Short Wave Magazine

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The Best Names in Radio write for you!

John Wilson

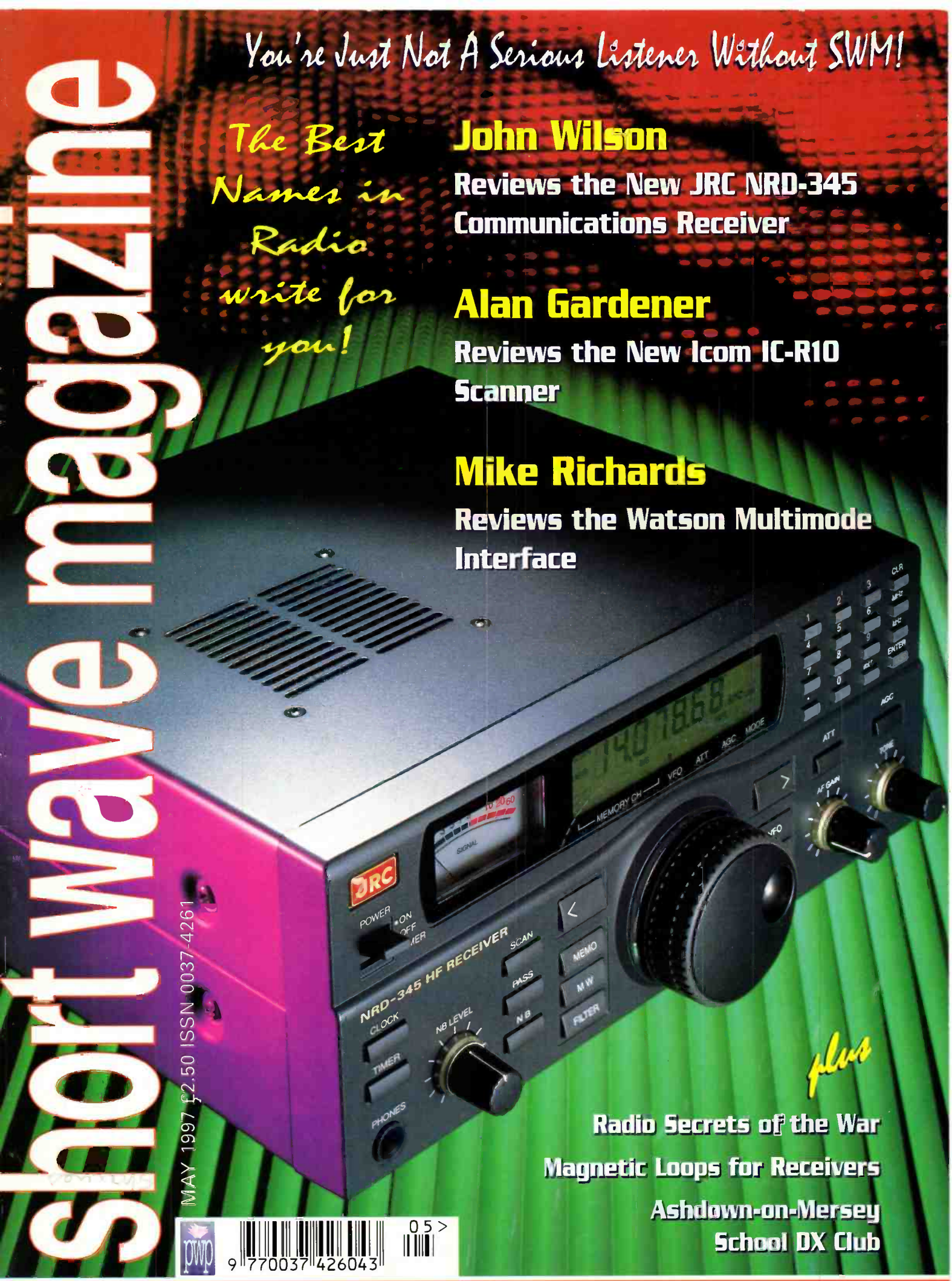
Reviews the New JRC NRD-345 Communications Receiver

Alan Gardener

Reviews the New Icom IC-R10 Scanner

Mike Richards

Reviews the Watson Multimode Interface



plus

Radio Secrets of the War

Magnetic Loops for Receivers

Ashdown-on-Mersey School DX Club

MAY 1997 £2.50 ISSN 0037-4261

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U.S. Patent No. 5,471,402

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U.S. Patent No. 5,471,402
Antennas shown are optional

For detailed specifications for each unit contact an Optoelectronics sales representative today.

Tone Decoder

NEW

DC442 CTCSS, DCS, DTMF DECODER

The DC442 instantly decodes CTCSS, DCS, and DTMF. The DC442 has the competition beat with its All Mode Decode function, which switches between decoding functions automatically. Now with built-in RS232 and CI-5 receiver compatibility the DC442 becomes the ultimate instrument for PC decoding applications.

- Decodes 52 CTCSS tones, 106 DCS codes, and 16 DTMF characters
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U.S. Patent No. 5,471,402
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Good Listening

Communiqué

SEND YOUR NEWS TO KEVIN NICE AT THE EDITORIAL OFFICES

Lightship To Be Activated By WACRAL

The *Goleulong 2000* Lightship moored in Cardiff Bay will be on the air as the Special Event Station **GC3NJB** over the weekend of 16-18th May. Organised as a special project by WACRAL in response to an invitation by the local churches, the station is to be installed as part of the city's celebrations of the centenary of Marconi's first transmissions from Lavernock Point near Cardiff.

The weekend has also been designated by WACRAL as the first of their biannual activity weekends when members seek out other Christians on the h.f. and v.h.f. bands to foster the true spirit of international amateur radio and good fellowship.

UK s.s.b. operators are invited to check-in on Friday 16th at 1900UTC on 3.747MHz or 2100UTC on 1.972-1980MHz. Saturday morning local nets will start at 0800UTC on 3.747MHz and at 0915UTC on 144.205MHz s.s.b.

A full scheduled of s.s.b. and c.w. operating times for EU and DX nets has been prepared and is available direct from WACRAL's Membership Secretary on **(01803) 854504** or **51 Alma Road, Brixham, S. Devon TQ5 8QR**. Check the Web at: **http://www.goppq.demon.co.uk** for late news.

Car Callsigns

Responding to requests from members about the release of the 'G' registration numbers, the RSGB has been holding discussions with the Driver & Vehicle Licensing Agency (DVLA) for over five years. Now, the DVLA has asked the RSGB to look into how many radio amateurs would be likely to purchase 'G' prefix vehicle registration numbers, if they were to become available.

In a letter to the RSGB General Manager Peter Kirby G0TWW, the DVLA Marketing Manager points out that there are many people other than radio amateurs who have expressed an interest in this particular series, so it would not be possible to restrict their eventual sale just to radio amateurs.

In order for amateurs to decide whether they would be interested in a 'G' registration number, the DVLA has advised the RSGB of the following terms and conditions, under which the registrations would be offered. They are as follows:

1) The numeric range will comprise figures 1 to 20 inclusive.

2) Almost any three letter combinations may be chosen excluding I, Q and Z. DVLA reserves the right to withhold and withdraw registrations, some of which may be sold at auction. Certain 'G' prefix registrations have already been sold by this means.

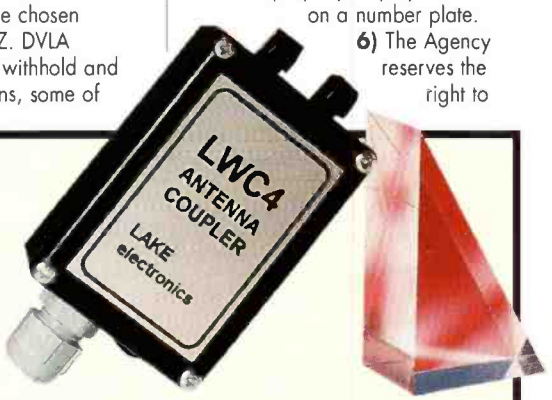
3) Registration numbers must not be used to make a vehicle appear younger than it actually is. In the case of the 'G' prefix registrations, the vehicle which will receive the mark must have been first registered as new on or after 1 August 1989.

4) All registrations must be assigned within one year of purchase to vehicles which are used and registered on the British mainland and which are the subject of a valid licensing application and in a classification normally subject to one of the Department of Transport's vehicle testing schemes.

5) All registrations must be properly displayed when on a number plate.

6) The Agency reserves the right to

Clever Coupler



Lake Electronics have announced the introduction of the LWC4 Antenna Coupler. Popularly known as a 'magnetic balun', the LWC4 is basically a broadband transformer. It is designed to enable the traditional 'long wire' antenna to be used in conjunction with a coaxial (ie. screened) downlead.

'Long wire' or 'end fed wire' antennas have been used with great success with many types of receiver for many years. As a good all round, all band antenna, they are a natural first choice for many listeners. The have the virtues of simplicity, ease of installation and low cost. Almost any length of wire, say about 20-30m, will work well, particularly if erected fairly high, ideally above roof height and, as far as possible, clear of buildings, trees, etc.

If the 'long wire' has a disadvantage, it probably lies with its ability to receive noise almost as readily as a signal! Most noise generated by domestic equipment such as vacuum cleaners, washing machine motors, electric drills, etc., is at its greatest field strength close to the source. It follows that the section of antenna wire closest to the house, ie. the 'downlead' is well placed to pick up such interference.

One way of preventing or at least reducing this, is to 'screen' the downlead section. Coaxial cable has an inner conductor screened by a woven copper braid along its length - the sort used for TV is ideal for this purpose. The braid is 'earthed' at the receiver end and the inner wire connects the antenna to the receiver.

Although there is no signal pick up by the inner wire, most of the interference is picked up by the screening 'braid' and conducted safely to earth. Unfortunately, direct connection of the antenna to coaxial cable results in considerable loss of signal due to the internal capacitance of the feeder.

The loss can be greatly reduced by 'matching' the antenna/feeder/receiver characteristics. Although it is not possible to obtain a perfect impedance match under **all** conditions with **any** fixed ratio transformer (ie. a 'magnetic balun') such a device can perform well enough to allow a screened feeder to be used, with minimal loss, thus giving a worthwhile reduction in noise pick-up without significant reduction of signal.

'Magnetic Baluns', although perhaps not always known as such, have been around for many years and there has been little change to their design. Most use a relatively crude method of connection, a thumbscrew terminal for the antenna wire (which always tends to loosen and corrode after a while) and a large screw type connector such as the infamous PL-259 which, apart from being anything but waterproof, is notoriously difficult to solder!

The LWC4 is claimed to avoid these unsatisfactorily features. The end of the antenna wire is firmly anchored by a fully protected screw connector, entering via a grommet below the case. The coaxial cable, again entering below the case, is fully supported and sealed by a waterproof gland. Connections to the braid and centre conductor are simply and securely made with a heavy duty terminal block. The whole assembly is hung, by two sturdy hooks, to either the antenna wire or to its supporting halyard.

The LWC4 is competitively priced at just £19.50 plus £1 for first class postage. Order directly from the manufacturer, **Lake Electronics, 7 Middleton Close, Nuthall, Nottingham NG16 1BX, Tel: 0115-938 2509, E-mail: 100775,730@compuserve.com**

NEWS • NEWS • NEWS • NEWS • NEWS • NEWS

determine the selling price of registrations and to individually price those registrations which are deemed to have an added appeal. Prices of the recently released 'B' prefix series are £999 for the number 1 and £399 for those in the 2-20 range. Some other combinations are at higher prices.

It will be noted that those with GM, GW, etc. callsigns, those with I, Q or Z in their callsign, and also all G0 licensees will **not** be able to purchase their callsign as a registration number. Also that G1 licensees are likely to have to pay considerably more than their G2-G8 colleagues for the privilege. These restrictions are entirely beyond the control of the RSGB!

The RSGB has agreed to undertake research for the DVLA on behalf of all UK radio amateurs (whether members of the RSGB or not) to determine how popular this scheme is likely to be. If you are likely to purchase your callsign as your vehicle registration number, please write to **Peter Kirby G0TWW** at **RSGB HQ** by **31 May 1997** at the latest, stating your callsign.

Royal Rally

Last year, over 2000 members of the amateur radio fraternity visited the **Royal Naval Amateur Radio Society** (RNARS) Mobile Rally in June. They joined some 4000 members of the general public who had come to enjoy a spectacular day out in *HMS Collingwood* (the RN Communications & Radio School) watching 12 fiercely competitive RN Field Gun teams compete for the Brickwoods Trophy. In addition, they had the opportunity to watch some top military display teams and bands, visit the fun fair and sideshows - in other words - plenty for everyone on the day.

This year's rally, to be held on Saturday 21 June, will have a similar format. Plenty of action for all the family, including a free fall parachute team jump, the Hampshire Police Motor Cycle display team, an aeronautical flying display plus all the usual radio rally features. The Radio & Communications Museum will also be open throughout the afternoon.

Transport will be provided from the main car parking area for equipment to be moved across to the Bring & Buy. The day is dedicated to enjoying action packed events in the arena, browsing around the radio stands and catching up with the latest on the equipment front and maybe buying that new or second-hand piece of equipment or 'build it yourself' bits.

The radio rally area has been increased this year to give everyone more room to view, buy, chat drink and move around. The traders will also be able to have access from Friday p.m. and the public will be admitted from 1030 to 1730 on the Saturday.

Traders who require more information should contact **Alan Owen G4POW** on **(01705) 353404** or **Mike Matthews G3JFF** on **(01705) 365503**.

Endeavour - Whitby

Captain James Cook set sail from England on 26 August 1768 on a voyage of exploration and discovery to the Pacific. Cook's first great voyage was a major step in advancing knowledge of geography, navigation, natural science and astronomy.

A magnificent replica of Captain Cook's sailing ship *HM Bark Endeavour* set sail from Australia on the 16 October 1996, bound for England. She is due to arrive in her home port of Whitby on the 9 May 1997 and will be berthed at Endeavour Wharf, from where the original ship was built and launched in 1765.

To celebrate this historic homecoming, the **Scarborough Special Events Group** will be on the air as **GB0END** during the ship's 10-day stay, from a site overlooking Whitby Harbour, alongside the bronze statue of Captain Cook. The main h.f. s.s.b. station will be around 3.725MHz, with c.w. and 144MHz activity at weekends.

A special full coloured QSL card will be issued to celebrate the occasion and this will be No. 15 in the Group's series of commemorative QSL cards. All contacts will be acknowledged via the Bureau and any s.w.l. reports are welcomes.

Anyone requiring a direct QSL card can apply via the club call **G0OOO**.

Antique Wireless Newsheet No. 1

Tudor Gwilliam-Rees of Savoy Hill Publications has announced the publication of the *Antique Wireless Newsheet No. 1*. This has hot news on all aspects of vintage radio and a sample copy can be obtained for either an s.a.e. or by sending an E-mail message - with your E-mail address, of course, to **tudor.gwilliam-rees@virgin.net**

Savoy Hill Publications, 50 Meddon Street, Bideford, North Devon EX39 2EQ. Tel/FAX: (01237) 424280.

JRC's Latest HF Receiver

We have received details from Nevada of the latest JRC h.f. receiver. Designated the NRD-345 this receiver has many interesting and useful features, such as a.m. synchronous detection, a wide dynamic range, - but they don't need listing them all here as John Wilson has reviewed the new set on page 14 of this issue of *SWM*.

The retail price of the NRD-345, aimed at the broadcast and short wave listener wanting high quality, interference-free reception, is £795. **Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01705) 662145.**

Radio & TXDX News

Rumours suggest that the Lebanese government is setting up a new radio station to broadcast prayers and religious programming for all ethnic and religious groups across the Lebanon.

The Spanish government has decided not to increase the budget that funds the state network broadcaster TVE. This has meant a total revenue availability for the next operational year of only 38%. TVE carries a mega deficit which the government is not willing to write off.

An expansion of cellphone activity is expected soon with both Cellnet and Vodaphone each being granted a 5MHz bandwith at 1800MHz. The frequency will be used for 'microcells' within city centres and large buildings thus a demand will be created for dual-band handsets which should hit the market during summer '97 through to early 1998. There is a potential interference risk with such a frequency since it falls within the passband of the domestic satellite system, the down-conversion between the LNB and receiver is at an i.f. of 950-2050MHz. Orange and One 2 One networks are both intending to have dual band systems on the market, already the Motorola MicroTac International 8800 model

The Voice of Hope

The new QSL card for The Voice of Hope.

The global Christian radio network, The Voice of Hope, has begun nightly short wave broadcasts beamed to Europe. Two hours of English-language programming originate each evening from the former Communist propaganda station near Tbilisi, Georgia.

The massive facility in the mountain village of Dusheti has more than a mile of transmitter towers and curtain antennas. It was built during the time of the Soviet dictator Joseph Stalin and was originally intended as a top secret jamming station to block broadcasts by the BBC, Radio Free Europe and Voice of America.

Today, the 100kW transmitters, which had been dormant, are now used from 1900-2100UTC for Voice of Hope programs. The antenna bearing of 302° is aimed at London, but reception reports from the first month on air have come from Russia, Scandinavia, West Africa, USA, New Zealand and most countries of western Europe.

High Adventure Ministries, which operates The Voice of Hope, already has stations in Lebanon, Palau, and its headquarters in California, USA. The new Tbilisi broadcasts can be heard on 9.310MHz.

For more information about the station, a web page is available at **http://www.highadventure.org**

GPS Active Antenna

With the growing popularity in the use of hand-held GPS in cars, the provision of a suitable antenna at a reasonable cost has, up to now, been a bit of a problem. Lowe Electronics have come up with an alternative to the manufacturer's antenna that works well with the popular Garmin GP45 and other models.

The antenna is supplied complete with 5m of coaxial cable, terminated in a BNC plug and has a magntic base to enable you to place it securely in the centre of your car's roof. The price is £39.95.

Lowe Electronics Ltd., Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800. E-mail: info@lowe.co.uk

is at an advanced stage of development for Orange, their unit may become available to the first subscribers from May/June '97. Orange plan that the dual-band or 'Roaming' networks will be expanded into over 50 countries within the next 9-12 months subject to gaining 'roaming' approval with the appropriate authorities.

Mobile communications will also benefit with a new mobile band just above 2GHz known as UMTS - Universal Mobile Telecommunications System! The new generation of mobile units should be available by 2002 and additional spectrum will be required as the UMTS band 'matures' by 2008.

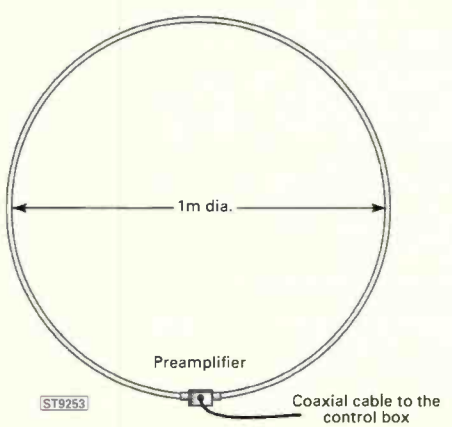
Recent changes in the GBC Gibraltar TV transmitter network has produced many reception problems across the 'Rock'. Pressure from the Spanish Administration, directed at the ITU, has led to a reversal of channel frequencies. The claim was that ch.E12 was causing inteference to mainland Spanish land mobiles and that the GBC ch.E12 has been re-assigned to ch.E6. The many ex-Brits. along the Marbella/Algeciras coastal region have lost GBC-TV. In effect GBC now transmits on ch.E6 from Signal Hill (1kW) and ch.E12 from North Mole (very low power).

A new 'wireless digital alternative to cable' system is being developed in the Netherlands, a set-top decoder and pencil sized indoor antenna will be used to receive off-air digital signals and bypass the conventional cable systems. Experimental transmissions will start early 1998 in Masterdam and backed by main broadcasters NOS, Multichoice, Nozema and Vestra. The European digital terrestrial standard will be used and be available country wide, offering choice in non-cable and existing cabled regions.

Wellbrook Active Loop

The ALA 1530 is a new broadband untuned loop antenna. The loop has a frequency range of 150kHz to 30MHz. With a diameter of only 1m the ALA 1530 is claimed to be ideally suited to users with restricted real estate, by providing performance comparable to that of conventional wire antennas.

The loop antenna has been designed to primarily to reduce local interference and offers significant advantages over traditional active and passive antennas. Moreover Wellbrook state that, "the ALA 1530 loop antenna is a balanced design and only responds to the maganetic field. This ensures thhat the rejection of local noise is far superior to other types of antennas. Interference reduction is secured in four ways; rejection of the electric field, deep nulls of the 'figure of eight' pattern, an intergral feeder isolator to reduce mains borne noise and immunity to static build-up. The excellent intermodulation performance (IP2 typically +70dBm) ensures that reception is free from images".



The ALA 1530 is a strong rigid structure using a 1m diameter aluminium loop, with the electronics encapsulated in epoxy resin to form a weather proof construction. This loop antenna is ideally suited to mounting at ground level so there should be problem with planning regulations. Furthermore, an antenna rotator can be used to exploit the ALA 1530's excellent directional characteristics, to both improve reception and reduce interference. The antenna can also be used for direction finding and as an element for compact phased arrays. Comprehensive operating instructions and installation instructions guide the user to an easy and safe erection.

The ARA 1530 is supplied complete with an active interface and a 12V regulated p.s.u. THe ALA 1530 costs £99.95 inclusive. The ALA 1530 Head Unit is also available seperately for £75.00 inc. Both are available direct from **Wellbrook Communications, Wellbrook House, Brookside Road, Bransgore, Christchurch, Dorset BH23 8NA. Tel: (01425) 674174**.

World Flight 97

On March 17, 1937, Amelia Earhart took to the skies in her Lockheed Electra 10E. Although no one, male or female, had ever completed this journey, Earhart's goal was to be the first pilot ever to circumnavigate the globe at the equator.

Sixty years later, on March 17, 1997, pilot Linda Finch embarked on her adventure of a lifetime when she took off from Oakland, California, to re-create and complete Earhart's heroic expedition. Finch's journey, called World Flight 1997, is not out to set any records. Rather, it is a tribute to Earhart's vision and spirit, and the sharing of a message that is as timeless today as it was sixty years ago.

Pilot Linda Finch departed on Monday, 24 March from Oakland, California on World Flight 1997 sixty years to the day after Amelia Earhart's 1937 World Flight departure. First touchdown Burbank. World Flight touched down in Miami, mid-afternoon Monday, last stop in the US before heading on to the Caribbean Islands Monday, March 31.

For those with Internet capability, there are several Internet web pages for tracking the flight of Linda Finch as she retraces the path of Amelia Earhart in her around the world flight of 1937. Linda is flying a restored Lockheed Electra 10E - the same type of aircraft that Amelia Aerhart flew in 1937. There are several Internet web pages containing a wealth of resources and up to the minute information.

The main web page for the flight is:
http://www.worldflight.org/

To find the planes current position go to:
http://www.worldflight.org/youcansoar/index.html

To receive up to date messages send an E-mail to:
majordomo@worldflight.org
and in the body of the message type: subscribe worldflight and in the subject line type: none

The flight path of World Flight 97 will follow a path landing at or passing over the following cities and airports:

Oakland, Burbank, Tuscon, New Orleans, Miami, San Juan,

Catalogues

Within its pages, *The 1997 Radio Kit Catalogue* from **CM Howes Communications** contains the full range of Howes products, including a.t.u.s, Morse kits, accessories, antennas, and much more. Also, this catalogue contains the new easy to build Howes '2000' range of kits, which are already proving to be very popular, making an excellent project for the Novice constructor, yet still delivers a satisfying level of performance.

