens 8.425 (Gr, 2155) Port, Sp to C/S Am 2200-2300 34444 at 2345 in E Bristol; Voice of Turkey, Ankara 9.444 (Eng) 2200-2300 44444 at 2230 in N Bristol.
Bushfires in my area during the New South Wales bushfire season are not new yet again, the immense value of two-way radio communications. The opportunity to use u.h.f. and v.h.f. transceivers while fighting larger-than-normal fires gave us valuable lessons in fireground communications management.

In common with all bush fire vehicles in the area, our own water tanker is equipped with a multi-channel v.h.f. transceiver. This is primarily used for controlled traffic through our central Fire Control but also can be used, with permission, for flank communication between vehicles to speed message traffic. We also have a mobile u.h.f. 40-channel CB transceiver that is intended to take the load off v.h.f. for flank communications. Most vehicles in our area are similarly equipped and can keep in touch once the fireground channel is allocated.

Our third line of communication is with three u.h.f. 40-channel hand-held transceivers. These can be used to maintain contact with tanker crew members working at a distance from the tanker.

Well that is the theory, but in the heat of the moment we all learned lessons about radio techniques, about the best use of communications time, about the proper selection of channels and about the need to have manageable channel lists. And in a situation when a dozen or more people are working the fire, we learned that all vehicles need to know who we need to talk to.

Anyway that’s all a bit removed from broadcast matters so I’ll get on with the latest from down under.

Radio Station Drama

On November 29, and much too late to make the SWM December deadline, Canberra radio stations 2FC and its a.m. sister station 2CA found themselves in the middle of a siege. A gunman, targeting the nearby place of employment of his ex-wife, had crashed a small truck containing gas bottles wired up to ignite on impact. The following hours found the gunman wandering around the building, setting off smoke bombs, bagging them soon. VL8T Tennant Creek write to Casey, C/- ANARE at PO Box 1359, Australia. For example, to GSL, Casey write to Casey, C/- ANARE at the given address. Note however that ships only go to these bases in summer. The last ship left on 1 January 1994 and the next is not due to leave until October 1994. This means that there might be a long wait for a reply but I guess this is not an unusual situation for s.w.l.s to face.

If your budget stretches to it you could speed your reception reports by FAXing Davis on +672 10 657, Mawson on +672 11 757, Casey on +672 12 657 and Macquarie Island on +672 13 957.

Transmitter Licences

Australia currently boasts 34 different types of transmitter licence and a lot of types of receiver licence. These coupled with a fee structure with 131 different fees has prompted the Spectrum Management Committee to launch a public inquiry. The current system according to previous DoTC Minister David Beddoes is outmoded and cumbersome. It is apparently too hard to administer, too hard to control and too hard to understand. The aim of the inquiry is to reform the apparatus licence system and to produce a more equitable, efficient and transparent licence fee system.

Reception reports for all three stations to ABC, GPO Box 9994, Darwin 0801, Northern Territory, Australia.

I welcome any news and comments. In particular I am interested in any s.w.l. information that is available to Australian stations heard by SWM readers so I can chase up more details and interesting snippets from this end. My address is PO Box 2922, Tasmania, 7050, Australia. For example, to GSL, Casey write to Casey, C/- ANARE at the given address. Note however that ships only go to these bases in summer. The last ship left on 1 January 1994 and the next is not due to leave until October 1994. This means that there might be a long wait for a reply but I guess this is not an unusual situation for s.w.l.s to face.

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Icom R-725, as new, complete with leads, manuals and case, £1550 net. Mike H6RT, London. Tel: (081) 996220.

Lowe HF-225 a.m./f.m. detector, key and led aerial and manual, all boxed and in mint condition, £50 including postage. Tel: Lancs (0253) 727279.

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Lowe HF-225 a.m.f.m. detector, key pad, hf, I.cads, active whip antenna, case complete, £300 plus post. Rushden, Northants. Tel: (0332) 72550.

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Pocom AF11000 decoder c.w./RTTY, AMTOR, and manual, £150. Sony 10" b/v monitor, £35. AOR 1000 scanner, boxed, manual, mains adapter, £165. Panasonic RX300 receiver, f.m., l.w., m.w., s.w.1, m.w., b.f.o., l.w., boxed, used condition, £90. Tel: Lancs (0253) 727279.

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Sony ICF SW55 receiver, 150kHz to 30MHz and 87.5 to 108MHz s.f.m. and s.s.b., hardly used, as new, complete with box, £220. Tel: Birmingham 021-308 4464 after 6pm.

Sony PR800 scanner, complete as new, in perfect working order, £150. Heathkit D5-2 oscilloscope, also working order, manual and circuit, £60. Tel: Chester 01244 131145.

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Velleman Morse decoder, decodes Morse at any speed, built from kit, £50 o.n.o. Colin Tunnah, 76 Abbey Park, Bedford. Tel: (0332) 427 1949 after 6pm.

Yaesu FT-708R hand-held transceiver, £100. Mr. P. Jolliffe, Berks. Tel: (0753) 548214 after 7pm.

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AR3000A/ICR7000 base scanner required, must be in excellent condition, also wanted Global ATU1000 and Dressler/Datong wideband active antennas. Tel: North Yorks (0609) 833222 9am to 7pm weekdays.

Edystone 888A receiver, also pre-select, both must be g.w.o. Tel: Sussex (0444) 241567.

Grundig Melody Boy 1000, does not have to be in full working order as only needed for spare parts. Tel: 081-890 0840 before 7pm. ICR7 or JRC-NRD355, must be in good condition. Tel: London 0171-231 5424.

JRC NV888 speaker or similar for JRC NRD-525 receiver, must be in excellent condition, also magnetic longwire balun antenna system (MLB). JIM 75 scanner pre-amp, £35 o.n.o. Alan, Cleveland. Tel: (0642) 559681 after 6.30pm.

Sony AN-1 active antenna, also exchange Sony 8mm VM-D3f camcorder for recent model communications receiver, preferably with serial port, cash adjustment either way. Lee, Isle of Man. Tel: (0482) 640240 after 6pm. 9600 or FRG-7700 or w.h.y? in working order. Tel: Coventry (0203) 440837.

Sony reel to reel tape recorder to match Sony CRF-320 s.w. receiver. John Hunt, 80 The Chase, Wallington, Surrey SM6 8YU.

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EXCHANGE

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