Copies of the *1997 Radio Kit Catalogue* can be obtained from **Dave** or **Chris Howes** at **Eydon, Daventry, Northants NN11 3PT. Tel: (01327) 260178**.

Nevada have just published their latest catalogue covering amateur radio, short wave receivers, scanners, digital equipment, software, books, accessories and anything else to do with communications you can think of.

Need a 2-way motorcycle intercom for those trips out on your Gold Wing? Nevada have one. Or just some low-loss coaxial feeder and suitable plugs? Nevada have it.

Nevada are UK distributors for many well-known brand names as well as main dealers for most of the rest fo the best. It's all to be found in their catalogue.

For your free copy just send an A4 size s.a.e. to **Nevada, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (01705 662145.**

Grant Rowley, proprietor of **Simba Communications**, wrote to congratulate us on reaching our Diamond Anniversary - and, of course, to send us a copy of his latest catalogue! They have also just celebrated the production of the ten thousandth Simba 3 balun - so congatulations are the order of the day!

They have now dropped the first part of their original name, Shenzi, and are now promoting their antenna range under the Simba banner.

The new catalogue contains useful information on installing and using their equipment.

For your copy send an A5 size s.a.e. to **Simba Communications, PO Box 35, Richmond, North Yorkshire DL11 7YX. Tel: (01325) 374229.**

Carapito, Paramaribo, Fortaleza, Natal, St. Louis, Dakar, Gao, N'Djamena, El Fasher, El Khartum, Massawa, Aseb, Karachi, Calcutta, Sittwo, Rangoon, Bangkok, Singapore, Bandung, Surabaya, Kupang, Darwin, Lae, Rabaul, Buka, Howland Island, Tarawa, Christmas Island and Honolulu returning to Oakland.

The following h.f. utility aeronautical frequencies are worth checking as they control the airspace that Linda will be flying through. She will have to check in with each and every one of them.

New York Radio controls the Caribbean in the CAR-A and CAR-B MWARA (Major World Air Route Area) regions. Frequencies for CAR-A include 2.887, 5.550, 6.577, 8.918, 11.396, 13.297 and 17.907MHz u.s.b. Frequencies for CAR-B include 3.455, 5.520, 6.585, 8.846, 11.330 and 17.907MHz u.s.b.

Dakar ATC can be heard on the AFI-1 MWARA route using 3.452, 6.535, 8.861, 13.357 and 17.955MHz u.s.b. N'Djamena ATC can be heard on the AFI-4 MWARA route using 2.878, 5.493, 8.903, 13.294 and 17.961MHz u.s.b. Khartoum ATC can be heard on the AFI-3 MWARA route using 3.467, 5.517, 10.018, 11.300, 13.288 and 17.961MHz u.s.b. Karachi ATC can be heard on the MID-2 MWARA route using 3.467, 5.658, 10.018, 11.300, 13.288 and 17.961MHz u.s.b. Calcutta, Bangkok and Singapore ATC's can be heard on the SEA-1 MWARA route using 3.470, 6.556, 10.066, 13.318 and 17.907MHz u.s.b. Bangkok and Singapore ATC can be heard on the SEA-2 MWARA route using 3.485, 5.649, 5.655, 8.942, 11.396, 13.309 and 17.907MHz u.s.b. Singapore and Darwin ATC can be heard on the SEA-3 MWARA route using 3.470, 5.733, 6.556, 10.066, 11.396, 13.318 and 17.907MHz u.s.b. Honolulu ATC can be heard on the following MWARA routes using the following frequencies:

CEP1/2 MWARA route using 2.869, 3.413, 5.547, 5.574, 8.843, 11.282, 13.261 and 17.904MHz u.s.b. San Francisco ATC will also be heard on these frequencies.

CWP 1/2 MWARA route using 2.998, 4.666, 6.532, 6.562, 8.903, 11.384, 13.300, 17.904 and 21.985MHz u.s.b.

NP 3/4 MWARA route using 2.932, 5.628, 5.677, 6.665, 8.915, 10.048, 13.294, 13.339, 17.904, 17.946 and 21.925MHz u.s.b. San Francisco ATC will also be heard on these frequencies.

SP 6/7 MWARA route using 3.467, 5.643, 8.867, 13.273 and 17.904MHz u.s.b.

It will take a bit of listening to hear traffic from Linda. As always patience is the key!

National Transmitter News

Hastings: A new television relay station opened on 19 February 1997 for Hollington Park, Hastings.

Located on top of the Churchill Court flats in Stonehouse Drive, it is provided jointly by the BBC and NTL on behalf of the Independent Television Commission (ITC).

It is designed to bring good television and teletext reception to approx. 460 people in Hollington Park, to include Gillsman's Park, Springside Walk, Stonehouse Drive and the surrounding area.

Station Details

Channels:	BBC 1 (South)	45
	BBC 2	39
	ITV (Meridian)	42
	Channel 4	55
Antenna Group:	E or W	
Polarisation:	Vertical	
ERP:	8W	

Wheatley: A new television relay opened on 7 March 1997 for Wheatley, about 3km north-west of Halifax town centre.

Provided jointly by NTL on behalf of the ITC and the BBC, it is located on mast adjacent to the junction of Wood Road and Wood Lane, Wheatley.

It is designed to bring good television, NICAM and teletext reception to an additional 800 people in the area of Wheatley. To the south-east of the transmitter this includes: Brackenbed Lane, Greenroyd Lane, Long Lane, Hebble Vale Drive and Wood Lane. To the north of the transmitter: Crag Lane, Roper Green, Dodge Holme and Slippy Lane.

Station Details

Channels:	BBC 1 (North)	58
	BBC 2	64
	ITV (YTV)	61
	Channel 4	54
Antenna Group:	C/D	
Polarisation:	Vertical	
ERP:	16W	

Bandscan AMERICA

Rallies

April 27: The BATC Rally '97 is being held at the Sports Connexion, Coventry. Doors open at 10am (9.30am for disabled visitors). Entrance is £1, 50p for OAPs and under 14s. There will be all the usual features of BATC rallies, over 200 trading tables, Bring & Buy, large outdoor flea market, specialist more television displays, ex broadcast vehicles, etc. GB6ATV talk-in on S22 and GB3CV (RB9). There are full refreshment facilities and a licensed bar. **Mike Wooding G6IQM** on **(01788) 890365**, FAX: **(01788) 891883**, E-mail: **batc97@g6iqm.demon.co.uk**

May 5: The Dartmoor Radio Rally are holding their rally at the Yelverton Memorial Village Hall, Meavy Lane, Yelverton, Devon. There is parking for 600 cars, access for disabled visitors, playground for children, trade stands, Bring & Buy, etc., refreshments. Doors open at 10.30am. Talk-in on S22. **Ron G7LLG** on **(01822) 852586**.

May 5: The Mid-Cheshire Amateur Radio Society are holding their rally at Winsford Civic Hall, Town Centre, Winsford. Doors open at 11am (10.30am for disabled visitors). Admission is £1, under 14s free with adults. Talk-in on 2m. There will be ample parking, a bar and catering services, too. All the usual traders will be there, there will also be a Bring & Buy stand. The rally is fully signposted. More details from **David G4XUV**, QTHR on **(01606) 77787**.

May 11: The Midland Amateur Radio Society (MARS) are holding their Drayton Rally at Drayton Manor Park, Tamworth, Staffs. Doors open 10.30 to 4.30pm. There will be trade stands, Bring & Buy, Flea Market, local clubs, children's entertainment, side show, a licensed bar and a zoo, etc. A day out for all the family. For more information 'phone **Peter Haylor G6DRN** on **0121-443 1189** or **Mike Nyman G4OMP** on **0121-486 1634**.

***May 16/17/18:** The Dayton HamVention, the largest amateur radio show in the world, is taking place at the Hara Convention Centre in Ohio, USA. Doors open at 12pm on the 16th, and the event runs until early afternoon on the 18th. For the early risers, the Flea Market is open from 6am on the 16th. You will be able to visit many trade stands, attend lectures and meet amateurs from all over the world.

May 18: Yeovil ARC are holding their 13th QRP Convention at Digby Hall, Hound St., Sherborne, Dorset. Doors open 0900 to 1700. There will be lectures, trade stands, refreshments, talk-in on S22. Entry is £2, which includes prize draw ticket. **Peter G3CQR**, QTHR on **(01935) 813054**.

May 18: The Dunstable Downs Radio Club are holding their 14th Annual National Amateur Radio and Car Boot Sale at Stockwood Country Park, Luton, nr. junction 10, M1. Doors open 10am to 4pm. Talk-in on 144MHz. Free entry to Mossman collection of Horse drawn vehicles, craft museum, plus much, much more. Plot details on **(01582) 613899**, pre-bookings for plots until May 14th. Plots can be purchased on the day.

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

* Short Wave Magazine & Practical Wireless in attendance

The long awaited, much promoted short wave broadcasting from the Caribbean island of Anguilla is finally a reality. The Caribbean Beacon, which has operated on medium wave for many years is now, also on the higher frequencies. Now owned by Dr. Gene Scott's University Network, the new station is using 6.090 from 2200 to 1100 and 11.775 from 1100 to 2200.

Unfortunately, the 'romance' level of this station is so low as to be unnoticeable. There is no local news, music or other programming on the 'Beacon' - just Gene Scott's broadcasts, the same as you'll hear via two or three US-based religious broadcasters. Reports go to the **Caribbean Beacon, PO Box 690, Anguilla**.

As always, a number of new Peruvian stations have come on the air or been reactivated, or quite rare ones have been heard since our last visit. These include:

4.005	Radio La Voz de Campesino, Alto Piura
4.485	Radio Frecuencia VH, Celenden
4.567	Radio Gotas de Oro, Chiclayo
4.764	Radio Chincheros, Chincheros
5.560	Radio El Sol, Pucara
5.566	Radio Santa Fe, Santa Cruz
6.895	Radio San Miguel de El Faique
7.141	Radio Ayabaca, Ayabaca (claiming 7.150).

Several others have given up their short wave efforts, including: Radio Frecuencia Popular, Radio Estellar, Radio La Voz del Atlo Mayo, Radio Estacion Lasser, Estacion Tarapoto Filial Yurimaguas and Radio La Voz de Naranjos. There is one new and one semi-new station on the air from Honduras, a country not known for its bustling short wave activity.

The new one is Radio MI, a religious station broadcasting in Spanish on 5.890 with the call HRMI. The station is in Comayaguela, a suburb of the capitol, Tegucigalpa and, initially at least, was running 200W although that may eventually be increased to 5kW. The address is **HRMI, la Voz de Misiones Internacionales, Apartado Postal 20583, Comayaguela, Distrito Central, Honduras.**

The semi-new is the reactivation of La Voz del Junco in Santa Barbara on 6.075, which caused confusion at first because DXers were hearing identifications for 'Radio Galaxia', which apparently is Junco's local f.m. station being relayed on short wave. Both this one and Radio MI sign on at around 1100 or 1200, and are mostly reported during the North American mornings when they're virtually impossible to hear from Europe.

They've been less frequently heard in North American evenings, probably due to the higher level of QRM then. Radio MI is scheduled to run until 0500.

Meantime, La Voz de Mosquitia may have resumed operations by now. They've had problems with both their main and their standby transmitters, which must be repaired at their headquarters in the US. Once they've returned it'll be on their usual 4.910.

In Costa Rica, Radio 88 Estereo is also using 6.075 to relay its local f.m. programming, but this is not being widely heard in North America so the short wave activity may not be consistent. The listed schedule runs from 1100 to 0500.

Long time religious broadcaster TIFC ('The Lighthouse of the Caribbean') now broadcasts from San Isidro and has two new 5kW transmitters operating on 5.055 and 9.645 (6.175 still uses an old transmitter). Their English segment is from 0300 to 0400.

Another long active Costa Rican, Radio Reloj, operates on 4.832 from 0100 to 1300 and 6.006 from 1300 to 0100. This, like Mexico's La Hora Exacta, is a musical/commercial clock, which announces the correct time every minute. Like someone once quipped about WWV, the format is 'all the time, all the time'!

In the Dominican Republic, Radio Barahona, nominally 4.930, has shown up on the out of band channel 5.160. A rarely reported station from the Dominican Republic is Radio Quisqueya on 6.235 or a shade higher, listed to run until 0430. This station seems to operate on an intermittent rather than a regular basis.

The Guyana Broadcasting Corporation's Voice of Guyana continues to be heard on 3.290 at various times during the night time hours - 0300, 0600, 0700, 0900, etc. with local programming and commercials, apparently a relay of their domestic service. Also active is 9.550.

A new outlet in Colombia is Colmundo Bogota on 6.065, which relays 1040 medium wave - the flagship station of the Colmundo network. Both the medium and short wave channels used to belong to the Super Radio network.

The current power on short wave is one kilowatt but this will eventually be increased to 5kW. This station may be reached at Diagonal 58, No. 26A-29, Bogota, Colombia. 6.065 is in use 24 hours per day.

Ondas del Orteguaza, in Florencia, a longtime occupant of 4.975 or thereabouts is now active only between 2100 to 2330 or so. Reception of this station is often blocked by a strong 'utility' station.

Another south of the border country which sees less short wave activity than one might think would be the case is Mexico, which has seen far more attrition than addition over the last couple of decades. But now there's a brand new one on - XERTA, Radio Transcontinental de America which was scheduled to operate on 15.120 days and 4.800 nights, broadcasting from Mexico City.

The address is: **XERTA, Torre Latinoamericana (piso 37), 06007 Mexico DF, Mexico, or PO Box 653, 06002, Mexico DF**. Although this station apparently has big plans (they supposedly have a 50kW transmitter for short wave) it seems to be starting out with very minimal power.

Radio Mexico International is now scheduled from 1300 to 1700 on 5.985 and 9.705, 0000-0600 on 9.705. A half hour programme in English is aired at 1500, 1600,2000, 2100, 0400 and 0500.

Radio Tus Panteras from Merida on 6.105 was active recently in the 1600 to 2200 period. This one has operated only sporadically for the past several years and may will be gone again by the time you read this.

In Paraguay, Radio Guaira has been reactivated after a very long absence, operating on 5.976. Like several others mentioned this month, it is relaying (partly, anyway) its local f.m. station which operates on 103.5. The station closes on short wave at around 0100.

Radio Nacional Paraguay, on 9.735, provides the only reliable short wave broadcasts from this country, always well heard during North American evenings. Emisora Ciudad de Montevideo is active from Uruguay on 9.650. It's programme thrust emphasis the various musical styles of Uruguay and includes live music broadcasts.

The schedule seems variable - on occasion it runs as late as

Gerry L. Dexter
c/o SWM Editorial Offices,
Broadstone, Dorset.
BH18 8PW

0400. There have been very few logs of this one in North America so far.

Radio Montecarlo uses 9.595 from 2330 to 0300 (sometimes half an hour or more earlier than that) and usually relays the local mediumwaver of that name but sometimes will carry fellow Uruguayan Radio Oriental. Other frequencies are 6.140 active from 1030 to 1630 and 11.735, which also carries Radio Oriental, from 1630 to 2330.

For sometime now there have been rumors that HCJB was going to build a short wave station in Australia so that it could better reach an Asian audience. HCJB has now denied this, although it does say that they have been researching various options and means of achieving such an end, including building a station in the northwestern part of Australia. So far, however, there are no definite plans one way or the other.

In the United States one of the old private short wave stations, WINB at Red Lion, Pennsylvania has returned to the air. Reports go to: **PO Box 88, Red Lion, PA 17356.** Frequencies used are 11.740, 11.950 and 15.715. Although the transmitter is 50kW the power used, at least initially, is apparently considerably less.

WVHA, which Prophecy Countdown purchased from the Christian Science Monitor a couple of years back, is up for sale. The group has been having problems meeting its loan payments and operating expenses. The station claims that several groups are interested in purchasing the facility, one reportedly being the Bloomberg Information Network, which already runs a cable TV channel.

High Adventure Ministries station KHBN on the Pacific island of Palau is now carrying two hours of the US government's Radio Free Asia each day and, by now, has probably added more hours. Some reports indicate that KHBN is very difficult to hear in China (one of the main targets of RFA).

High Adventure gets paid for providing the air time for Radio Free Asia.

That covers things for this time. We'll have another report for your in three months. Until then - good listening!

Grassroots

Club Secretaries: Send all details of your club's up-and-coming events to: Lorna Mower, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

AVON

Bristol International RC: Tuesdays, 8pm. The Little Thatch Country Club, 684 Wells Road, Whitchurch, Bristol. All visitors are welcome. The club has been formed so that all radio enthusiasts, whether they be Licensed Amateurs, s.w.l.s or CBers can get together and have a good natter and do things that you do in radio clubs. PO Box 28, Bristol BS99 1GL.

RSGB City of Bristol Group: last Tuesdays, 7pm. New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol BS16 1BG. May 20 - EMC by Hilary Clayton Smith G4JKS. Robin Thompson G3TKF on (01225) 420442.

South Bristol ARC: Wednesdays, 7.30pm. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. May 7 - 20m activity eveing/committeee meeting, 14th - Calibration evening - bring your 'gear', 21st - 4th evening of build a basic receiver. For more information ring (01275) 834282 on a Wednesday evening.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 8pm. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). May 7 - Discussion eveing, 21st - Fox hunt. Gerry Somers G7VFV on (01296) 432234.

CHESHIRE

Mid-Cheshire ARS: Meetings held every Wednesday, 8pm, at Cotebrook Village Hall, North of Tarporley, Cheshire. April 30 - Rally planning and final arrangements, programs, etc., may 5 - Midcars Rally, working parties assemble Civic Hall, Winsford Town centre 7a, (tea/coffee laid on), 7th - natter night - Rally de-briefing, 12th - Committee meeting - Ivanley Arms A49 8.30pm, 14th - HF on air/plus short quiz night (30mins) G0RBA, 21st - Backpacker radio talk (proposed).Ted Bannister G0RBA on (01606) 592207.

DEVON

Appledore & DARC: 3rd Mondays, 7.30pm. Appledore Football Clubroom. May 19 - Talk by Dennis G0FCL on the Phase 3D Satellite. Dave Brierley G3YGJ. (01237) 476124.

GREATER LONDON

Wimbledon & DARS: 2nd & last Fridays, 7.30pm. St Andrews Church Hall, Herbert Road SW19. May 9 - Switch mode p.s.u.s by G8PYE. (01737) 356745.

HAMPSHIRE

Horndeon & DARC: 1st & 4th Tuesdays, 7.30pm. Lovedean Village Hall, Lovedeon Lane, Lovedean, Hants. May 6 - Natter night. S. Swain (01705) 472846.

Southampton ARC: Mondays, 7pm. This club is now up-and-running after some years of inactivity. New members welcome. Harold McIntyre on (01703) 737715.

HERTFORDSHIRE

Hoddesdon RC: Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon. May 8 - The club will be attending the Open Evening of Martin Lynch at 14-142 Northfield Avenue, Ealing, Lodon W13, where their extensive stock will be on display, and light refreshments and a buffet will be available. Don G3JNJ on 0181-292 3678.

KENT

Dover RC: Wednesdays, 8pm to 10pm during term time. Duke of York's Royal Military School, Dover. Morse classes are held from 7pm to 8pm and Novice training courses are also conducted as required at that time. The club is in the course of registering as a C&G Exam centre and hopes to be operational as such in time for the May exams next year (1997). The club also operates a CB station and encourages practical project work. April 30 - Talk on the origins of Icom by Paul G3VJF, May 7 - Club operating and natter night, 14th - Talk by Dr. Ken Smith G3JIX on 'Experimentation', 21st - Club operating and natter night. Brian Hancock G4NPN on (01304) 821007.

Maidstone YMCA ARS: Fridays, 8pm. YMCA Sports Centre, Melrose Close, Maidstone, Kent, ME15 6BD. April 29 - Dummy Morse tests, May 2 - Licence conditions, 3rd - RSGB Morse tests, 16th - Final rally meeting. (01622) 743317.

NORTH YORKSHIRE

Hambleton ARS: All meetings held at Allertonshire School, Northallerton, 7.30 to 9.30pm. April 24 - Packet, operating and video, May 8 - Repeaters, 22nd - Operating night. More details from John G0VXH on (01845) 537547.

NOTTINGHAMSHIRE

Mansfield ARS: 2nd Mondays, 7.30pm. Novices particularly welcome. May 12 - AGM followed by surplus equipment sale. David Peat G0RDP on (01623) 631931.

SHROPSHIRE

Salop ARS: Thursdays, 8pm. The Telesports Club, Abbery Foregate, Shrewsbury. April 24 - SSB by Simon G0EIY, May 1 - Natter night/night on the air, 8th- Junk sale, 15th - Night on the air/natter night, 22nd - 2m Fox hunt. Ian Davies G7SBD, QTHR or @ GB7PMB.

SOMERSET

Yeovil ARC: Thursdays, 7.30pm. The Red Cross Centre, 72 Grove Avenue, Yeovil. April 24 - Club station on the air and ommittee meeting, May 1 - Magnetic loop aerials by G0WTG, 8th - The Oriana - continuing sage by G3GC, also enrolment night for the next session of RAE classes by G3MYM, 15th - Moon bounce by G3MYM - plus final briefing for QRP Convention, 22nd - Packet radio, a demo by G8WKK. Malcolm Sadler on (01460) 54657

TAYSIDE

Dundee ARC: Tuesdays, 7pm. Dundee College, Graham Street, Dundee. April 29 - Club night - technical forum, May 5 - MEGS visit, 13th - Club night - technical forum, 20th - Presentation of awards. Allan Martin GM7ONJ, 11 Langlee Place, Broughty Ferry, Dundee, Tayside DD5 3RP.

WARWICKSHIRE

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington, Stratford-upon-Avon. April 28 - Top band direction finding competition, a chance to use the receiver you have built! - May 12 - Visit to the Technical Operations Centre, BBC Transmissions, Warwick (numbers limited). The Society are again organising a course of instruction for the Radio Amateur Examination of the City & Guilds of London Institute and further details can be obtained by writing to the Chairman of the Society, Mr J. Harris G8HJS, enclosing a stamped addressed envelope. The address to write to is: 57 Evesham Road, Stratford upon Avon, Warks CV31 2PB.

WEST YORKSHIRE

Wakefield & DRS: Tuesdays, 8pm. The Ossett Community Centre, Prospect Road, Ossett. April 29 - On the air, 30th - Visit to Police Driving School and Skid Pan. Bob 0113-282 5519 or G3WWF@GB7WRG.

WILTSHIRE

Trowbridge & DARC: 1st & 3rd Wednesdays, 8pm. The Southwick Village Hall, Southwick, Trowbridge. May 7 - QRP operating and construction G0FUW, 21st - Natter night. Ian G0GRI on (01225) 864698.

Editorial

Are we all in danger of taking life too seriously? It has become a tradition for magazines to publish 'spoof' articles as near as possible to April 1, and *SWM* is no exception. However, this year I received an equal number of letters of against the article as in favour of it and this is what prompted my opening question.

Even more interesting was the fact that one of the two letters against was sent by E-mail. (There wasn't room for it on the 'Letters' pages, in case you worry about my ability to count!) I have noticed from monitoring Newsgroups and E-mail groups that the immediacy and ease of reply - just click on 'Reply', type and hit 'Send' - enables one to send a message before the real content of the original has been digested. Writing a letter takes a bit more effort and gives you time to think about what you are going to say.

How often have you written a letter in haste and then decided not to put it in the pillarbox? With Internet messages, once you have hit the 'Send' button you've had it. The message has been converted into electrons to be reconstituted on computer screens all over the world.

I write my replies off-line and then send them all at once later that night. Often I have re-opened a message sitting in the 'Out' mailbox for a quick rethink or even to kill it stone dead.

Doesn't time fly? The Easter Bunny has been and gone and when you read this I will be on holiday. Then it's Dayton followed six weeks later by Freidrichshafen. If you are going to either of these shows do please drop by our stand - in Dayton it's called a booth, but you'll not see Punch and Judy - and say hello.

Dick Ganderton G8VFH

Letters

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

The WiNRADiO Debate

Dear Sir

This card, depicting my O-V-O short wave receiver, together with the observations below says it all,

does it not?

O-V-O; 1.6-30MHz; a.m., s.s.b. and c.w.; h.f. air and marine.

Test equipment used: **Ears**.

Random testing of RX on 20m s.s.b. yielded the following stations: ZL63GH (New Zealand), VO1FE (Newfoundland), 89PU (Barbados), SX3A (Uganda), ZS6BJH (Africa).

Receiver generated noise: **Nil**.

End of debate!!

Ron Pearce
Bungay

PS: I've sent similar cards to John Wilson - winner of the debate - and Richard MacLachlan at Lowe Electronics.

Dear Sir

I have always read John Wilson's reviews and articles with much interest as he always provides both technical, and perhaps, more importantly, practical accounts. But his review of WiNRADiO (*SWM*, March '97, p.48-53) was quite a disappointment.

I am a computer systems engineer and although I am not an expert in PC-r.f. receiver hybrids, I have some knowledge of computer designs and associated birdies. It appears that John has had little exposure to the latter, resulting, I am afraid, in the least practical and certainly the most unfair review I have ever read from him.

As a matter of fact, John raised a number of increasingly relevant issues regarding digital system-r.f. module hybrids (lets use the acronym D/RFS for digital/r.f. systems; most commercial receivers/transceivers today are D/RFS) that radio enthusiasts really need seriously consider:

1. Like it or not, D/RFS are here, they are here to stay, they are getting better and eventually you will not want to use anything less. They provide frequency synthesis, memories, computer interfacing and more recently DSP features and other goodies most of us are now starting to take for granted.

2. Digital systems use binary coding and as such generate pulse/square/rectangular and other sharp edge signals of various frequencies (and in the case of PCs of varying amplitudes). As we all know, sharp-edge signals generate an infinity of amplitude-decaying harmonics which make digital systems **very** noisy throughout large chunks of the r.f. spectrum.

3. With emerging low noise standards being applied to digital electronics, digital noise suppression is being seriously addressed by the PC, TV/Video, communications and automotive industry. I was in fact quite pleased to read in Rosettas reply article that WiNRADiO is built using a type of board developed by Rosetta themselves that is made of a composite material providing both magnetic and electric shielding. With the help of such techniques contributing to future D/RFS developments, digital noise immunity will most certainly improve.

4. Contrary to John's belief, the integration of computers inside a receiver (such as in my Icom ICR-71E and most other good quality receivers built in the last 15 years) has not been entirely successful in effectively suppressing internally generated digital noise. However, we will see in the next few years that the integration of a receiver (and other r.f. modules) into a computer is a much more viable combination provided the required precautions are taken (in short the isolation of r.f. modules from surrounding digital circuitry can be made far more effectively).

5. Radio amateurs and s.w.l.s are technically minded individuals who in many cases have contributed to radio tremendously through ingenuity, passion and determination. I believe that we must remain open to emerging technology and techniques and I hope that some of us will completely embrace D/RFS and perhaps, once again, be on the pioneering edge of leading concepts in radio. John's problems with internally generated noise during his review were most probably caused by the I/O Controller board and the video graphics controller in the computer he used (hence the noise generated when moving the mouse, the rotating logo, etc. were definitive signs) and readers of John's review a few years from now will be thinking that with a little D/RFS knowledge and a little know-how John could have resolved these problems in no time and write a more objective article. If Mr. Reginald Aubrey Fessenden, inventor of the heterodyne principle in 1901, had stopped his work because of a technical difficulty (such as the fact that the valve had not yet been invented) while developing his principle, where would radio be today? One must adapt to the circumstances and radio enthusiasts will quickly learn the '**dos** and **don'ts**' of integrating r.f. modules into their PCs.

6. Perhaps the most important point that cannot be emphasised too strongly: **Read the manuals very carefully** and take nothing for granted. Although John read Rosetta's manual, he did not really appreciate the inherent practicality of its contents, as highlighted by Mr. Milan Hudecek in Rosetta's reply. Mr. Hudecek's replies to the technical and practical issues raised by John were admittedly absolutely spot-on and it appears that most were discussed, at length, in the manual. I must admit that Mr. Hudecek raised my interest in his product tremendously (I do not own a v.h.f./u.h.f. scanner) and I hope many of your readers have also read his reply for a little D/RFS insight into what today's hybrids have to offer.

I sincerely hope that radio enthusiasts who read John's article will not be turned-off by the idea of radios in PCs and that the real enthusiasts will appreciate the full potential of the concept and get active. I wish all the very best to Rosetta's future developments and products and thank *SWM* for an excellent magazine.

Jean-Marie Latino
Oxfordshire

The controversy regarding the marriage of r.f. technology and computers will continue for a long time yet. I would suggest that a careful and considered re-reading of John's article before leaping to conclusions will show several things.

*John's article was not a review, but an **experiment**, using the sophisticated test gear at John's disposal, to try to determine if a sensitive piece of r.f. equipment, particularly one designed to operate in the h.f. part of the radio spectrum, could be successfully placed inside a PC. Mike Richards **reviewed** the WiNRADiO in the May '96 issue of SWM - and he*

found that it wouldn't fit inside his PC, either! Mike also found that the h.f. performance was, as is common with wide coverage receivers, poor. By coincidence this issue of SWM also carried the story of Reginald Aubrey Fessenden - back issues are available.

What if, having bought a WiNRADiO, you find that it doesn't fit inside your PC? Try to find another PC that will accept it? If the problems are due to the "I/O controller board and the video graphics controller in the computer he used" what do you do? Spend a lot of money experimenting with different cards until you find one that does work? I don't think so.

I am prepared to allow the controversy to run in the letters pages for a little longer. However, please keep the discussion to the technical aspects. I will blue-pencil any personal or derogatory remarks made against anyone on either side of the debate! ***Ed.***

Dear Sir

Re: March Issue 1997 pages 34/35

It is with great interest that I read these two pages. It was about that year 1936/7 that I became interested in radio. I suppose that dad's crystal set and eventually a valved receiver that first sparked off some interest.

I was not interested in carrying the accumulator to the local plumber for recharging. The 120V h.t. battery had various tappings for different voltages, and we mustn't forget the grid bias battery.

We eventually bought a mains radio from the Co-op. It was a 'Defiant' with a green 'magic tuning eye'. It lasted many years and I believe it was retired in the 1960s or even later.

I used to build one and two valve sets for short wave listening using Eddystone plug-in coils and condensers. The list of stations on page 35, one especially is of interest, W4DLH. This operator had an interesting QSL card.

The callsign letters 4DLH was announced as Four Dark Lean Horses. His QSL card showed the four horses as if they were charging towards you. Funny how a thing like that sticks in your memory and yesterdays news is forgotten.,

Recently I recovered an amount of old radio gear from a rubbish skip. Stuff going back to before WW2. Most of it was snapped up at the Ynys Mon Radio Users Group meeting. Among the items were two issues of guess what, yes, *SWM*, dated October 1975 and January 1978 (35 and 40p each).

Reading through them brought back old memories. One callsign, G3BW, mentioned on one of the pages reminded me of my days in Cumberland. G3BW lived at Whiteheaven and was one of a group of amateurs in the area. Some of the others were G8RZ, G3SY, G4NS, G6JZ and G6WR, a great group of radio 'hams'.

Well, I have said enough. I can only say that I have lived in a space of time when the 'wireless' world has developed more than we ever thought all those years ago. Let us hope it will be to the benefit of mankind.

Harold Pinkey (was 2FSB A/A) - Just Listening
Anglesey

The Truth Is Out There?

Dear Sir

As usual when Mr Postie dropped my copy of *SWM* on my doormat, I was looking forward to reading about the usual vagaries of the radio spectrum, plus the 'whys and wherefores' of how to get the best out of my comms receiver. Oh and not to forget all those lovely adverts, suggesting how I would spend my lottery win - dream on!

This month, (April), oh no, you had me jumping around the room in a frenzy. What has caused all this excitement, why am I about to FAX and 'phone all my friends, should we forgo the summer holiday and invest in a 3m parabola? "This is the *SWM*, not the *Fortien Times*" I say to my wife Sandra. "Why has this been missed by the Martian bacteria obsessed tabloids?"

On reaching for my credit cards thinking, "what could I get for a one careful owner FRG-7700 and AR8000? Must raise the cash for this satellite system." Then the penny finally drops. April, oh no, surely not, no, no, no! Please, please tell me that the news mankind has been waiting for since Roswell is not an April Fools' joke - that 'The Truth' is not really out there!

Please put me out of my misery, tell me my fears are not true, let me get that 3m dish and S-Band LNB and assorted paraphernalia. Oh, and do you have any suggestions on how to receive John Fuller's, Ghosts on 39 Megacycles, I was tending to something omni-directional, wouldn't you? Nice one!!!

Steve Jackson
Aberdeenshire

Dear Sir

I cannot tell you how much I enjoy *SWM*. A most enjoyable, vibrant and, let's face it, essential magazine. Before I reach the real reason for my writing to you, I would like to express my gratitude to you for including two very interesting features in the April 1997 issue, namely John Wilson's invaluable article concerning CE Markings and also, as a *Star Trek* and *X-files* fan, I found the article 'The Truth Is Out There?' very interesting indeed.

I have always wondered where those echo transmissions come from. April one and April fool, sorry I mean Par Olnie and Prof. O'Lail must be very dedicated in their field!

I don't know about Britain's Best Radio Magazine, you are certainly Britain's best joker! Well done!

I would also like to make a brief comment on the one valve competition. I found this feature very useful, but I didn't not build the one valver (or enter the competition of course) as, at the time, I was embroiled in constructing a three transistor HAC radio - I think it was called 'The HAC Triple-T' from an original circuit diagram.

I wound my own coils to cover three bands, 520-1625kHz, 3.2-13.0MHz and 8.0 to 26.0MHz, selected with a wave change switch rather than the original plug-in coil arrangement. It all works rather well and drives a small loudspeaker adequately, in fact, it is useful as an additional radio. I can recommend a bit of home construction of this nature to anyone with an interest in radio - very rewarding!

In the meantime, may I wish you, everyone at *SWM*, and all your readers very best wishes.

Michael Smith
Warwickshire

But some readers didn't appreciate the article. ***Ed.***

Dear Sir

I must agree with Mr Jacobs' letter regarding some of the unreadable print in your magazine. What is wrong with having normal type printing which is readable, I cannot understand why your art department has to have all this gimicky printing. I suppose it is that everything has to change nowadays, such as the way television is going.

I see this month that you have printed your stupid article in unreadable print. Why do you always have to waste paper and insult our intelligence with a stupid article in the April issue as it is so obvious no one is going to waste time reading it, apart from the fact the print is unreadable!

As I received my magazine on 22 March and April Fools day is on 1 April, it does not really count. I would have thought that as Britain's Best Radio Magazine, you would not have anything to do with this April issue tripe!

G.E.R. Denman
Portsmouth
Hants

SWM SERVICES

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Subscriptions are available at £25 per annum to UK addresses, £30 in Europe and £32 (Airsaver), £37 (Airmail) overseas. Subscription copies are despatched by accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £45 (UK) £54 (Europe) and £58 (rest of world).

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

The printed circuit boards for *SWM* projects are available from the *SWM* PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: (0956) 374918 (Mon. - Fri. 9am - 5.30pm).

Photocopies and Back Issues

We have a selection of back issues, covering the past three years of SWM. If you are looking for an article or review, or whatever that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues are £2.60 each, photocopies are also £2.60 per article, plus £1.00 for subsequent parts of serial articles.

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JRC NRD-345

Well, you lucky chaps, you must be important as potential short wave receiver purchasers for so many manufacturers to be making the investment in new designs to tempt money from your wallet. Latest on the scene is the NRD-345, and you don't need me to tell you that it must be from JRC and the latest in a long line of top quality h.f. receivers from this mammoth company, which was founded in 1915. Having just visited one of their manufacturing plants in Japan, I can tell you that they are **big** - far bigger than any of the other familiar names in the field. It has always surprised me that such a company would devote time and effort to make receivers for you and me, but thank goodness they do.

Simple But Subtle

Having in the past been the UK distributor for JRC, it gave me a twinge of nostalgia to see the familiar style of carton and logo, and unpacking the NRD-345 reassured me that JRC have lost none of their expertise in making a receiver look good. Simple, but subtle styling makes the NRD-345 look very attractive and the panel layout is exceptionally friendly, with the tuning knob slap bang in the middle and the minor controls located exactly where they should be around the panel. This is a receiver which anyone can use without reference to the instruction manual because each control is clearly labelled and each control has but a single function. This harks back to the decision taken at JRC when they produced the all conquering NRD-535, that they would not use any dual controls - what a good idea for those of us going down the inevitable pathway to being slightly bewildered.
The NRD-345 is smaller than its larger brothers, but not so small as to be unusable. The front panel measures 250 x 100mm, which allows sensible spacing between the controls and the depth of 238mm means that the NRD-345 will sit comfortably even on a coffee table, for indeed it looks attractive enough to be seen in domestic surroundings. The weight of 3.5kg won't cause any unexpected visits to the hernia specialist, but it's heavy enough to be stable in use. The modest weight is to some extent caused by having no internal power supply, the NRD-345 like most modern receivers uses an external 12V d.c. supply. The colour? What else could it be but satin black, which always looks good when you first take the unit out of the box, but this admittedly popular finish does show fingerprints easily, so for those of you who like eating chips out of newspaper, you had better wash your hands before touching the receiver. But that's enough, the NRD-345 is attractive, the right size and weight, and has the right upbringing, let's take a tour around the panel.

Quality

The starting point has to be the JRC badge, not because it's made by Fabergé (it's not) but because that badge denotes quality of manufacture. JRC have a much envied reputation for high production standards and it's well deserved, judging by the minimal fault returns on the thousands of JRC receivers I sold in the past. I see no reason why the NRD-345 should let that reputation down. The major front panel controls are related to tuning the receiver, and the main tuning knob is a good size and weight with a silky smooth feel to it. The tuning rates are initially set to default values at switch on, but are easily varied by the user at any time. The tuning step in use is shown by a small arrow alongside the appropriate digit of the frequency read out on the main display, and is changed by pressing the kHz and MHz buttons on the numeric keypad. Although the least significant digit on the display is 10Hz, the finest tuning step is actually 5Hz, which is small enough to give smooth tuning on any signals, even data which does require a very slow rate. Prodding the kHz button changes the tuning steps from 10(5)Hz to 100Hz, 1kHz and 10kHz, then back to 10(5)Hz again, with the little arrow pointing to the step chosen on the display. Very neat and easy to use. The resultant tuning rate per knob revolution is shown in **Table 1**.

Table 1. Tuning Rate

Tuning Step	Change for one Revolution
(Hz)	(Hz)
10 (5)	250
(kHz)	(kHz)
100	5
1	50
10	500

You can see that, with only 250Hz per revolution, using the smallest step, the resultant tuning rate is impressively slow for pin-point tuning, whilst the selection of the other tuning rates gives the ability to race up and down the spectrum with ease. I found myself using the 100Hz step most of the time for general tuning around, but when the going got tough I soon switched down to the finer resolution of 250Hz per turn of the tuning knob. Tuning can also be carried out by using buttons labelled with left and right arrows conveniently placed just above the tuning knob. These change the receiver frequency in the steps chosen by the use of the kHz button, even down to the finest 5Hz resolution, but it's a pity that 5kHz and 9kHz steps are not provided because they would have then been ideal for short wave and medium wave channel hopping. The MHz button moves the little arrow to the MHz digit on the display and the tuning increments are then 1MHz.

Couldn't Be Easier

Having mentioned the keypad, let's turn to that method of putting the receiver on to a wanted frequency. It couldn't be easier, just key in the frequency you want, terminating the entry with kHz or MHz as you prefer. For example, if you want to listen to 5975kHz that's what you key in. If you prefer to use 5.975MHz instead, then that is, again, what you key in. A 'clear' button allows you to cancel any incorrect entry. The keypad is also used for time setting the clock and selection of memory channels. The keys are soft to the touch and operate easily, with a 'click' feel so that you know selection has been made, but I would like to have seen provision for a keypad on a flexible lead or an infra red link so that I could use it flat on the table (the keypad, not me!), because horizontal keys are so much easier to use - that's why computers don't have vertical keyboards. A further, and very interesting use for the keypad is the function of directly keying in short wave bands in metres rather than frequency. For the 41m band for example, you key in 41 followed by a poke at the 'mte' key. Sadly, in common with many manufacturers, JRC refer in their handbooks to wavelengths as 'meters' instead of the correct 'metres'. To read '41 meters' calls to mind a long line of AVO instruments side by side, 41 metres is clearly a measure of a wavelength. JRC have provided no less than 22 'mtr' bands from 160 to 10 metres covering both broadcast and amateur bands, with the mode and tuning rate automatically set for the chosen band. Now at this point, I had a distinct feeling that I had seen this idea before, and sure enough, I realised that the AOR AR3030 has exactly the same feature set up in exactly the same way, so either JRC have bought in the software design from the AOR designer, or they have pinched it - hardly likely with JRC's reputation. Having used the direct band access and found it very useful, I'm pleased that such a good design feature has been provided by both AOR and JRC. It also removes the need for me to remember the start and stop frequencies of the 41 metre band or any other broadcast band.

Finally, two independent v.f.o.s are provided, each covering the entire tuning range of the receiver, with the usual facility to swap between them or equalise them in frequency. Very useful to use one

John Wilson has been looking at the latest receiver to come out of the JRC stable, the NRD-345

as a 'scratch pad' memory or to jump between two frequencies when listening to duplex radiotelephone channels. Both v.f.o.s incidentally also store mode, filter bandwidth, a.g.c. setting, noise blanker on/off and r.f. attenuator on/off, so they are effectively two separate receivers.

Bright Display

The main front panel display is bright and easy to read with black characters on a yellow background. Frequency is shown to seven digits, the last being 10Hz (although the receiver tunes in 5Hz steps) and the display also shows all the subsidiary information about memory channels, v.f.o. A/B, noise blanker on/off, r.f. attenuator setting, a.g.c. speed, mode in use, etc. Pressing either the 'clock' or 'timer' buttons changes the frequency read out to time read out, and I will just mention here that although the NRD-345 has a timer function to switch the receiver on and off at preset times, it does not provide any switching function to turn on an external tape recorder, so unattended recording is not possible unless you use a voice operated tape recorder. Strange omission from the otherwise comprehensive specification.

Alongside the display panel is a back-lit signal strength meter and it's a proper moving coil analogue meter, which waggles nicely, bringing pleasure to traditionalists like me. The calibration is in 'S' units from 0 to 9 with +10, 20 and 30dB above 9, but the numbers from 0 to 9 are 1, 3, 5 and 7 with no space for intermediate steps. Still, it works well and is very easy to read. To the right of the main tuning knob are push buttons for v.f.o. selection, mode and dial lock.

The NRD-345 had a goodly selection of reception modes including u.s.b., l.s.b., c.w., a.m., synchronous a.m. and FAX. When switching from u.s.b. to l.s.b., the receiver remains exactly on frequency and no-retuning is necessary. This makes it really easy to use exalted carrier reception of fading a.m. signals with selectable sidebands, but of course we also have synchronous a.m., so why not use that? Simply because JRC have fitted the synchronous a.m. system from big brother NRD-535, which uses the incoming carrier of the station being received and processes it to give reasonably constant amplitude before re-combining it with its sidebands in the s.s.b. product detector.

SPECIFICATION

Frequency Range:	100kHz to 30MHz
Modes:	a.m., synchromous a.m., u.s.b., l.s.b., c.w. and FAX
Architecture:	Double superheterodyne. First i.f. 44.855MHz

Sensitivity:

(MHz)	s.s.b. (dBμ)	c.w. (μV)	FAX (dBμ)	a.m. (μV)
0.1 - 0.54	0	1	10	3.2
0.54 - 1.8	15	5.6	25	17.8
1.8 - 30	10	0.3	6	2

S+N/N: 10dB; Modulation: 400Hz, 30% (a.m.)

Selectivity:	WIDE: ≥ 4kHz (6dB); ≤ 10kHz (60dB) NARR: ≥ 2kHz (6dB); ≤ 6kHz (60dB) AUX*: ≥ 500Hz (6dB); ≤ 1.6kHz (60dB) * AUX bandwidth is with CFL-232 optional filter fitted.
Image Rejection:	> 70dB
IF Rejection:	> 70dB
AGC:	< 10dB a.f. output variation for antenna input signal change from 3μV to 100mV
Frequency Stability:	< ±10p.p.m. after 5 to 60min warm-up period. < ±5p.p.m. per hour thereafter.
Audio Output:	Speaker: 1W into 8Ω 10% distortion Line: 700mV 100kΩ load 10% distortion
Power:	12V d.c. 800mA
Size:	250 x 100 x 238mm
Weight:	3.5kg

Because the reinserted carrier is still the original in phase component of the incoming signal, there are no heterodyne howls as the system operates, and you are blissfully unaware that the synchronous detector is working until of course you realise that the selective fading effects have diminished. However, the minor drawback is that you do not have the facility to select sidebands when in 'Sync' mode and therefore cannot choose the least distorted sideband unless you revert to u.s.b./l.s.b. exalted carrier mode. But it works well in practice and is easy on the ear until you go some way off tune when reception becomes distorted - you are warned about this in the handbook.

The c.w. mode is set to give an 800Hz tone when the frequency of the receiver is zero beat with the incoming carrier, but no provision is made for tuning the b.f.o., so if you have an optional narrow c.w. filter fitted, it's 800Hz or nothing. In FAX mode, the receiver shows the incoming signal frequency when the receiver output tone is 1.9kHz centered on an 800Hz shift - all perfectly correct and tickety-boo.

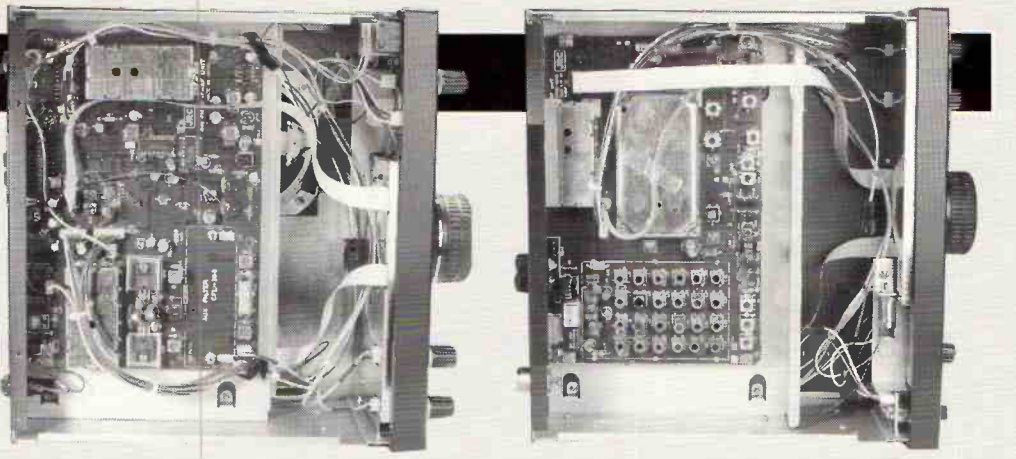
All the modes work extremely well, with good quality recovered audio and absolutely no fuss about mode selection because the receiver is always showing the correct frequency. This is, I suppose, only to be expected from an experienced communications company like JRC, but not all manufacturers take the same trouble over these details.

Alongside the buttons are the rotary controls for a.f. gain and tone. Both are standard analogue controls, which operate very smoothly with the tone control being a simple high frequency variable cut which can help when receiving noisy signals. Above the a.f. gain and tone controls are the two buttons selecting 'ATT' and 'AGC'. There is a single step 20dB attenuator fitted to the NRD-345, but I think that the receiver could benefit from two 10dB steps - see later. On first using the receiver I thought that the a.g.c. had simple slow and fast settings, but perusal of the manual told me how to enable an a.g.c. off setting as well. You know that I am in favour of being able to switch off the a.g.c., but it's no good unless you also have an r.f. gain control, and this is one omission I find very hard to take from JRC. For a receiver from such a company to come without an r.f. gain control is almost unforgivable, and the keen operators will miss it. Let's have the tone control removed and an r.f. gain control in its place, please.

Doing a swift *arabesque* to the other side of the tuning knob, we find the 'MEMO' and 'MR' (memory recall) buttons, together with the 'Filter' select button. The NRD-345 comes with two i.f. filters fitted as standard, a good nominally 2.3kHz narrow and a nominally 4kHz wide. An 'AUX' facility allows mounting of one of the superb JRC crystal filters normally used in the NRD-535, and although most people will assume that this means a c.w. filter, in fact, the range covers five bandwidths from 200Hz to 2.4kHz. All these option filters are top class 455kHz multi-pole crystal units which means that they are amongst the best you can buy - they are also amongst the most expensive, but believe me, the performance is well worth it. However, the two filters already fitted are very good, with the narrow unit giving steep sided adjacent sideband rejection and the 4kHz wide filter providing pleasant a.m. quality with decent rejection to go with it.

Three more buttons provide memory scan, memory skip and noise blanker on/off. The blanker works well, aided by the fact that it has a variable threshold set by a convenient rotary control alongside the on/off button. This performed entirely to my satisfaction, and although over ambitious use of the threshold control can sometimes result in signal distortion, I didn't notice this to any great extent, and the blanker worked very effectively. Now what was it I had to remember? Oh yes, the memories.

Lurking inside the NRD-345 are 100 memory channels, each one storing frequency, mode, a.g.c. setting, r.f. attenuator setting, filter bandwidth and noise blanker on/off. The memory contents are backed up by a lithium battery fitted internally, which has a stated life of about



five years. Putting settings into any memory is extremely simple, as is recalling any channel and there are further enhancements in the provision of a memory scanning system which allows you to set the receiver to automatically scan through any or all of the memories, pausing on each one. There is no squelch or noise suppression system on the NRD-345 so the scan pauses on each selected channel for long enough to allow you to hear what is happening. The pause time can be selected between 1 and 9 seconds and there is a further feature which allows you to designate memory channels which you want to scan to skip over. By careful memory management, you could therefore have groups of, say, h.f. airband channels grouped together and scan only those, or a group of BBC World Service frequencies together and scan them continuously to check which frequency is providing the best reception. In common with the other facilities on the NRD-345, the memory system is really easy to use and does exactly what you want when you want.

Fouette To The Back

Having *arabesqued* across the front, let's now *fouette* to the back panel Here we find an RS-232 connector, which gives you computer chaps full access to the internals of the receiver. Just about every function of the NRD-345 is available via the RS-232 port and the receiver also replies (not Hello Sailor again?) to confirm the settings you wanted changed have been changed. JRC even give a sample little program (why oh why can't we spell programme?) in the handbook to get you going. I have no doubt that the software demons will be writing lots of interesting tricks for the NRD-345 to do, so keeps your eyes on the advertisements. Joking apart, it's a fact that all the receiver functions can be controlled from the data port and the handbook gives complete details of every command and response given.

The antenna connector is a standard SO-239 socket for the 50Ω coaxial input, with a terminal block for the alternative high impedance long wire input and a switch to change from one t'other. Three miniature jack sockets give external speaker, record output and FAX output, with the record and FAX levels being fixed and not affected by either the volume or tone controls on the front panel. All neat and comprehensive.

Looking inside one cannot fail to be impressed by the beauty of the construction. The r.f. and mixer stages are on one board, with the i.f. and audio on another, separated by a substantial screened spine along the width of the receiver. You can't see much of the front panel gubbins because it is hidden behind an all-enveloping r.f. shield, which effectively removes any control processor noise from the sensitive r.f. bits. JRC do know how to make circuit boards of the very highest quality.

Technical Details

So, Dr. Frankenstein, let's get to the gory technical details. How did it perform under the operating table lights?

I measured the receiver noise floor at -135dBm with an intermodulation free dynamic range of 84dB and a 3rd order intercept point of -9dBm at 20kHz spacing using the nominal 2.3kHz i.f. filter (actual measured 2.6kHz).

Table 2: Reciprocal Mixing

Spacing from wanted signal (kHz)	Reciprocal mixing ratio (dB)	dBc/Hz (dB)
5	67	101
10	78	112
20	88	122
50	97	131
100	104	138

Stop yawning and listen! The NRD-345 is sensitive - possibly too sensitive for its own good, and certainly more sensitive than the other receivers in its category - but that's not necessarily a bad thing if you want to winkle out weak signals on 10 metres. However, on lower frequencies, you will find yourself making use of the r.f. attenuator and then you find that the single 20dB step is sometimes a bit harsh, which is why I said earlier on that two steps of 10dB would have been a better choice - or an r.f. gain control, did I hear someone cry? Put it into some context, it's better than my KWM-2, but not so bomb proof as the AR7030. It's better than the beloved TS-900 transceiver, which was hand-built by Kenwood to prove that they could make the best in the world, and how that world has changed with receivers like this. I wish that I had been able to do the tests using one of the narrow c.w. filter options because that would have given a more impressive result, but you knew that didn't you?

Reciprocal mixing performance is not so good close in, but improves at wider spacing from the wanted signal. In this area, it's not as good as my KWM-2, but that's only to be expected when the KWM-2 uses a quartz crystal as the first conversion oscillator. Measurements were taken using the 2.3kHz filter.

The 'S' meter calibration was good, corresponding to a nominal 6dB per 'S' point across the scale, with S1 at 4μV. The receiver sensitivity for 12dB SINAD on s.s.b. using the 2.3kHz filter was a creditable -126dB and on a.m. with 60% modulation -117dBm. As I have already remarked, this is probably too sensitive (who would ever have thought that a reviewer would say 'too sensitive'), but you always have the attenuator button....One niggle is the annoying habit of Japanese manufacturers to take it upon themselves to stick a 20dB attenuator in the medium wave tuning range from 1.8MHz to 540kHz and sure enough, JRC have done it. Why? ostensibly to reduce intermodulation problems in the medium wave band, but if you happen to be a medium wave DXer and need that extra bit of gain, it's not much good having 20dB of attenuation forced down your throat. I'm sure someone will find a way of disabling it in due course.

Smooth AGC

The a.g.c. performance is smooth and bounce free, although I did notice an odd 'latch up' effect when brutalising the receiver with high levels of two tone test signals. Under some conditions, when increasing the input signal from S1, at about S3 the receiver gain would step up and remain up even though the input signal was reduced down to the original S1 level. Odd, but it only happened under test conditions and didn't cause any distress in real operation. The audio output always sounded nice and clean whatever the signal levels, but that high sensitivity did make itself apparent when listening to signals below the a.g.c. threshold when the receiver background noise was slightly intrusive - of course that is offset by the fact that I was listening to signals at a fraction of a microvolt - not too many receivers can do that (as Michael Caine might have said). Lots more to say, but no space to say it, so let us hear the conclusion of the whole matter (Ecclesiastes Ch.12, v.13):

The NRD-345 is a little honey of a receiver because it combines good (not great) performance with a logical, easy to control layout. The concept of a knob for each function is something JRC have clearly decided is to be one of their design aims and it pleases me no end. At the suggested retail price of £795 it sits in the hottest spot in Hades, competing with the AR7030 from AOR, the Lowe HF-250 Europa, and the yet to be tested Fairhaven receiver. The AR7030 is at the leading edge of r.f. performance and will not be bettered for a long time. It is, if you like, the Formula 1 Ferrari of the receiver world, and if you have the skills of Michael Schumacher it will dance to your music of time. The Fairhaven has still to be tested, and I hope I have the privilege in due course. The Lowe HF-250 Europa is starting to show its age, but the NRD-345 carefully steers its way through traffic to give the balanced drive and ease of use which you might expect from a Mercedes - and with the JRC background of reliability, the Mercedes - and with the JRC background of reliability the Mercedes analogy is quite apt.

I'm glad I don't have £799 pounds to spend on a new receiver, because it is becoming an increasingly difficult choice to make, so all I can say is that the NRD-345 is a strong contender for your approval and you should hot foot it to a decent dealer and try it out. Perhaps, since **Nevada, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (01705) 662145** were kind enough to lend me the unit for test, your first call should be there! ■

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Watson Multi

Right: This highly detailed chart was received using JVFAX and the Watson Multimode interface.

Left: Enlarged portion of the chart on the right showing the excellent detail.

When beginning with the data modes the hardest decision is often trying to decide which mode to start with. Is it to be RTTY, SITOR, FAX, SSTV or Packet, to name but a few of the options. The Watson Multimode solves this in one easy step as it provides, not only the interface, but also a selection of popular shareware software packages. As an added bonus it also includes facilities to transmit all the modes.

Overview

Let's start with a look at the interface requirements of these programs to understand how this can all be brought together in one very compact unit. The most significant point to note is that RTTY, SITOR, SSTV and Packet all use a very similar technique to convert computer data into a form that can be carried by radio. As all computers can only deal with numbers, and binary ones at that, all the information emanating from the computer's data port is in the form a voltage that varies between a logic 1 and logic 0. To put it more simply, this equates to a voltage that varies between 0 and 5V. Obviously this can't easily be sent over the air, so a device called a modem is used to convert the varying voltage into varying audio tones. These tones can then be connected to the microphone socket of a conventional radio transmitter for broadcast. This is a very much simplified description, but gives an outline of how a data signal can be transmitted over radio.

You will note that I excluded FAX from the above. This is because there is a subtle difference with this mode, especially when it's used to send grey scale images. Rather than using a voltage that switches between two distinct levels, FAX signals can, and do, use intermediate voltages to convey the differing values of the grey scale. In this case, the transmitter and receiver need to be able to accurately reproduce this range of signals. The Watson interface has the task of taking the received audio tones and converting them back into voltages that represent the original sequence of binary numbers that left the transmitter. How do they do that? Well, it's all down to some clever electronics and neat programming. For the reception of all modes other than Packet, the Watson unit uses what's known as a comparator interface. In this system the audio signal from the receiver is squared-off by an operational amplifier

'mode Interface

If you want to start monitoring the data modes but don't know where to begin, the new Watson Multimode interface could be just the ticket, says Mike Richards.

before being applied to the computer. The computer then monitors the resultant square waves and calculates the frequency of the signal so that it can work out the logic 1s and 0s that make-up the data being sent.

When switched to Packet mode the Watson uses a 'Baycom' type interface system. This is a German design that provides a cheap, but very effective way to get into Packet radio. Rather than using the computer to work out the audio signal, the Baycom system makes use of a semiconductor modem chip to directly convert the incoming audio tones into logic 1s and 0s that the computer can process. The great benefit of this system is that it removes some of the load from the computer so that it can use its processing power to handle the advanced facilities that are available through the Packet network. An important point to note about the BAYCOM modem is that it only works with v.h.f. 1200 baud Packet systems. For the 300 baud systems used on h.f. you will need to revert to the HAMCOMM interface and use the rather crude PK-MON software.

Start-up

There are two separate operations that have to be performed in order to get on the air - software installation and the hardware connections. Installing the software was simple thanks to the 'Install' program supplied on the first of the two program disks. This transferred the program files for all the packages onto the working disk drive. Once complete you then need to run each of the programs to configure them to work with your particular system. This was quite simple thanks to the helpful screen shots that were printed in the Watson's otherwise scant manual.

Completing the hardware connection was slightly more involved as you needed to be able to make-up a lead to connect to your receiver's audio output. This requires some soldering skills to make a link between a 9-pin D-connector and a 3.5mm jack. The connection to the computer required no such cable and the interface could be directly connected to the computer's serial port. With most computers this would result in the interface residing behind the PC. This is not such a good idea as there is a selection of indicator l.e.d.s on the top panel and a selector switch to change from Packet to the other modes. The best solution is to use a straight 9-pin extension lead so that the interface can be placed where it's easily accessible.

Software

Although the Watson interface comes with a full set of software, this has no direct connection with Watson itself as all the programs are shareware and are widely available from amateur radio and computer shareware operators. In fact thay are all written by radio amateurs. Having said that, there's a lot to be said from getting the software and interface from the same supplier. But you do need to remember that you need to register the software with the author. Just because you've paid for the interface don't think you have also bought the software. One of the advantage of using the shareware programs is that they are very widely used and well supported. You will also find mention of most of them in my 'Decode' column.

Performance Summary

The Spanish made Watson is in no way revolutionary, but it is a very compact implementation of a combined HAMCOMM and BAYCOM type interface. The performance on all modes is to the standard I would expect from this interface system. I was just a little disappointed that the HAMCOMM part of the interface didn't use a more up-to-date operational amplifier as this could have slightly improved the FAX detail when used with a really good receiver. This is by no means a serious gripe and the slight loss would not be noticed on the vast majority of FAX transmissions. The compact design and easy software installation make the Watson Multimode an interesting contender in this competitive arena.

The Watson Multimode costs £69.95 + £2 P&P and can be obtained from

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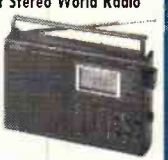

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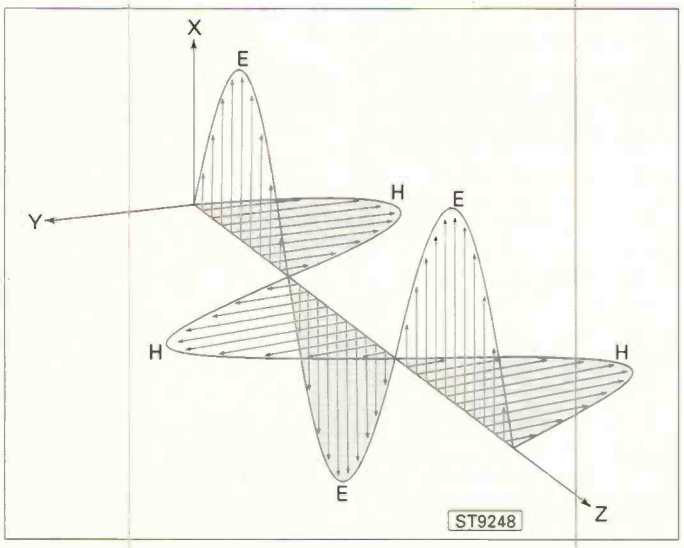

Fig. 1: Schematic of a plane electromagnetic wave moving along the +z axis. The electric vector E is in the vertical plane (parallel to the x axis). The magnetic vector H is in the horizontal plane (parallel to the y axis)

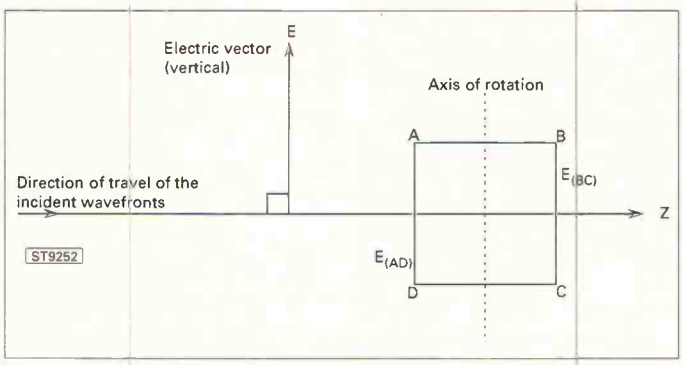

Fig. 2a: Plane of loop is perpendicular to the plane of the incident wave fronts, e.m.f.s E_{AD} & E_{BC} are not in phase. There is a net e.m.f. round the loop.

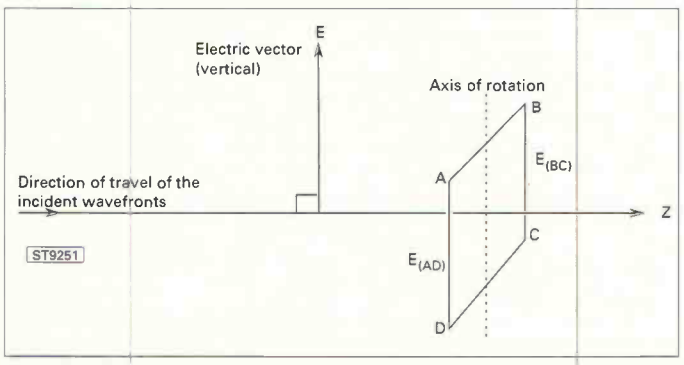

Fig. 2b: Plane of loop is parallel to the plane of the incident wave fronts, e.m.f. E_{AD} = E_{BC} at all times. Net e.m.f. is zero - the 'null' position.

C. Gordon Bennett looks at the physics of the 'Magnetic Loop' antenna.

The usual statement introducing an article on loop antennas, even in commercial journals, goes something like this: "The laws of physics always apply, so it follows that loops respond to the magnetic component of the passing radio (electromagnetic) wave". The implicit impression given, therefore, is that they respond only to the magnetic component, and indeed this is often stated explicitly!

I regard both these implicit and explicit statements as quite weird because the two components, magnetic and electric, are not independent, each in fact generating the other in turn. I suspect that the initial confusion arises because the use of the word 'component' in the standard texts is taken to be similar to the use of the word 'component' in connection with a force. In this latter case, of course, the perpendicular component of the force is zero!

Reverting back to the field components, it seems that it is thought that the electric and magnetic components are 'detachable' because I have been asked many times whether the voltage produced in any receiving antenna is due to the electric field of the passing electromagnetic wave or its magnetic field, or both! (See **Fig. 1** for a standard schematic of an electromagnetic wave).

Meaningless Question

The question is meaningless if you stop to consider that anywhere in space (except very close to the source), the electric field of a travelling wave is the result of a changing magnetic field and this resulting electric field continually reproduces a changing magnetic field. The electric field induced in an antenna is likewise the result of the changing, passing magnetic field. One can view the resulting electromotive force in the antenna as either the integral of the electric field of the wave in space, or regard this resulting e.m.f. as due to the change of incident magnetic field. It is immaterial which view one takes. Both are correct.

The best analogous question I have ever read in this connection is to ask whether a cork rising on the crest of a water wave (commonly demonstrated in a 'ripple' tank) is lifted by increasing water pressure or by the higher water level of the crest. There cannot be one without the other! (I claim no credit for that very appropriate analogy).

Now, as I have implied that a 'magnetic' loop can, and does respond to the (non-detachable) electric components of a passing wave, I shall attempt to demonstrate how there can be a resulting e.m.f. in the loop from this viewpoint. For

simplicity, I shall choose a rectangular loop, with the sides vertical and the top and bottom horizontal. Let the incident radio wave be vertically polarised, i.e. the electric vector is vertical (see **Fig. 2a**). Such a wave can induce an e.m.f. in the vertical arms but not in the horizontal arms. Let the loop be oriented so that its plane is parallel to the direction of the travelling wave and therefore perpendicular to the (assumed) plane, incident wave fronts. Voltages will be induced in the two vertical arms, but they will be somewhat out of phase because an on-coming wave front will reach one vertical arm before the other. There will, therefore, be a phase difference between the two induced voltages, meaning there is a net electromotive force around the loop. (The separate voltage arises because electrons in each vertical arm are accelerated and therefore displaced towards one end or the other of each vertical arm by the passing electric field. The vertical electric field cannot accelerate electrons towards one end of the horizontal arms of this loop, which is why there is no horizontal e.m.f.). Now, consider the effect of the area within the loop turns. Let the loop be small compared to the wavelength of the relevant signal. The e.m.f. in each vertical arm is proportional to the length of that arm, i.e. to the height of the loop. The phase different between these e.m.f.s is proportional to the width of the loop. It follows that the net e.m.f. round a small rectangular loop is proportional to the area of the loop.

It should be clear by now that the loop were to be rotated about a central, vertical axis through 90° then the voltages induced in the vertical arms would be equal and in-phase (although both constantly varying with time). In other words, the net e.m.f. is permanently zero, as shown in **Fig. 2b**. This is the perfect so-called 'null' position of the loop with respect to the postulated incident signal. Note, that we can, therefore, easily calculate the magnitude of the induced e.m.f. with no reference whatsoever to the 'magnetic component' of the incident electromagnetic wave.

So much, therefore, for the term 'Magnetic Loops'! Somewhat strangely, I note in radio club bulletins that any attempted explanation of the action of a loop antenna is always given with reference to the 'electric component' in a similar but less detailed way to that in which I have dealt with it above.

Another way of relating the magnitude of the resultant (sinusoidal) e.m.f. to the area of the loop involves reference to the 'magnetic component'. Using the loop orientated as stated in the previous discussion, **Fig. 3a**, the magnetic vector will be horizontal and perpendicular to the plane of the loop. The induced e.m.f. is proportional to the rate of change of magnetic flux linkage through the loop. Since the total, normal flux linkage at any instant is directly proportional to the area of the loop, it follows immediately that the induced e.m.f. is, again, proportional to the area of the loop. Likewise, when the plane of the loop is aligned parallel to the magnetic vector, **Fig. 3b**, the total flux linkage is always zero, so the rate of change of flux linkage is zero, and, therefore, the induced e.m.f. is always zero, the 'null' position. If the loop has more than one turn, then the voltage at the terminals is also clearly proportional to the number of turns. It is therefore relatively simple to calculate the p.d. in a particular case, with the caveat that there must be no current flowing round the loop. When the latter occurs, the resistance of the turns and the distributed inductance of the system, re-radiation from the loop and the impedance of the 'load' system must all be taken into account. Note therefore, that the final situation is by no means as simple as I previously indicated, when

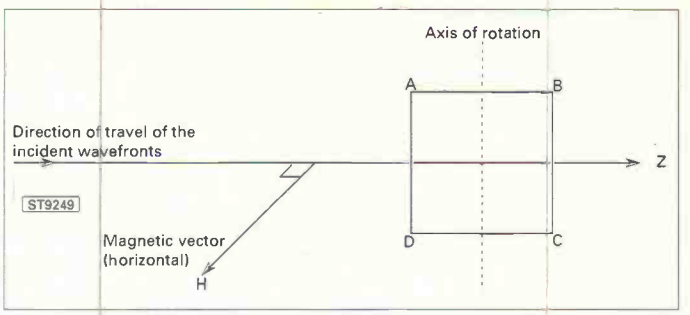

Fig. 3a: Plane of loop is perpendicular to the plane of the incident wave fronts. Magnetic flux linkage is at a maximum so induced e.m.f around the loop is a maximum.

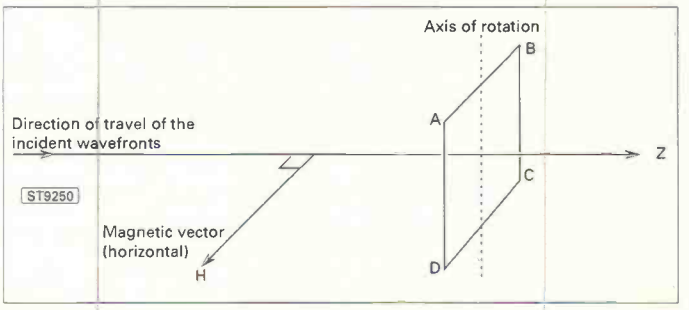

Fig. 3b: Plane of loop is parallel to the plane of the incident wave fronts. Therefore Magnetic flux linkage is always zero so Induced e.m.f. is always zero. The 'null' position.

just illustrating the effect of the passing radio waves 'magnetic' component.

Again, I find it strange that most readers of the journals mentioned above, seem to be totally unaware of the flux linkage aspect of the origin of the induced e.m.f. in a loop. They are certainly not members of the 'Magnetic Loop Club'!

Reciprocity Theorem

I referred to a small loop earlier and it must be kept in mind that I have only discussed such loops from a viewpoint of reception. Therefore the obvious follow up in the future is an explanation of the implications of the Reciprocity Theorem, which is frequently a source of confusion.

Despite searching through relevant texts, both old and very recent, and at various levels up to post graduate, I have failed to find any mention of the term 'Magnetic Loops'. This nomenclature may have some connection with the fact that a magnetic dipole can be shown to produce a far field similar to that of a small loop. For this reason a small loop was occasionally referred to in some older texts as a 'Magnetic Doublet'. I suspect this may well have been misconstrued into 'Magnetic Loop' over the years, the way most myths develop, until they are eventually taken to be authentic.

The root of all the preceding and similar problems is a misunderstanding of the nature of electromagnetic radiation. I have found that many readers are discouraged when they encounter partial differential equations and Vector Calculus, i.e. DIV, GRAD, CURL and so forth. (A small, specialist book on the latter is *DIV GRAD CURL and ALL THAT* by HM Schey, Norton & Co. 1973). For some understanding of electromagnetic radiation, without tears, I recommend *Fundamental Physics* by Jay Orear (Wiley 1963). He gives non-calculus explanation of electromagnetic radiation and acknowledges that his approach was worked out, especially for this book, with the help of Richard Feynmann, who else?! What a man! At that time, holding a Chair at the Californian Institute of Technology, and one of the founding fathers of Quantum Electrodynamics he was yet prepared to find time to aid the development of an effective and quantitative approach to electromagnetic radiation which avoided Vector Calculus. ■

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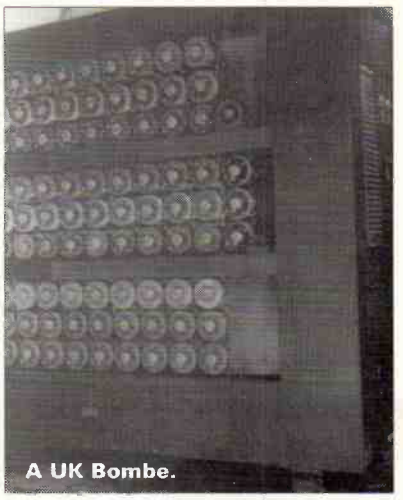
A UK Bombe.

I have previous discussed the wartime radio intercept 'Y Organisation' of all the armed services, this time I will concentrate on the Royal Navy Y Service, which gradually attained more and more importance as the war of 1939-45 progressed.

In 1939, Royal Navy and merchant navy ships were mostly fitted with a radio direction finding antenna system which consisted of two large perpendicular loops. This system worked well during the hours of daylight on low frequencies but was inaccurate at night due to reflections from the ionosphere.

On the high frequency bands, it performed fairly well during the day or nighttime but still only gave the bearing of a radio transmission - to within four or five degrees at best - but, not the range. The Navy, realising the importance of obtaining the exact location of enemy warships, had setup a few radio direction finding stations on the British mainland, but these were soon supplemented by more of them once the German U-boats really started causing havoc to merchant shipping crossing the Atlantic Ocean.

The British merchant fleet was our lifeline and one which the Germans were really determined to cut, especially when they had failed to invade Britain in the autumn of 1940. The man that Hitler placed in charge of the German Navy (Kreigsmarine) was admiral Karl Donitz. His sole plan was to destroy the British at sea and to effect this, his master plan was to build the biggest submarine fleet the world had ever seen and these were called U-boats (which is short for Untersee boats).

Complete Chain

The two main problems for the British were 1) to locate these enemy U-boats, 2) to try and intercept the messages to and from these U-boats. In order to ascertain the positions of them our Navy now set up a complete chain of radio direction finding stations and these were placed in Iceland, Shetland Isles, Wick and Cupar in Scotland, Scarborough, Winchester, Cooling Marshes near Gravesend, St. Just in Cornwall and later in the war at Gibralter.

Radio Location of Enemy Submarines

The station at Cooling Marshes was transferred to Lydd at the end of 1940 as it became too dangerous to be in due to the constant rain of falling shrapnel from our own anti-aircraft guns as well as enemy bombs. This also applied to the large army 'Y Station' at Chatham, which was badly damaged by enemy bombs and many of the ATS girls were killed.

The survivors and other off-duty personnel were transferred to RAF Chicksands 'Y Station' until another purpose built 'Y Station' could be built at Beaumanor. All these d.f. stations were positioned as far apart as possible in order to get the best possible fix by triangulation. The other problem was that all the messages for the U-boats were sent in coded form and were enciphered by a machine called the 'Enigma', which had been invented in 1918 by a German called Arthur Scherbius.

This was a superb machine which was constantly being refined by the Germans and they ultimately thought it was invincible. The Poles were the first to crack the Enigma codes and build a replica of an Enigma cipher machine in mid 1933. But as war threatened to engulf Poland, they handed over an early copy of the machine and its information in the summer of 1939 to British and French government officials at the Polish secret service headquarters near the village of Pyry located in the large Kabacki woods 12km south of Warsaw.

Here the British and French were also shown an amazing invention for the first time. It was called the Bomby and this machine could work out with rotor settings of the Enigma. All details were brought back to Britain and delivered to Bletchley Park, which was the new British code breaking agency headquarters.

On 4 September 1939 Alan Turing, a brilliant Cambridge undergraduate, arrived at Bletchley Park and one of his first incredible achievements was to make such a vast improvement to the Polish Bomby idea that a British machine was built incorporating his ideas and improvements and in respect to the poles was called the 'Bombe'.

Successful Sinking

Despite some success against the Luftwaffe Enigma and to a lesser extent the Wermacht Enigma codes, the Kreigsmarine Enigma obstinately remained unbroken until a stroke of luck on the 12 February 1940 when German U-boat *U33* was sunk by a British minesweeper *HMS Gleaner* at the entrance of the Firth of Clyde. Three Enigma rotor wheels were captured and thus

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AR7030 customer feedback

Previously, comments from reviewers have been reprinted, for a change, here are some of the supporting comments made by AR7030 owners...

This is the first letter that I have written to express my feelings over a radio. On Saturday 28/09/96 I received my AOR AR7030 Short-wave receiver from Northern Short-wave Centre in Cumbria. You may say so! Well let me tell you I have had many short-wave radios in my 15 years or so as a listener, from the small Sony ICF7600 to the big Icom R9000, and I must say that the AOR 7030 comes out on par if not better than the Icom R9000, which as you know is a vast difference in price. I have picked up stations even the Icom could not cope with. May I say you have a world class radio receiver.
A.J.Wilson, Blackpool

I bought an AOR 7030 with standard filters in October from Martin Lynch having had much discussion about the set over a period of months... My interests are DXing on medium wave and shortwave and shortwave listening. I've been in the hobby since 1964 and been associated with the **World DX Club** since 1967, **currently DX News editor and treasurer**. Previous sets are a FRG7, SAIT MR 1411 and an NRD 515.

Despite reservations expressed by some reviewers I find the AOR 7030 very easy to operate...

I find the filters supplied fine for both listening and DXing on the medium wave and shortwave bands. Indeed I often will tune in a DX station on the 2.1 kHz filter and then switch to the 5.4 kHz filter, coupled with the right amount of passband shift this can provide excellent audio and intelligibility for the weaker signals.

What really sets the set apart, for me, from other models is the quietness, the audio quality and the passband shift. I use a bookshelf style speaker from an old music centre and the audio quality is superb. I like listening to different music from around the world from domestic stations on shortwave and there is a real depth to the audio quality I have never encountered before... As well as making listening a pleasure the audio also comes into its own when DXing... the set delivers an intelligible signal from the weakest of stations and, with the passband shift, the flexibility to minimise or eliminate interference.

For the price the set represents superb value for money for any serious shortwave listener or DXer. I can think of nothing that would improve the sets performance for a shortwave listener and DXer such as myself more than marginally.

I have also done some medium wave DXing using a loop antenna. I have found the narrow synchronous AM to be extremely effective in conjunction with the passband shift for difficult channels where North American stations are close to European powerhouses...
Mike Barraclough, Hertfordshire
[Mike is one of UK's highly respected and top DXers. Currently he is the DX News editor and treasurer of the World DX Club (WDXC)]

Short Wave Column: *There May Be Trouble Ahead...*

For a pilot at 32,000 feet, with the HF on 5450kHz, a comforting sign that he is on his way home is the still small voice that says, "This is Royal Air Force Volmet..." from West Drayton. This is the Royal Air Force Weather Service. "Volmet" has its root in French and appears officially as "Meteorological Information for Aircraft in Flight" Catchy, but I still don't see the connection. Weather conditions are given by pre-set voice samples. The voice they used is old-school RAF, the stuff of Ealing Studios circa 1952. When announcing maximum visibility one night, we were half expecting: "Moonlight can be cruelly deceptive, Amanda..."

Mail me at **bob@aor.co.uk** if you here this or any other Weather Service.

New utility listeners can try 4742kHz for RAF Flight Watch.

Architect is the Flight Watch callsign. Despite all the new technology, the main enemy to flight operations is the weather. Listen for these codes to précis weather to pilots preparing to fly between British airbases. An airfield is **Status Blue** when visibility is 8Km or better, cloudbase is 2500ft, **White** at 5Km visibility and 1500ft cloudbase, **Green** at 3.7Km with cloud at 700ft and getting tricky **Status Yellow** at 1.8Km with cloud at 300 feet. Try your luck landing **Status Amber** with hardly a kilometre visibility and cloud billowing at 200 feet.

Less than 0.9Km is **Red** and **Black** is a no-go. From this we will learn that a ***Wattisham Blue*** has little to do with being an all-round good egg while up at University, but "Forever Amber" is a good status for most of my holidays in Wales.

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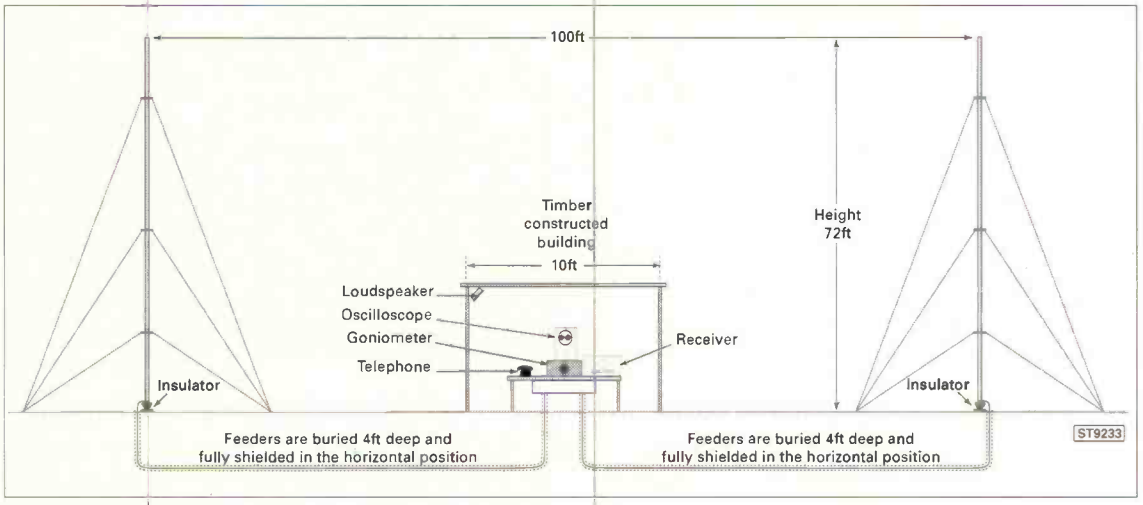
This has become "the" model by which all new entries are measured, used extensively by government organisations... why not simply have the best?



Side elevation. Marconi Adcock vertical radio direction finding station system, frequency range 1 to 3MHz. Only two vertical antennas are shown for clarity in East West direction, two verticals for North South are not shown.

helped speed up the work of the cryptanalysts.

On 22 May 1940 the Luftwaffe Enigma code was finally broken and remained able to be read until the end of the war. But with more of our merchant ships being sunk by the U-boats, much luck and hard work was needed to obtain the Kreigsmarines naval keys and it wasn't long in coming because on 26 April 1940 *HMS Griffin* captured the German ship *Julias Pickenpack* near Norway and removed the Enigma keys for 24/24/25 and 26th April enabling all Kreigsmarine enciphered messages to be read for four consecutive days.

In June 1940 a copy of the *Regulations For Use Of Naval Ciphers* was captured from *U13* but then there was a long gap before a raiding force of British warships attacked the Lofoton Islands off the coast of Norway on 10 March 1941 and fortunately came across a German patrol vessel called *Krebs*. It was fired on and boarded by some of the crew of destroyer *HMS Somali* and two Enigma rotors and key lists for all of February 1941 were captured.

The Navy, realising that this was going to be the only way to find out what the Kreigsmarines intentions were, decided to try again on 7 May 1941 and this time their target was the German weather reporting ship *Muenchen*. Once more *HMS Somail* fired on and boarded it east of Iceland and the Enigma key lists for the whole of June were captured. But the really big breakthrough occurred just two days after this time to

The three wheeled Enigma encypher machine.

the west of Iceland when *HMS Bulldog* depth charged *U110* to the surface and before it sank was able to remove not only the Enigma, but all rotors, settings and key lists for the whole of June and also the signal book and operating instructions.

Suprise Raid

At last, we were beginning to read the coded instructions to the German U-boat fleet. The British tails were now up and another pre-arranged surprise raid on 28 June 1941 was made on the German weather reporting ship *Lauenberg* by *HMS Tarter* this time east of Jan Mayen Island and all cipher keys for July 1941 were captured and the vessel was then destroyed.

After this, the British were cracking the Kreigsmarine ciphers very effectively but the suspicious Germans must have realised that we were reading some of their ciphers because they noted that the British shipping convoys were being routed away from the U-boat wolf packs and accordingly on the 1 February 1942 they introduced a new four-rotor naval Enigma, replacing the old three rotor machine. This effectively closed down all U-boat code breaking till December of that year.

The number of convoy ships that were being sunk rose alarmingly throughout 1942 which was the year that the battle of the Atlantic was almost lost. The only hope now was the radio direction finding stations. The Germans were now crafty and gave their U-boats instructions to keep their radio transmissions as brief as possible so as not to give the British d.f. stations a chance to obtain a plotting fix, but as this was our only source of locating the enemy submarines, great importance was given to the d.f. stations.

In the first two years of war all land based Navy d.f. stations were fitted with the Marconi Adcock system of four vertical aentennas which took up a lot of land. The feeders were brought into the wooden d.f. buildings and were coupled into two separate fixed coils at right angles to each other. The d.f. operator would rotate a wheel which was attached to a third coil known as a search coil and this could be turned inside the other two coils until the received signal vanished (the null).

Short Transmissions

All this took time and was fine while enemy U-boats made longer radio transmissions but when they later used only short transmission periods, it sometimes became impossible to obtain a position fix. At the end of 1941, a system was introduced in Britain which replaced the manual goniometer with its needle pointer on a 360° scale with the goniometer search coil coupled to an electric motor which enabled it to spin continuously inside the other two fixed coils, a synchronised pulse fed into the X-input of an oscilloscope and the received signal fed into the Y-input produced a dis-

play on the face of the scope which gave the bearing of the enemy transmitting station.

This of course was very much faster than the manual search system and enabled the d.f. stations to locate the position of the U-boats even if they transmitted for only a few seconds. The radio transmission to and from the main U-boat stations in Lorient and Berlin were in groups of four letter cipher and they transmitted and received on the same frequencies in the 12, 8, 5 and 3MHz bands which made it easy for the British intercept 'Y stations' at *HMS Flowerdown* near Winchester and Scarborough on the east coast to monitor them.

A typical example is when one of the WRNS operators at Scarborough heard a U-boat calling its base station, she would then quickly shout out the frequency as loud as possible, this was immediately relayed down fixed landlines which were connected to loudspeakers in the direction finding huts. The gonio was switched on and the receiver tuned to the frequency and if the signal could be heard then the bearing was given immediately by the d.f. operator to the Operational Intelligence Centre (OIC) at The Admiralty in London where a large tilted map of the Atlantic Ocean and the British Isles was situated in the submarine tracking room.

On this map, all the navy d.f. stations were clearly marked by a large hole which went through the wooden base and a cord was passed through the hole and a weight was attached to the bottom end. The other end of the cord was attached to a small spike which enabled it to be stuck into the map. Around the position of all the d.f. stations on this map was placed a circle of 360° compass bearings, so if the Lands End d.f. station at St. Just and the Scottish d.f. station at Cupar could hear the signal then they would report the bearings and the map tracking operator would take the spike from those two stations on the map and pull the cord along the line of the given bearing and place the spike in the edge of the map, where both of the cords crossed each other was the location on the enemy U-boat.

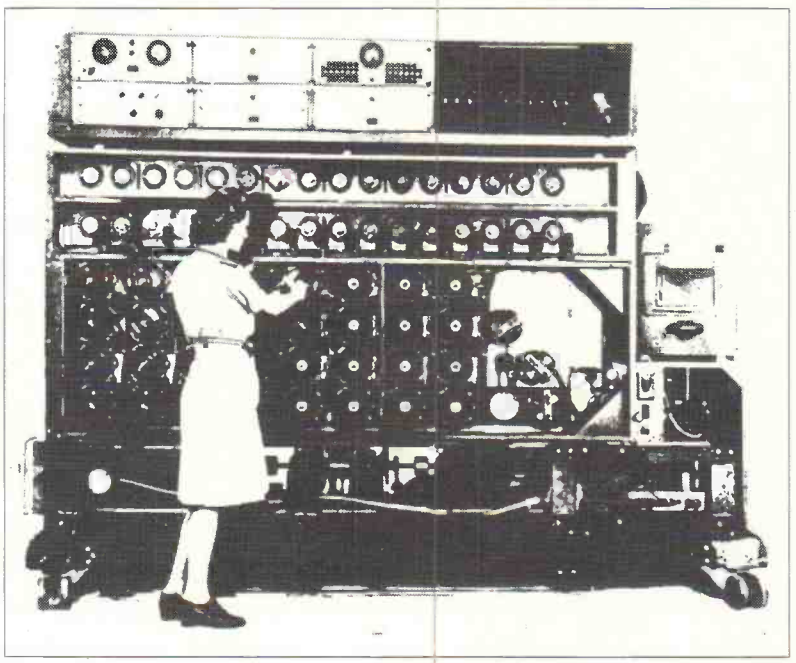
Total Relience

Throughout the whole of 1942 Britain relied totally on radio direction finding. There were also departments in the 'Y stations' that attempted to identify individual enemy operators by the style of sending or any bad operating habits he may have had and another department specialised in filming with a high speed camera the enemy signals observed on a oscilloscope which assisted in identifying enemy radio transmitters by the kind of note that emanated from them and also by traffic analysis and from May 1941 the east coast of the United States began exchanging direction finding information with the British and as the U-boats attacked merchant shipping close to the American coast another d.f. station manned by British personnel was opened in Kingston, Jamaica. All this was being supplemented by merchant ships being converted to escort carriers by the fitting of a flight deck on top of the ship which was then able to carry about a dozen of the Fairey Swordfish or Albacore biplane torpedo bombers.

Also Sunderland flying boats were sent out to patrol over the convoy and from America, Catalina flying boats covered the USA side. But unfortunately there was a large gap in the middle of the Atlantic Ocean which flying boats from America or Britain could not reach and this is where the vast majority of the British merchant fleet were sunk. At last, in December 1942 the new four-rotor Enigma code was finally cracked at Bletchley Park and from the spring of 1943 the losses to the shipping convoys at last started to fall dramatically as we were able to read once again the messages to and from the U-boats and accordingly route the convoys away from where the U-boats were waiting.

The Kreigsmarine U-boat messages were intercepted at *Flowerdown* and Scarborough and immediately passed to Bletchley Park where the enciphered messages were immediately passed to the Bombe rooms. Initially these were located within the park itself, but it was thought that if enemy bombs should fall on Beltchely then all the Bombes could be destroyed at one fell swoop, so they were sent out to various sites around the country. These were at Wavendon, Gayhurst, Adstock and Crawley Grance in Buckinghamshire and then to Eastcote and Stanmore in Middlesex.

The British had given the Americans all details of the British Bombe, which was attacking the three-rotor Enigma ciphers and the Americans built their own Bombe, which was designed to attack the four rotor enemy Enigma naval cipher. The British Bombe was built by the British Tabulating Machine Co. of Letchworth in Herts and the 80 American Bombes, which were installed in Washington in 1944, were built by the National Cash Register Co of Dayton, Ohio. Such great urgency was given to the building of these huge weighty and noisy monsters that you can judge for yourself when you realise that by Christmas 1941 only 12 bombes were in operation.



A US Bombe in operation.

100 Bombes

Christmas 1942 saw this number rise to 34 and by the same time in 1943, there were 100 in operation. 1944 saw 152 and in May 1945, there were 198 hammering away to break the Enigma codes of all three German services and over 200 WRNS were employed in running these machines on a 24-hour round the clock basis. If Ultra was the prime source of current intelligence then radio direction finding was a great supplement, indeed the only source for much of the war. ■

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BUILD A VLF RADIO

PART 2

Build a VLF RadioScience Observing Receiver
Using a Virtual Inductor to Overcome the Coil Problem

RadioScience Observing is an extension of the short wave and monitoring hobbies, and consists of making amateur science observations of natural phenomenon associated with radio waves. Included in this term are radio astronomy, propagation studies, observing terrestrial natural radio signals (e.g. 'whistlers' and 'spherics'), recording signals from the planet Jupiter, and detecting solar flares by observing their effect on the earth's ionosphere. Here Joseph J. Carr concludes this feature and details the construction of the project to allow you to monitor these phenomenon.

A Dual Channel VLF RadioScience Receiver

The particular receiver that I built (**Fig. 2.7**) is a dual channel job, designed to pick-up the signals of US Navy v.l.f. radio stations at 24.5 and 28kHz. The boards (**Fig. 2.6**) are designed to be compatible with the SESCOM (2100 Ward Drive, Henderson, NV, 89015) r.f.-tight metal boxes. I used the type SB-7, which measures 162.5 x 68.9 x 27.9mm. Each receiver (**Fig. 2.8**) has an antenna input, two power inputs (-V and +V), an r.f. output and a d.c. output. The metal box serves as the ground connection. The overall project was housed in a 19in rack mount box (also a SESCOM product).

The connections for the two receivers (VLF1 and VLF2) are shown in **Fig. 2.9**. One d.p.s.t. switch (S1) is used as a master On/Off for the ±12V d.c. power supplies, while additional d.p.s.t. switches (S2 and S3) are used to turn VLF1 and VLF2 on and off. Red light emitting diodes (D1 - D3) are used to indicate which functions are turned on). I used 1500pF feed through 'EMI filter' capacitors on the d.c. voltage lines going into the boxes, but this turned out to be a needless extravagance.

The output levels can be monitored on a digital panel meter (d.p.m.). I found a model at Tandy that operated from 0 to 19.99V for $20 or so. Because meters are so expensive, I elected to use a switch (S4) to select which receiver is being monitored at any one time. Of course, the d.c. outputs to the recorders are on all the time, only the output d.c. voltmeter is switched between the functions. Because the d.p.m.

A portion of the circuit of **Fig. 1.5a** can also be used as a tuneable preamplifier for existing v.l.f. receivers or for v.l.f. loop antennas. You can build the stages IC1a, IC1b and IC1c, using an r.f. output to the receiver. If you wish to use the printed circuit board of **Fig. 1.6a**, then leave out amplifier IC2, C5, and all components associated with IC2a and IC2b (**Fig. 1.5a**), except C6. The output end of C6 is routed to the r.f. output coaxial connector. Gain can be set by reducing the value of R7 using the screwdriver adjustment.

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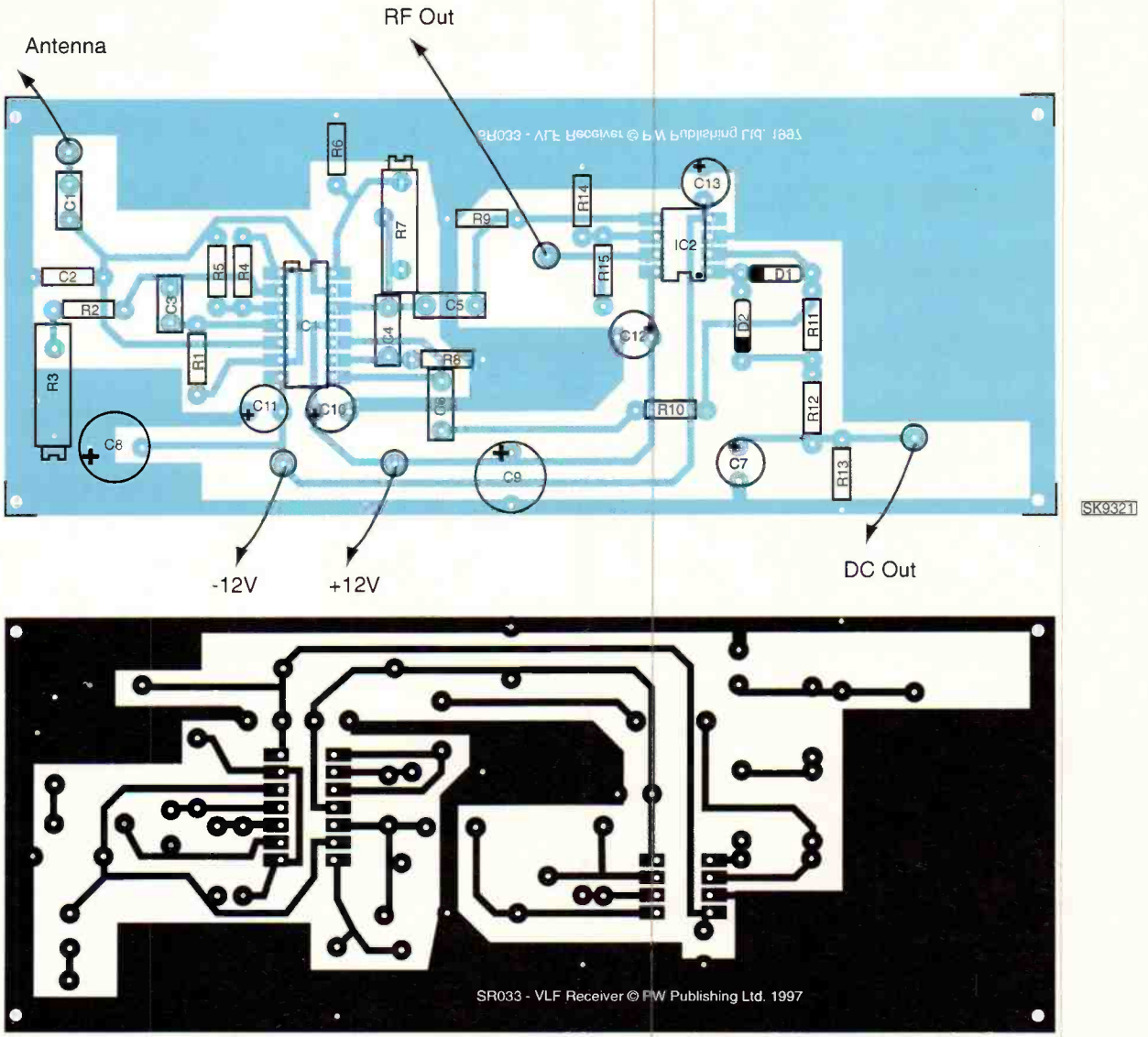

Fig. 2.6: a) Printed circuit copper track pattern; b) parts layout.

Fig. 2.7: My dual-channel receiver built in a 19in rack mount.

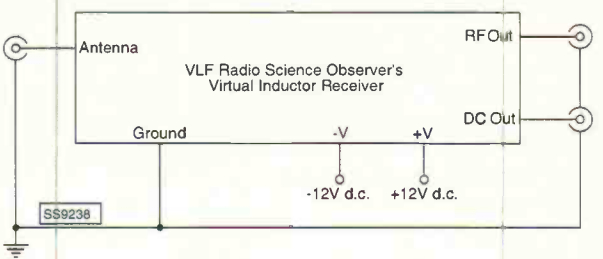

Fig. 2.8: Block diagram of v.l.f. receiver connections.

selected operates from +5V d.c. power supplies, a 7805 voltage regulator must be provided as well (IC1).

The power connector (J7) is a 5-pin microphone connector (**Fig. 2.10**) refugee from an old CB set. I have a number of them and have standardised on that model for my personal electronics projects (makes bench connections easier). I use pin 1 for +12V d.c., pin no. 3 for ground and pin no. 5 for -12V d.c. The remaining two pins (2 and 4) can be used for anything else the project may require.

The inside views of the actual as-built receiver are shown in **Figs. 2.11** and **2.12**. I elected to use 2.5mm jacks sockets for the antenna connections, BNCs for the 'RF Output', and RCA phono connectors for the 'DC Output' functions. Small diameter coaxial (RG-164) or small diameter shielded or microphone cable is used to carry all signals, while 18s.w.g. solid wire is used for all other functions. Note in **Fig. 2.12** that one receiver has the lid on the box, and that two 10mm holes are drilled in them. These holes are for adjusting R3 and R7 with the shielded lid in place.

The Proof is in the Pudding, Not in the Recipe

It's all fine and dandy to design and build radio receivers, but if they don't receive signals they are of

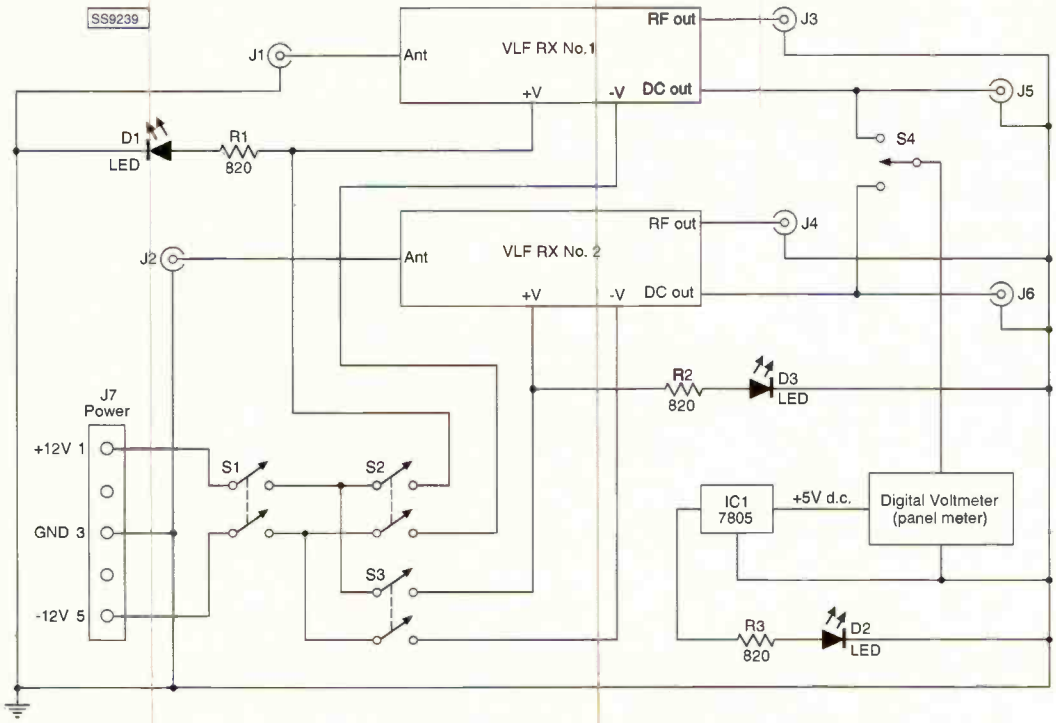

Fig. 2.9: Internal wiring of two-channel v.l.f. receiver.

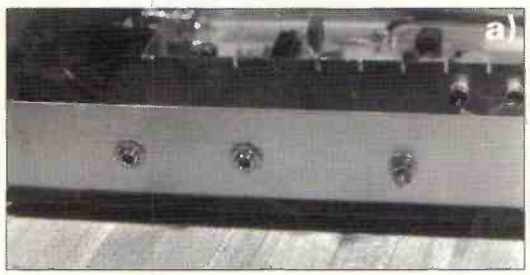

Fig. 2.10: a) Antenna and ground connections; b) d.c. power connector (salvaged CB mic. connector).

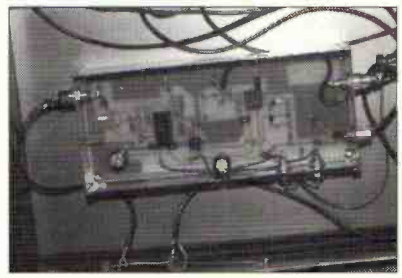

Fig. 2.11: Internal view of one receiver channel.

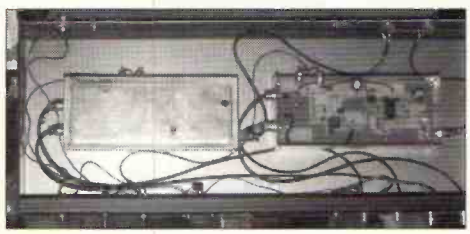

Fig. 2.12: Both channel receivers mounted in place.

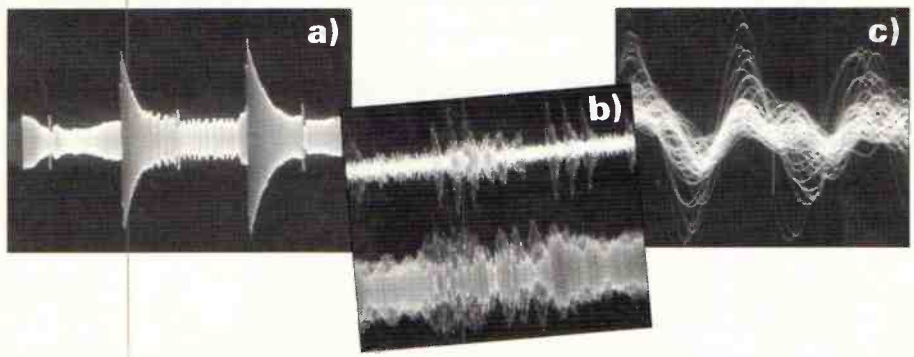

Fig. 2.13: Signals observed on the air with an oscilloscope.

little use. When building a short wave receiver or broadcast band receiver, one need only put on the earphones, or turn on the loudspeaker, and listen for results. Even though a lot of screeches and sqawling is heard on the short waves, it's by and large intelligible (at least at spots). In the v.l.f. range, a loudspeaker will be useful, but not nearly as useful as on other bands. The output indicators for these receivers are the d.c. panel meter, the d.c. recorder (or A/D converter) and the oscilloscope (for the 'RF Outut' functions). **Fig. 2.13** shows several waveforms obtained from the receiver that I built. The antenna was a 10m length of 18s.w.g. solid wire wrapped around the ceiling of my 'basement laboratory' (a.k.a. 'Daddy's therapy room'). **Fig. 2.13a** is the 24kHz signal, viewed with the 'scope sweep set to low audio frequencies. Both channels are shown in **Fig. 2.13b**, with two different stations operating at the same time. In **Fig. 2.13c** we see the signal of **Fig. 2.13a**, but with the 'scope sweep speed increased to show only a few cycles of 24kHz signal. Note the characteristic amplitude shift keying seen in this signal. It's also found on 60kHz WWVB signals.

Conclusion

The v.l.f. receiver described in this article is well suited to hobbyist builders, and uses easily obtained components. You should find many hours of enjoyment building and using this equipment. ■

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WiNRADiO

Since becoming licensed in 1984, Colin Tinker G1GSW has become more and more interested in digital communications. One of his interests is the reception of WEFAX signals, which are broadcast both by satellites on v.h.f., and by ground stations on h.f.

Fig. 1: Satellite picture showing cloud mass approaching Europe.

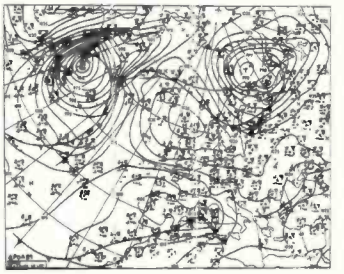

Fig. 2: HF WEFAX showing weather map for N. Atlantic Ocean and Europe.

I had been looking at scanners and h.f. receivers for this work for a while, but did not want two separate receivers (one for h.f. and one for v.h.f./u.h.f.), and besides, my budget did not stretch that far. The WiNRADiO seemed to fit the bill perfectly, because it covers all the frequencies of interest and more - 500kHz to1.3GHz - and it fits inside the PC. This last point was especially important for me, because I don't really have much room on my shack desk. There was also the appeal of using the same PC to run WiNRADiO, and to process the WEFAX data.

In March '96 I saw an advertisement for WiNRADiO on the Lowe Electronics Web page, and instantly decided I just had to have one of these **gadgets.**

Unfortunately, it was not available at the time, so I had to place an order and wait.

The evening the toy arrived, I managed to locate and decode some h.f. WEFAX from Germany, and although the results were not perfect, it worked well considering the small indoor antenna.

That weekend I purchased a discone, which was the first acquisition for my WiNRADiO antenna farm. This greatly improved the reception above 30MHz, and I soon followed it with a 'longwire' for the lower frequencies. The quality of the weather faxes improved, helped of course by the better conditions as summer approached.

An Odd Name for a PC?

The PC I use is a 'BITSA' - bits of this and bits of that. It started life several years ago as a 386SX-16, and since then has evolved into a Cyrix 166+ with 40Mb of RAM and a 1Gb hard drive, running Windows NT 4.0. It is supplemented by an original SoundBlaster 16 card, an 8-speed Creative Labs CD-ROM drive, and a tape drive scrounged from the dustbin at work. The tape drive is a 2Gb Exabyte 8mm unit, which after cleaning worked perfectly from the SCSI port on my sound card - isn't it amazing what people sometimes throw out? This all fits inside a second-hand case sitting under my desk, and also contains the WiNRADiO card, and a WinTV Celebrity card.

Satellite WEFAX

To decode the satellite WEFAX signals, I started out with *JVFAX7.0.* Of all the DOS programs, this one seemed to be the best for WEFAX. It resides on an old Compaq 286, which is connected to the output of the WiNRADiO card using the simple audio interface described in the *JVFAX* documentation. *JVFAX*, written by Eberhard Backeshoff DK8JV, is shareware. It will handle automatic decodes in unattended mode.

The *JVFAX* audio interface plugs into the RS-232 port, and takes its power from this port as well.

After using *JVFAX* for a while, I decided to try *WXSat.* This has the advantage of running under Windows, and not needing a special audio interface as long as the PC has a sound card. All I had to do was to connect the output of WiNRADiO to the input of the sound card, and I was in business. This also freed up the serial port. I must confess that most of my decoding is now done using *WXSat*, and I intend to retire the old 286 to the attic soon.

WXSat has a tuning meter, which makes tuning the signal a breeze. When you find a signal, all you need to do is fine tune it using the meter, click on 'Build', and off you go. A disadvantage until recently was that the software was totally in German, so I was glad when a German student appeared in our office at work last year! Fortunately, an English manual has now finally appeared.

This new manual is excellent, and provides a good insight into the workings of WEFAX and satellite imagery in general. If you are seriously interested in the subject, I recommend you get a copy and read it. *WXSat* is written by Christian H. Bock, and is free for amateur use. As with *JVFax*, it will also handle automatic decodes in unattended mode.

A picture showing a large cloud mass approaching Europe, decoded from my sound card using *WXSat*, is shown in **Fig. 1**.

This picture was received from NOAA 10 at about 1800UTC on 15 July 1996. The antenna is a simple crossed dipole from Maplin, fitted with a mast-head preamplifier (also from Maplin) to boost the signal and reduce the noise. It works well, and does what I need.

Better pictures might possibly be obtained using a dedicated receiver, but I find that for my needs WiNRADiO performs well, and only needs a small amount of tuning to correct for doppler shift in f.m. Narrow mode.

At present I can only hear NOAA 12, NOAA 14, Sich 1-7 and Okean 4. I believe the others have ceased transmission for various reasons. For current status see 'Info in Orbit' every month at the rear of this publication. Over the next couple of months, as time permits, I plan to build a 1.6GHz downconverter to feed into my WiNRADiO, for the geostationary satellites operating around that frequency.

HF WEFAX

I have also successfully used WiNRADiO to receive h.f. WEFAX transmissions, which can be received from a number of ground stations. These are more straightforward to receive than the satellite transmissions, because a normal short wave antenna can be used, and there is no need to track satellites.

WEFAX on h.f. is received with the receiver set to s.s.b. instead of f.m. The image **Fig. 2**, shows a typical h.f. WEFAX transmission, which was received at about 1800UTC on 31 December 1996. A couple of mild bursts of interference are visible in the centre third of the picture:

Software Sources

Most of the software mentioned

in this article, plus ordering details for the *Hamcomm* hardware interface, can be found at the following excellent site:
http://ourworld.compuserve.com/homepages/h.f.FAX/hf-fax.htm

Windows NT drivers and the latest WiNRADiO software is at Rosetta Lab's site:
http://www.winradio.net.au

Wintrak Pro is at:
http://www.hsv.tis.net/~wintrak

All of the software mentioned in this article runs satisfactorily on a 486 with 8Mb of RAM and a VGA monitor, although *WXSat* and *Wintrak Pro* work noticeably better on a Pentium 90 with 16Mb of RAM and a SVGA monitor.

Conclusion

I still feel like a relative newcomer in all this, but find it very interesting, and it fits in well with my hobbies of amateur radio and computers. One advantage is that I am always warned well in advance of the sort of conditions which lead to enhanced v.h.f. propagation!

I love gadgets and new developments in radio and computers. I must be mad, because I repair computers all day professionally, and then come home and play more computers all evening and on the weekends (wife and kids permitting, although they are really very understanding). The only grumbles I hear are when the 'phone bill arrives, as I am on the Internet a lot, although fortunately I manage to pacify 'she who must be obeyed' most of the time.

It takes patience to get a readable image at times, and it is frustrating when a satellite makes a pass at 1400 and you are at work, but if you are patient you will be well rewarded. Hopefully your partner will understand your commitment to the hobby, during the hours you will spend glued to the monitor with your PC and receiver emitting strange beeps and whistles.

There may be better dedicated h.f. and satellite receivers around, but WiNRADiO keeps it simple and does the job admirably. The price is right, and at Lowe Electronics it will currently cost you £329. **Lowe Electronics** are located at, **Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (01629) 580800**. Now let me see, what else can I use it for?

Cannot a plain man live, and think no harm, But thus his simple truths must be abused

William Shakespeare, Richard III

I suppose that any manufacturer of a product will take exception to it being criticised, but the response from the General Manager of Rosetta Laboratories, makers of the WiNRADiO, was outstanding. It's tempting to make a blow by blow, point by point reply, but frankly I think it would bore the average reader, so I'll keep it brief. You will recall that my basic observation, which led to Richard McLachlan of Lowe Electronics inviting me to take a close look at the WiNRADiO, is that computers and radio receivers don't mix, and that the last place you would want a radio receiver was in the heart of a PC. It's somewhat ironic, therefore, to read that the manager of Rosetta confirms my view precisely when he says:
"Based on Mr. Wilson's figures, the cyclic noise he refers to is characteristic of that generated by his video monitor and/or video card....." and goes on to say:
"The same interference would be observed if any professional receiver were to be placed next to the PC and connected to it, for example via an RS-232 control cable." Well, that's exactly what I said, and I thank Rosetta for pointing it out so admirably. It's not impossible to use a computer to control a receiver - I do it every day, but the receiver is made by Rohde & Schwarz and cost £25 000 and even they balked at putting it inside the computer!

Pseudo-technical

The bulk of the rest of the text is, frankly, pseudo-technical mumbo jumbo, signifying very little of worth and, in my view, designed to lead the reader away from the real points which I raised. It's also sad that the writer sank to making personal remarks about me, Those of you who know my background can surely judge for yourselves if I know my subject. Let's simply say that, as the man who can claim to have instigated and brought to the market the Lowe HF receivers, I probably have some experience in this field, and have certainly had some success in making real radio receivers. As I said when I first began writing for *Short Wave Magazine*, my aim is to put myself in the position of a prospective purchaser and use my lifetime's experience to ask the question "Is this equipment what I want, and are the advertising claims genuine?". That is the role I adopted with the WinRadio on behalf of our readers.

Selective

What disappoints me most of all is the selective nature of the comments which ignore several important questions I raised. What about the 'chuffing' noise when tuning, which makes it almost impossible to hear a received signal? What about the rasping noise from using the mouse? What about the apalling reciprocal mixing performance which renders the receiver virtually unusable with an antenna of any description connected to it? and what about the 25dB leaps in noise when tuning through many v.h.f. and u.h.f. frequencies? All that stuff about P=kTB pales into insignificance when faced with this level of performance.

It's Not A Bad Buy

I'm pleased to learn that Internet magazine rated the WiNRADiO as "The coolest card you can stick into your PC". It may well be just that, but I still say (as does Mr. Hudecek) that the PC and the radio receiver are ill-matched companions. I acknowledged in my original article that the WiNRADiO is beautifully made, and the software makes it easy to use. As a v.h.f./u.h.f. scanner it performs just like many other scanners and at the current reduced price of £329 (from £409) it's not a bad buy, but an h.f. receiver it ain't.
'Nuff said - **John Wilson**

The Editor's Last Word

The experiment to find out whether a piece of r.f. equipment could live inside a PC has been both interesting and exciting from a technical standpoint. Richard McLachlan of Lowe Electronics was brave enough to let one of the most respected names in the business take a critical look at a WiNRADiO.
It is now up to readers to make up their minds as to which side won the argument - for now I am prepared to allow the debate to carry on in the 'Letters' column of this magazine - but only in a civilised manner.

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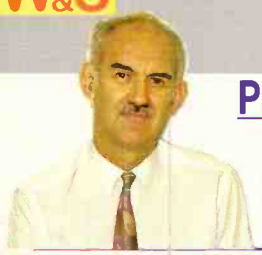

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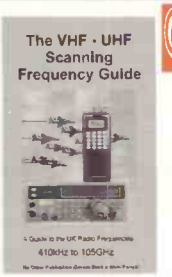

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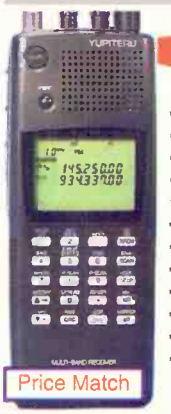

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- Totally programmable
- Multiple tuning steps
- Extremely sensitive front-end
- Good strong sugnal performance
- Includes AC charger and Ni-cads

Open Day, Sunday 1st June 10am Hockley

W&S

Welz WS-1000 Scanner

Super Value W&S £299

* World's smallest scanner
* FM, WFM, & AM
* 500kHz - 1300MHz
* Fast scanning speed
* Clear LCD readout
* 400 Memories
* Super sensitivity
* Good strong signal handling
* Runs from just 2 x AA cells
* Battery saving mode

Price Match

AOR AR-8000 Scanner

Special W&S £329

* 500kHz - 1900MHz
* WFM, NFM, SSB, AM
* 1000 Memory Channels
* 20 Search Banks
* 30 ch. per second search
* Band Scope Display
* Password Protect
* Computer control outlet
* Signal Strength meter
* Illuminated Display
* Programmable Steps
* Ni-cads and AC charger.

Price Match

Yupiteru MVT-7000 Scanner

Special W&S £249

* 100kHz - 1300MHz
* WFM, NFM, AM
* 200 Memories in 10 banks
* 20 channels per second speed
* Programmable Steps
* Illuminated Display
* Audio and Carrier Search
* Signal Strength meter
* RF atenuator switch
* Ni-cads and AC charger

Price Match

Yupiteru MVT-7100 Scanner

Great Value W&S £269

* 100kHz - 1650MHz
* NFM, WFM, SSB, AM
* 1000 Memories
* Signal Strength Meter
* Illuminated keypad - display
* 500 Ch. pass memories
* 30 Ch. per second speed
* Unique mode scan
* Ni-cads & AC Charger

Price Match

Yupiteru MVT-7200

Special W&S £359

* 100kHz - 1650MHz
* WFM, NFM, SSB, AM
* 1000 Memories
* Illuminated kepad - display
* Signal Strength Meter
* Narrow AM mode
* Built-in ferrite AM aerial
* Narrow band SSB filters
* Improved battery consumption
* Improved SW reception
* Improved selectivity
* 30 ch. steps per second
* Unique mode scan
* Ni-cads & AC Charger

Price Match

AT-2000 Listener ATU

W&S £99.95

* Handles Coax, balanced feed and, long wire
* Covers 500kHz to 30MHz
* Includes unique "Q" switch for best selectivity
* Gets maximum signal into your receiver
* Improves front-end selectivity
* Reduces intermodulation and cross modulation

MFJ-784B DSP filter

W&S £239

* Works with any receiver or transceiver
* This filter is fully programmable with memories
* 16 factory pre-set positions for easy use
* Plugs directly into the headphone socket
* Drives speaker or headset to good volume
* Requires 12v DC at approx. 500mA.

OptoElectronics Cub

Free Freq. Guide

W&S £138

* 1MHz - 2.8GHz
* 1Hz readout
* Hold feature
* BNC antenna supplied
* Ni-cads and charger

Scout

Free Freq. Guide

W&S £348

* 10MHz - 1.4GHz
* 400 Memories
* 255 hits record
* Auto store and recall
* Interfaces with AR-8000
* Ni-cads and charger

Mobile Speaker

PRICE DOWN

W&S £4.95 Was £14.95

* Up to 10 Watts
* 4" Driver unit
* 111 x 111 x 64mm
* Mobile mounting bracket
* 3.5mm plug terminated

WATSON GPS Active Antenna

W&S £39.95

* 1.6GHz GPS ant.
* Low profile for car
* Magnetic mount design
* 6dB gain design
* Guarantees improved range
* BNC terminated coax.
* OK for Garmin etc.

WATSON WEP-400 Earpiece

W&S £14.95

* Improved
* Soft pad
* Left/right fit
* 8 Ohm driver
* Extremely comfortable
* Fitted with 3.5mm plug

WATSON QS-400

NEW W&S £9.95

* Mounts handy on dash grill
* The safe way to go mobile
* Quick release feature.
* Doesn't use nasty adhesive!

WATSON QS-300 Desk Stand

Super W&S £19.95

* Handheld Desk Stand
* Firmly holds handheld
* Adjustable angle
* BNC plug to SO-239 socket
* Superbly made unit.

WATSON FC-128 Counter

W&S £79

1MHz - 2.8GHz

This new model has a wide frequency range and is powered by internal ni-cads. External BNC socket with aerial makes it very sensitive. Supplied with AC charger, it is very well built. Don't be fooled by the price!

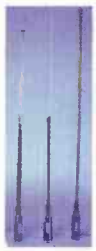
WATSON WSM-1900 Antenna

Mini -Magnetic Scanning Ant. W&S £29.95

Airband Civil & Military model WSM-225

* 25MHz to 1.9GHz Car Antenna
* 29cm super magnet that really sticks!
* Low profile 400mm long black whip
* 2.75m of coax fitted BNC plug
* Out-performs all helicals!
* Scanning whilst on the move

Portable Scanning Whips



* 25MHz to 1900MHz
* Fully flexible with BNC fittings
* Out-perform factory supplied models.

Tele-Gainer	41cm long rigid telescopic whip with knuckle joint	£14.95
Regular-gainer	21cm flexible whip that is ideal as replacement whip	£12.95
Super-Gainer	40cm flexible model for the ultimate in gain	£19.95

OptoElectronics Xplorer

PRICE DOWN

25-1300MHz Nearfield Monitor W&S £798

* Complete FM Receiver
* Spectrum scan in 1 second!
* Reads out exact frequency
* Records "hits" and multiples
* Shows tones and deviation
* Computer interface option
* Ni-cads & AC charger

WATSON WSC-2 Belt Case

NEW

W&S £14.95

Combined quick release spring clip and belt loop. Self adjusting, fits all handys.

USED GEAR

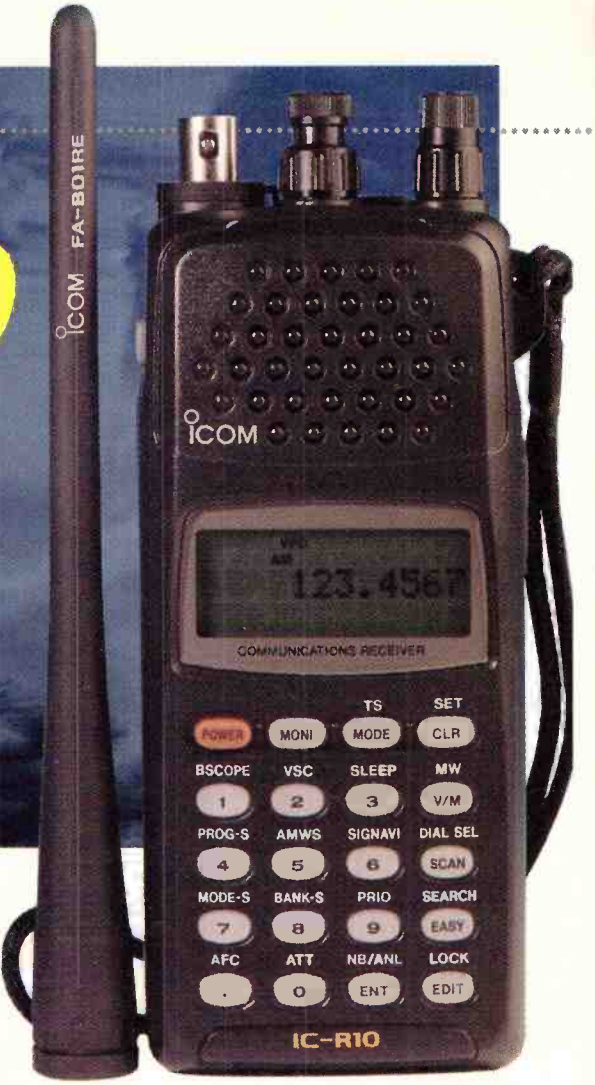
Lots in stock. **R-5000** £749, **HF-250** £499, **ICF-7600G** £119, **ICF-SW100** £149, **FRG-7700** £299, **FRG-100** £399, **AOR-3000** £499, **AOR-2001** £129, **AOR-3000A** £699, **MS-1000** £229, **FRG-9600** £299, **PRO-2036** £239, PRO-2039 £129, MVT-6000 £199, MVT-8000 £279, **DJ-X1** £139, **PRO-41** £49, **PRO-37** £89, **PRO-31** £59, **PRO-44** £89, **VT-150** £129, **VT-225** £179 etc. etc. etc.

FREE - Full copy of our latest used gear list. Phone or write for your copy of great bargains - all with three month warranty.

REMEMBER at W & S

* We PRICE MATCH
* No Credit Card Surcharge
* Give you 10 days approval
* Have 4 Service Engineers
* Still offer help after the sale!

ICOM IC-R10



Alan Gardener just couldn't wait to get his paws on the potential replacement for his trusty IC-R1, did the new IC-R10 fit the bill? Read on to see how it faired.

I had been looking forward to reviewing the new Icom IC-R10 since it was first advertised, so when I received the 'phone call from *SWM* to tell me that they had been able to get hold of one, I was delighted.

I have owned an Icom IC-R1 for about five years and because it is so small it always tends to be the hand-held scanner I carry with me 'just in case something interesting turns up'. The IC-R1's performance is fairly poor by modern standards and mine has had several modifications to improve the receive performance and provide a crude form of s.s.b. detection. It's not a process I would recommend because it required cramming surface mount components encapsulated in epoxy resin into gaps between existing circuit boards - But have Icom produced a good successor?

Good Looking

Well the IC-R10 looks great - the design is based on Icom's current range of hand-held Amateur Radio transceivers which look very sturdy and fit nicely into the palm of your hand. The case measures approx. 59 x 130 x 32mm (w x h x d), which makes it a lot smaller than most of the competition. However it's not quite tiny enough to loose in the pocket of a pair of jeans, but it does allow the keyboard to be big enough to be operated by even the largest of fingers.

The bottom half of the front facia contains the keyboard which is arranged in four columns of five rows. As is the case with most scanning receivers, nearly all the keys have second functions. On the IC-R10 these are selected by pressing a key on the left hand side of the case. Unfortunately, the function key has to be held in whilst buttons on the keyboard are pressed, preventing single-handed operation, a disadvantage if you wish to use it dash mounted in a car. Just above the keyboard is the l.c.d. display, which has provision for up to two lines of alpha-numeric text as well as various symbols representing different operating modes and user options. An automatic backlight mode allows the display and keyboard to light for approximately two seconds each time a button is depressed or a signal received. This is a very handy facility, but it would have been even better if a photocell had been built in so that the light only operated when it was required. If you wish to preserve battery life I would recommend turning the backlight off using the 'Set' menu function. The remaining top section of the front panel is occupied by the loudspeaker, which permits a reasonable level of audio to be emitted, but a cheap pair of 'Walkman' style earphones would be useful during operation in crowded places.

The top of the case has a BNC antenna socket, 3.5mm earphone socket, concentric volume and squelch controls and a separate rotary tuning knob. I particularly liked the style and position of the tuning knob, which didn't cause my fingers to become wedged between the adjacent controls when I turned it. One further point to Icom's credit was that the knob didn't break or fall off during the review period - don't laugh, a lot of other models I have tested exhibit this problem. On the right hand side of the case there is provision for a wrist lanyard, and two further sockets, one for an external 12V power supply/charger and the other for a computer interface - thank goodness Icom have fitted one! Actually there are two (Clone and CI-V port) but more of that later. At the rear of the case the battery compartment can be accessed by lifting off a panel which reveals four AA-sized NiCad cells. A small switch hidden between the cells allows you to turn off the charger circuit if you wish to substitute dry cells. Very handy if the NiCads go flat whilst you are out and about.

In Use

The power button is located in the top left hand corner of the keyboard. Pressing it causes the operator to be greeted with a welcome message on the l.c.d. display. Further button pressing allowed me to receive a few local signals before I had to refer to the handbook for more clues.

The main features of the receiver are: All mode reception over the frequency range 500kHz to 1300MHz; 1000 memories which can be individually alpha-numerically tagged; Variable tuning step size; etc, etc - well let's face it, if you are at all interested in the radio you will have already read all this stuff in the adverts! So what's it like to use?

Search or Scan

The first interesting point is that rather than differentiating between 'Search' (where the receiver automatically tunes between pre-defined frequency limits with a given step size) and 'Scan' (where the receiver tunes to specific pre-defined frequencies and modes stored in pre-set memory locations). Icom have chosen to call everything 'Scan'. The only difference being the way in which the various scan modes are initiated. The more observant readers will by now have spotted a button on the front panel marked 'Search' - so what is going on?

The 'Search' function allows the operator to perform an alpha-numeric text search of memory titles and contents - all very handy if you can't remember which one of the 1000 memories contains your local airport tower frequency. Memories and search bands can be edited and copied by use of a special 'Edit' button and in order to speed up the process of writing alpha-numeric titles in memory it is possible to use the keyboard as a shortcut as well as by rotating the tuning control. This really does speed up the process, but if you want to make it even faster, perhaps you should consider the special cloning software and cable that Icom can supply. This plugs into the earphone socket and permits the contents of the memories to be edited and downloaded from a PC, along with a few other functions, such as being able to set up to 15 bands of mode and step size which the IC-R10 can be made to automatically select when tuned to the appropriate frequencies. You can also use the cloning facility to copy the entire receiver set-up to another IC-R10 if you wish, another nice touch.

Easy Operation

The IC-R10 also has an 'Easy' program button which I found confusing, as it appeared to operate in a similar manner to normal method of operation - but perhaps I'm just being a bit too critical. Memory banks are labelled A-Q, with bank R being used to store frequencies which are to be excluded from searches and Bank Q being used to store the contents of the 'Auto Memory Write' search function. This works really well, especially when used in conjunction with the 'VSC' or audio scan function which only stops a search or scan on signals with audio present. The 'Auto Memory Write' finds busy frequencies by searching through pre-defined frequency ranges and automatically writes active frequencies into memory. The operator can leave the receiver running, perhaps with the sleep timer set to give just an hours worth of operation, and then return to review the captured frequencies later. Unlike some receivers which have similar facilities, Icom have made sure that frequencies only get written once into memory - so you don't end up with a local paging frequency in all of the 100 memory locations set aside for the function. A great time saver if you can't continuously monitor the airwaves. Even better if you own an Optoelectronics 'Scout' frequency recorder as you can plug it directly into the CI-V computer port on the right-hand side of the case. The CI-V interface is good news if you are interested in external control of the receiver, although it does require a simple interface unit if you want to connect it to a computer RS-232 port.

Tuning Around

All of these facilities nearly compensate for the moderately slow search rate of approximately 17 channels per second, and the painfully slow scan rate of approximately 7 channels per second. A good range of tuning step sizes can be selected and in addition a user defined step size can also be programmed in increments of 100Hz up to a maximum of 999.99kHz. Unfortunately this does not permit the 8.33kHz step size which is being considered as the future standard for v.h.f. aircraft communications, although 6.25kHz steps are provided and frequencies offset by half channels can be entered. In some instances this can improve the tuning rate during frequency searches.

Noise And The Lack Of It

Another nice touch is that Icom have provided an Automatic Noise Blanker for use on a.m. signals and a Noise Blanker for use when u.s.b., l.s.b. or c.w. is selected. The ANL function worked very well and removed nearly all of the ignition interference on a.m. short wave broadcast signals when I tried using the receiver in my car. The NB function was much less successful and in some cases actually made the reception of s.s.b. signals worse. A lot seemed to depend on the type and level of interference present. One other interesting feature was that the squelch control doubled up as an r.f. gain control when s.s.b. or c.w. was selected. I always found that I needed maximum r.f. gain, so the control knob had to be reset every time a.m., w.b.f.m. or n.b.f.m. signals were being received. I think in practice the attenuator function is more likely to be used than the variable gain control, especially if an external antenna is in use.

A Bit Wide

Listening to stations in busy segments of the radio spectrum presented a problem. The i.f. filter bandwidths of 15kHz (a.m. and n.b.f.m.) and 4kHz (s.s.b./c.w.) are just a bit too wide for average use. This makes it difficult to listen to

signals without adjacent channel interference from strong signals, particularly if 12.5kHz spacing is in use on the v.h.f. and u.h.f. bands, or you are trying to monitor s.s.b. transmissions on a typical short wave amateur band.

Interesting enough the IC-R1 exhibits the same sort of problem - it's a pity that Icom didn't quite manage to fix it this time around.

The wide i.f. filter also makes the Automatic Frequency Control function less effective than it might otherwise have been. The a.f.c. only works during n.b.f.m. operation and seems to have a range of approx. ±5kHz. The idea being that if a signal is received slightly off frequency the a.f.c. function retunes the radio to ensure perfect reception. Now this would be great if the receiver had a really narrow i.f. filter as it would

prevent off-tune signals from sounding distorted, but the existing i.f. filter is so wide that signals 5kHz off-tune easily fall within the i.f. passband. I would have preferred the a.f.c. function to have a wider lock range and work on a.m. as well as n.b.f.m. which would have made it possible to use a much narrower i.f. filter, especially for v.h.f. airband reception, where most receiver designs use a wider than normal i.f. bandwidth in order to permit the reception of offset transmissions which are used in this band. The real icing on the cake would have been w.b.f.m. operation with a.f.c., as this would appeal to satellite enthusiasts who have to contend with doppler shift on orbiting satellites and counter-surveillance operatives trying to locate simple bugging devices, which have a tendency to drift in frequency.

Looking Either Side

The 'Bandscope' function allows you to 'see' activity up to ±100kHz either side of the frequency the receiver is tuned to. This equates to approximately five channels ether side of the centre frequency, however the i.f. filter bandwidth is so great that half the screen is filled when a strong local signal is being received. The Bandscope circuit is also used to provide a fast search facility which Icom call 'Signal Navigation'. The idea of this is that during a search when an active signal is found and the receiver has stopped on a channel, the Bandscope circuit checks 100kHz higher or lower in frequency (depending on the direction of the search) for other signals. When the scan resumes, the receiver can jump directly to the next active channel without wasting time trundling though the other inactive frequencies. In theory this is a great idea, but the limited search range means that unless you are monitoring a very busy chunk of the spectrum you are not likely to notice any great improvement in search speed.

Measured Performance

The measured receive sensitivity was average with figures of -122dBm (2.5kHz deviation n.b.f.m.) -116dBm (60% modulation a.m.) -120dBm (60% Modulation s.s.b.) -105dBm (50kHz deviation w.b.f.m.) all for 12dB SINAD at 150MHz. The performance fell off fairly dramatically below 1MHz and above 1GHz but was reasonably consistent across the remaining frequency range. I found that most signals I could hear with other modern hand-held scanners could also be heard on the IC-R10, although short wave performance with the supplied antenna was really only suitable for a.m. broadcast station reception. I had to connect a few metres of wire to the antenna socket before I could really start to hear the weaker amateur and utility stations below 30MHz.

The intermodulation performance was not quite as good as I would have hoped for, with a calculated 3rd order intercept of approx. -40dBm for 100kHz carrier spacing at 150MHz. I had a bit of difficulty obtaining consistent intermodulation measurements at close frequency spacings. This was partially due to v.c.o. phase noise which tended to be particularly noticeable on s.s.b. signals above a few hundred MHz and the i.f. filter performance. However at larger frequency spacings the results seemed to be much better and I can only assume that this was due to the r.f. and i.f. roofing filters making an improvement. With an external roof mounted antenna connected, intermodulation products from v.h.f. paging systems could be heard at various points in the v.h.f. aircraft and 2m amateur bands. Very few problems were experienced with the supplied flexible rubber antenna, which the IC-R10 was designed to work with. ■

Summary

My impressions of this receiver are a bit mixed. I really liked the feel of the radio and the performance is OK for its size and selling price - **£339.95**. I am sure that it will sell like hotcakes but I just wish that Icom had worked a bit harder on some aspects of the design. My thanks to **Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE, Tel: (01705) 662145**, for the loan of the review model.

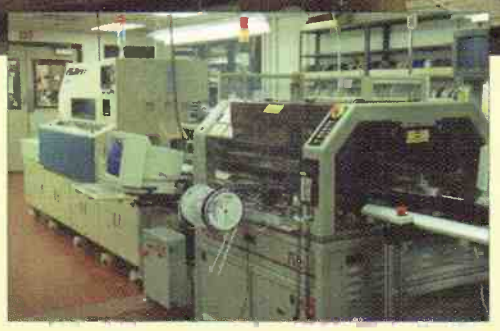
Profile on Drake

While over at Dayton Hamvention last year, Dick Ganderton took the opportunity to visit Drake's Franklin, Ohio factory. Well-known in the past for their amateur equipment, Drake is now one of the leading companies designing, manufacturing and selling high-quality satellite receiving equipment. They have, however, utilised their considerable expertise and production capabilities to produce the R8E Communications Receiver and SW8 World Band Shortwave Receiver.

This wall-mounted display of some of the classic Drake amateur equipment from the past is a feature of the staff rest area.

Although Drake pride themselves on the reliability of their products, they provide a repair and alignment service for any of their products. This is made possible by the dedication of their staff, many of whom have been with them for a long time.

Drake's modern factory is equipped with the latest production aids. In this area operators put sub-assemblies together, test and align the various sub-assemblies and carry out any remedial work needed.



The p.c.b.s in all of Drake's products have their components inserted by computer controlled component placement machines. The populated boards are then passed through a wave-soldering machine ready for inspection and testing.

VOTE FOR LYNCH - NO TAX

....NEW PRODUCTS....

Calling all HAND HELD & BASE SCANNER USERS!!!

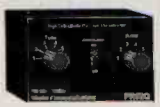
We know that any user of hand held scanners would like to improve the performance on medium wave and shortwave, especially when used at home. Martin Lynch & Son can offer two new products to assist in boosting the usability of your scanner today!

MyDEL ML-2Q Passive Preselector

By offering a tuned circuit to the frequency you want to listen to on medium or shortwaves, the new ML-2Q will reject most of the rubbish that "overpowers" the scanner. The ML-2Q provides a sharp tuning "peak" at the desired frequency (set by you), simply rejecting interfering signals from other bands and I.F. Images. The unit also has a selectable attenuator. Works with any wire antenna.

£39.95 incl. VAT.
Lead suitable for scanner £5.95 p&p £3.50

MyDEL ML-AT2



Everyone knows how important it is to use an Antenna Tuning Unit in between your long wire and receiver/scanner. That random piece of wire may only be resonant on one frequency - you're trying to use it on hundreds!

The new ML-AT2 will peak random wires, coaxial feeds and loop antennas over the entire shortwave spectrum, 500kHz - 30MHz. In addition, the ML-AT2 employs a variable "Q" Control which increases the selectivity of the tuning for better interference rejection and cross modulation.

£49.95
Lead suitable for scanner £5.95 p&p £3.50

MyDEL Long Wire Balun

The Mydel Balun is designed to reduce the impedance of a long wire to a low impedance more closely matching that of the receiver or scanner's input circuit. Will help reduce electrical noise from internally generated sources within the home. Ideal when used with the MyDEL ML-Q2 Passive Preselector.

£22.95 p&p £3.50

MyDEL Shortwave Antenna

Only 40ft (16 metres) in length, this simple to install end fed wire antenna is ideal for the newcomer to ShortWave Listening. Supplied with 15ft of coax cable and terminated with a PL-259 plug, this is ideal to use with any receiver.

£39.95 p&p £3.50

NOISE REDUCTION

Suffering from power line noise? Got a noisy street lamp or thermostat clicking away? Slip in line the ANC-4 and see it disappear. If not send it back and get a refund!

RRP £195 incl. p&p.

NEW Icom ICR-8500

The new IC-R8500 has proved itself to be the professional choice for all band monitoring. Covering 100kHz to 2GHz with no gaps and all mode fitted as standard.

- 100kHz to 2000MHz
- Incredible 10Hz resolution
- All mode including USB/LSB, CW, AM, FM & WBFM
- Built in TCXO for unrivalled frequency stability
- IF Shift & Audio Peak Filter
- Noise blanker, RF Attenuator & selectable AGC
- Digital AFC
- 1000 memories including Alpha Numeric tagging
- RS-232C serial Port
- Versatile Scanning functions
- 13 different tuning steps
- Optional Voice Announcement

RRP £1695

ML Price: 1429

...or go for our super "8500 Package"

- New Icom IC-R8500 with two years RTB warranty
- Matching Icom SP-21 deluxe speaker
- Icom AD-55 Mains PSU
- Icom FL-52A 500Hz CW & Data Filter

Total value £1900, *ML Price £1615*

Available on Low Cost Finance, £175 deposit and 36 payments of £52.31, Cost of loan £443.34

ICOM ICR-10E

When Icom introduce a new scanner, the competition take a deep breath. The amazing ICR-1E introduced over 5 years ago stopped all other scanner sales in their tracks. With the introduction of the new ICR-10E, looks like Icom are about to continue a tradition. Just look at these features:

- All mode FM, WFM, SSB, CW, AM
- 500KHz-1300MHz
- Real Time Bandscope
- 1000 memories
- Alphanumeric tag to each memory
- Tunable bandpass filters employed for excellent RX performance
- Multi function dot matrix display
- Full Computer access capability.

Now available from stock

RRP £379.

ML Price £329 **From only £6.14 per week**

Also available on Low Cost Finance, Deposit £39 & 12 payments of £26.63, Cost of loan £29.56

AR-3030

If you've been looking for the bargain of the year then you've come to the right spot. The AR3030 was one of the first receivers to be offered with Collins filters as an accessory. Classically styled, the compact receiver from AOR is a DDS receiver with A TCXO fitted as standard and tuning rate of only 5Hz.

Awarded FOUR STARS by Radio Netherlands & World Radio & TV Handbook.

List price £699. A limited quantity offered at only £499 and is available on FREE FINANCE.

ML Price: 499

Deposit £99, 12 payments of £33.33, ZERO APR.

KENWOOD TS-570D/M

One of Martin Lynch & Son's best selling HF rigs is the new TS-570D, from Kenwood. So why mention it in a Short Wave Magazine. Simple! Its got the best receiver for short wave we've come across for many years. We have disconnected the transmit section (easily re-enabled) to safe guard against accidental transmission and to ensure non licensed users can legally own and use the transceiver.

- 16 bit AF-stage DSP delivers superb audio quality
- Digital filtering gives you the edge when the going gets tough
- Large clear easy to read display, showing all major operating parameters
- Set up operator engineered features using the new menu system
- CW auto tune - A world first, altering the VFO to your preset pitch
- 100 memories. Extensive Memory functions including browsing of contents
- Compact size 270x96x271. Weight 6.8kg

Supplied with Mains PSU for receiver operation.

ML Price: £1329

Available on finance, £229 deposit and 36 payments of only £39.96, cost of loan £338.66

WEB SITE: http://www.martin-lynch.co.uk

MARTIN LYNCH & Son

THE AMATEUR RADIO EXCHANGE CENTRE

- Martin Lynch can also offer finance terms upto 36 months. Deposits from a minimum of 10%. We welcome your part exchange against any new (or used!) product, provided its clean and in good working order. Call the Sales Desk today. APR: 19.9% Payment protection is also available.
- All units are brand new and boxed and offered with full manufacturers RTB warranty. All prices quoted for cash/cheque or Switch/Delta card.
- Finance on all products is also available. (Subject to status).

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HV

ON OUR ADVICE!

AOR AR-5000 & NEW AR-5000+3

"WEEKLY COST FROM ONLY £10.39!"

The widest frequency coverage offered by any Base scanner available - 10kHz to 2600MHz. All mode and ideal for either base or mobile use. Introduced during April, the new AR5000+3 is a standard version of the original with 3 enhancements (hence the +3):

■ Synchronous AM ■ AFC ■ Noise Blanker

AR-5000 "Original" £1399, (RRP £1495), deposit £159, 24 payments of £62.12 Cost of loan £250.97, or 36 payments of £45.04 Cost of loan £381.77

AR5000+3 £1595, (RRP £1749), deposit £189, 24 payments of £70.44, Cost of loan £284.57, or 36 payments of £51.07 Cost of loan £432.87

NEW MVT-9000

"A thoroughbred amongst scanners"

Now established as THE handheld scanner to own (along with the ICR-10E), the MVT-9000 offers an excellent Bandscope facility, full coverage to 2039MHz (with no gaps) and all mode. The price is down and you can buy on our special LOW COST Finance.

RRP £489

ML Price £409

Deposit £49 and 12 payments of £33.06, cost of loan £36.74.

Welz WS-1000

NEW

SPECIAL OFFER ONLY £99

Incl. VAT & FREE postage

NOW AVAILABLE FROM STOCK

FREE NICADS THIS MONTH ONLY!

specification

- 500kHz-1300MHz
- AM/NBFM/WBFM
- 1/5/6.25/9/10/12.5/15/20/25/30/50/100kHz steps
- 400 memories ▶ Skip search
- Power voltage from only 2.2-3.5V DC
- Dimentions in mm: 58(w) x 97(h) x 24(d)
- 16mA power save 1 sec.
- Weight: 200 grams incl. batteries & antenna

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The all new Xplorer. Hear it, see it, Decode it, Map it & record it. A high speed FM close proximity receiver that sweeps continuously from 30MHz to 2GHz in less than one second. All mode decoding includes: CTCSS, DCS, DTMF, LTR, Latitude & Longditude, FM deviation.

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The most innovative product for scanners of 1995? Connect this little frequency counter up to your AR-8000 and see it make the scanner jump onto a frequency that its literally just "sniffed" out of the air! Termed "Reaction Tune", it has many uses both for the hobbiest and commercial user.

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ML Price: £189

p&p £10

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NEW

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OPENING TIMES MON - SAT : 9.30 - 6.00 LATE NIGHT THURSDAY BY APPOINTMENT

Ashton-on-Mersey

Tom Read, an avid DXer since 1988, is a teacher at Ashton-on-Mersey Grant Maintained secondary modern school in Sale, Greater Manchester. Although there are many extra-curricular activities for the pupils, he decided to introduce short wave listening to the children in the hope that they would experience the same fascination with international short wave broadcasting as he had.

Ashton-on-Mersey is a Grant Maintained secondary modern school in Sale, Greater Manchester. There are approximately 1200 children (11 to 16) on roll. It is here I started my teaching career in September 1994.

There are many extra-curricular activities available in the school. As I was completing my first year at Ashton, I decided to add some short wave listening to that range.

I started DXing in 1988, since which time I have heard and received QSLs from around one thousand stations around the world and in the British Isles. It was my hope that some of the students would experience the same fascination with international short wave broadcasting, if that could be made available to them.

Thinking Through

I did spend some time thinking through what I could meaningfully achieve with a school DX Club. The first objective had to be getting the children to realise they could hear English language short wave broadcasts from a foreign countries.

Once this was done, then all the other aspects of the pastime could be used to stimulate and motivate. I looked around magazines and stores for a cheap four-band portable radio, which could be used easily by secondary age children.

My final selection was the Morphy Richards R-135, which at less than twenty pounds, I felt would be a viable use of School Fund money. My request to the Headteacher was accepted, and the Club was advertised in the School's *Daily Bulletin* to begin the following Wednesday lunchtime.

First Session

Around fifteen interested children turned up to that first session, most of whom still take part. Starting with the 19m band, I myself tuned around for an English broadcast, and thankfully I soon caught a strong clear signal from Radio Australia. This was the perfect start!

The pupils made a short note of the date, time, metre-band, ID and SIO (the first aspect of DXing I 'taught'), then took it in turns to have a go at tuning the radio themselves. The Morphy Richards proved to be ideal.

The single speaker gives a nice crisp audio, the tuning is smooth with no backlash. Unusually for a school environment, there is no man-made interference whatsoever, so the children did not have that common obstacle to overcome.

They did then successfully tune in to Radio France Internationale and Polish Radio Warsaw in that first session. I typed these up using the School's IT facilities to start off the Club logbook. I continue to up-date this after every Friday, which is the day I now run the activity.

Template Produced

During the next week, I produced a template club reception report form for the students to use. I was deter-

School DX Club

mined to maintain the level of interest and did not feel that going through the arduous 'how to write a reception report' routine served that objective particularly well!

A system was established where upon finding an English language programme, pupils would be handed a piece of scrap paper on which to make the necessary logging, reception and programme notes. When, in my opinion, sufficient proof of reception is noted (usually after about ten minutes), a report form is issued to be written up.

On completion, an envelope and last year's *World Radio TV Handbook* is handed to the pupils for addressing. All the outgoing mail is taken down to the School Office to go with all the School's mail just before the afternoon's lessons are to commence.

Reception Report

Ten minutes is a short time over which to compile a reception report, indeed less than half the time normally requested by broadcast stations. However, I believe it was vital to stimulate the children by allowing each individual to look for a broadcast, and to hear three or four different stations each week.

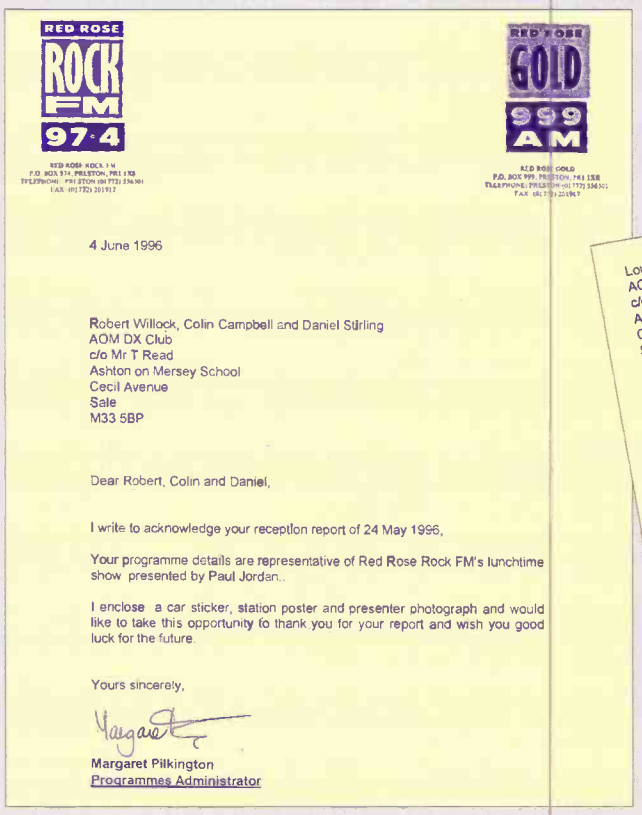
With only one hour per week available, this is the only way to give a representation of what can be heard. Another compromise was the fact that only the metre-band could be noted from the Morphy Richards.

I could have used my own knowledge, and the *WRTH* to provide frequency details, but this would have interrupted an otherwise pupil-centred activity. From my own experience, I knew that most stations would still QSL ten minute reports on a metre-band anyway!

First QSL

The first QSL to be returned was that of Radio Prague. It was addressed to a 7th Year (11 to 12 years old) girl and was accompanied by a letter and a schedule. This proved to be a major source of encouragement to all the children, who continued the listening and reporting.

Radio Netherlands and Swiss Radio International have responded particularly well. Their excellent signals are heard by different pupils most weeks, and most weeks they receive a report. Nonetheless, each one is QSLed within



RED ROSE ROCK FM 97·4

RED ROSE GOLD 999 AM

4 June 1996

Robert Willock, Colin Campbell and Daniel Stirling
AOM DX Club
c/o Mr T Read
Ashton on Mersey School
Cecil Avenue
Sale
M33 5BP

Dear Robert, Colin and Daniel,

I write to acknowledge your reception report of 24 May 1996,

Your programme details are representative of Red Rose Rock FM's lunchtime show presented by Paul Jordan..

I enclose a car sticker, station poster and presenter photograph and would like to take this opportunity to thank you for your report and wish you good luck for the future.

Yours sincerely,

Margaret Pilkington
Programmes Administrator

Kiss 102

Louise Broughton
AOM DX Club
c/o Mr T Read
Ashton on Mersey
Cecil Avenue
Sale
Greater Manchester M33 5BP

16 November 1995

Dear Louise

Thank you for your recent reception report. I am happy to confirm that you were indeed listening to Kiss 102 - Manchester's Essential Rhythm, broadcasting from our 500w transmitter at Sunley Building, Manchester on 102 MHz FM.

Congratulations on the contact. I enclose some of our stickers and flyers.

Yours sincerely

Guy Hornsby
Managing Director

about two weeks.

On their first reply, Swiss Radio International, without request, went to the trouble of enclosing a pile of schedules and stickers which I was able to hand out to my students. Radio Australia returned a huge package which included a full colour Australian calendar, Voice of America even enclosed one US dollar with their response! The response of virtually all international broadcast stations, with just one or two disappointing exceptions, has been superb.

Short Wave

Although the primary objective was to introduce the short wave bands to the children, we have listened on l.w., m.w. and f.m. as well. Most local BBC and ILR stations contacted so far have responded with a QSL verification letter, plus printed information and car stickers.

The best has been BBC Radio Wales, this reply included a huge batch of publicity photographs of the presenters. The only direct request made on the reception report forms is for a QSL, therefore it is nice that many stations have chosen to acknowledge the school club situation by returning plenty of items to be shared round.

Colourful Display

I now have a bright, colourful display building up along the back wall of my classroom. This contains cards and stickers of station logos.

The children manage this display themselves as and when mail comes in. The usual format is that all the contents of the reply are displayed, most of it temporarily with drawing pins.

If it is a new station, I try to select one part showing the station logo to staple-gun onto the permanent display. After one week, the pupil to whom the QSL was returned, removes the items

QSLs RECEIVED AT ASHTON-ON-MERSEY SCHOOL SO FAR...

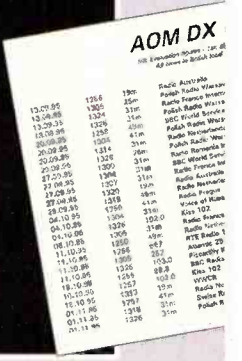
Austria	Radio Austria International (QSL letter, photo, schedule, lots of stickers, info, reception report form)
Australia	Radio Australia (QSL card, poster, calendar, schedule, info, sticker)
Bulgaria	Radio Bulgaria (QSL cards, letter, info, road map, lots of schedules)
Croatia	Croatian Radio, Zagreb (QSL letter)
Czech Republic	Radio Prague (QSL card, schedule, information)
England	BBC Radio Lancashire (QSL letter, car sticker, lots of photos) BBC World Service (letter, poster, schedule) Radio City, Liverpool (QSL letter) Classic FM (QSL letter) Jazz FM, Manchester (QSL letter) Kiss 102, Manchester (QSL letter) Rock FM, Preston (QSL letter, car stickers, photos)
France	Radio France Internationale (duplicate letter)
Greece	Voice of Greece (QSL card, schedule, tourist information book).
Ireland	Atlantic 252 (QSL card, programme schedule, sticker) RTE Radio 1 (QSL card, information, stickers)
Netherlands	Radio Netherlands (QSL cards, '*On Target*' magazine, info, stickers)
Poland	Polish Radio Warsaw (QSL cards, letters, info, stickers, reception report form)
Romania	Radio Romania International (QSL card, letter, schedule, info)
Russia	Voice of Russia (QSL card, schedule, questionnaire)
Sweden	Radio Sweden (QSL card, sticker, info)
Switzerland	Swiss Radio International (QSL cards, stickers, info)
USA	Voice of America (QSL card, poster, info, schedule, $1) *WWCR* (QSL card, programme schedule)
Uzbekistan	Radio Tashkent (QSL card, schedule)
Wales	BBC Radio Wales (QSL letter, info, lots of photos)

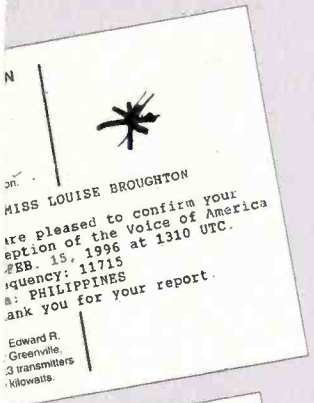

VERIFICATION OF RECEPTIO
(QSL) form
VOICE OF AMERICA
WASHINGTON, D.C. 20547
USA
We are pleased to confirm your recepti
To:
Date:
UTC Time:
Frequency:
Site:
Sunrise at the Voice Of America's
Murrow Transmitting Station nea
North Carc . This facility has
with a comb..ed power of 7,30


Dear Mr PAUL TAYLOR AND
This is to verify your reception
port on our programme which
heard on 17.05.96 at 1
hours GMT in the 19
band on a frequency of 15
All details were correct. 73
RADIO TASHKENT
Correspondence
Section


RADIO AUSTR
To commemorate 50 years of trans
Radio Australia invites listeners a
us about reception in your area.
We confirm your reception report:
Date/time | Frequency
97 3 96 | 15530
NTA
NATIONAL
TRANSMISS
AGENCY


RADIO ROMANIA INTERNATIONA
BUCHAREST
QSL
This confirms your repo
Feb 3 1996 concerning
transmission at 1300
on 1269 kHz.
Your remarks are of gr
terest to us and your fur
ports will be much appr
Bucharest - the Romanian Ather
built in 1888


AOM DX

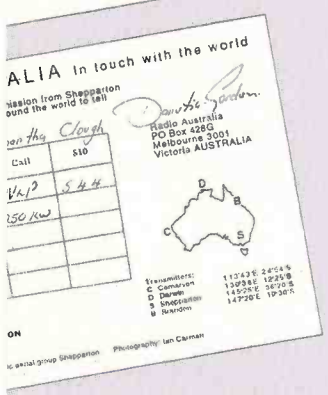

MISS LOUISE BROUGHTON

are pleased to confirm your eption of the Voice of America FEB. 15, 1996 at 1310 UTC. quency: 11715 a: PHILIPPINES ank you for your report.

Edward R. Greenville, 3 transmitters kilowatts.


DANIEL STIRLING

re- you .04 metre s. from


ALIA In touch with the world

Radio Australia PO Box 428G Melbourne 3001 Victoria AUSTRALIA


Mr Daniel Stirling

Manchester

ENGLAND

FOREIGN LANGUAGES PRESS GROUP


Club Logbook

from the temporary display to take home.

I did imagine that these would be proudly exhibited to the students' families, but probably then discarded. However, the encouraging news is that the children are telling me that they are now building up their own QSL collections at home!

The display potential in the hobby is enormous - one idea from a colleague is to project a world map onto a pinboard, on which we could pin all the locations heard.

Degree Of Interest

This hobby certainly is not everyone's 'cup of tea'. I encourage students who express a degree of interest to try the activity once, then take it from there.

To date, over fifty children have had a go at short wave listening and sending reception reports. Of these, around twenty attend the DX Club every week - definite radio and s.w.l. enthusiasts.

Virtually all have told me how they have had to explain the pastime to their parents and friends. I should imagine that most who are reading this can identify with this!

One boy, on doing this, found out that his late grandfather was a licensed radio amateur. Unfortunately, his QSL collection had long since been donated to the Manchester ARC!

Mailbag Swelled

Other DXers around the country have reacted favourably when I told them about the school DX Club. The mailbag has been swelled with packages of stickers, magazines and listening tips from fellow enthusiasts.

This interest has proved to be a major source of encouragement to the children, and they have been eager to write their own thank you letters in return. One gentleman even donated a Sangean ATS-803A receiver to the Club. He wanted the children to enjoy the digital frequency readout facility he had come to take so much for granted! This coincides with where the Club logbook changed from metre bands to exact frequencies in kilohertz! ■

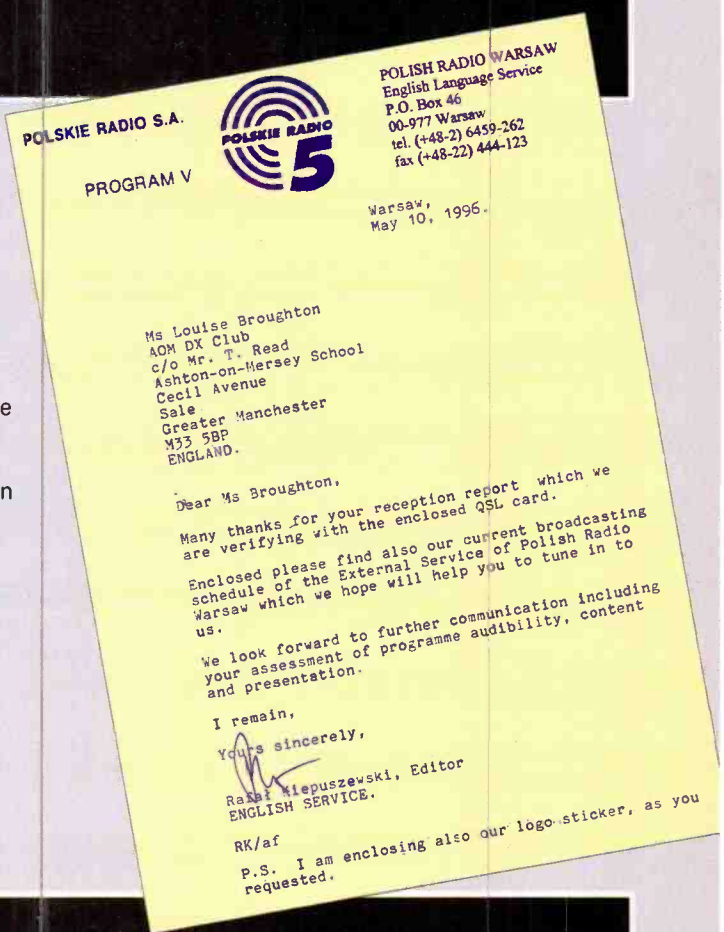
Most Successful

I would conclude that starting the Ashton-on-Mersey School DX Club has been a most successful venture. I did not know what to expect initially, so it has been rewarding to discover that:

1 Short wave broadcasters are delighted to be contacted by youngsters.

2 Other DXers want to support the work in a most generous way.

3 Children/teenagers **are** interested in short wave listening - they just need to be aware of the fact that these transmissions exist!


POLSKIE RADIO S.A.

PROGRAM V

POLSKIE RADIO 5

POLISH RADIO WARSAW
English Language Service
P.O. Box 46
00-977 Warsaw
tel. (+48-2) 6459-262
fax (+48-22) 444-123

Warsaw, May 10, 1996.

Ms Louise Broughton
AOM DX Club
c/o Mr. T. Read
Ashton-on-Mersey School
Cecil Avenue
Sale
Greater Manchester
M33 5BP
ENGLAND.

Dear Ms Broughton,

Many thanks for your reception report which we are verifying with the enclosed QSL card.

Enclosed please find also our current broadcasting schedule of the External Service of Polish Radio Warsaw which we hope will help you to tune in to us.

We look forward to further communication including your assessment of programme audibility, content and presentation.

I remain,

Yours sincerely,

Rafał Klepuszewski, Editor
ENGLISH SERVICE.

RK/af

P.S. I am enclosing also our logo sticker, as you requested.

You can contact us as follows:

AOM DX Club, c/o Mr T. Read,
Ashton-on-Mersey School,
Cecil Avenue,
Sale,
Greater Manchester M33 5BP,
England,
United Kingdom.

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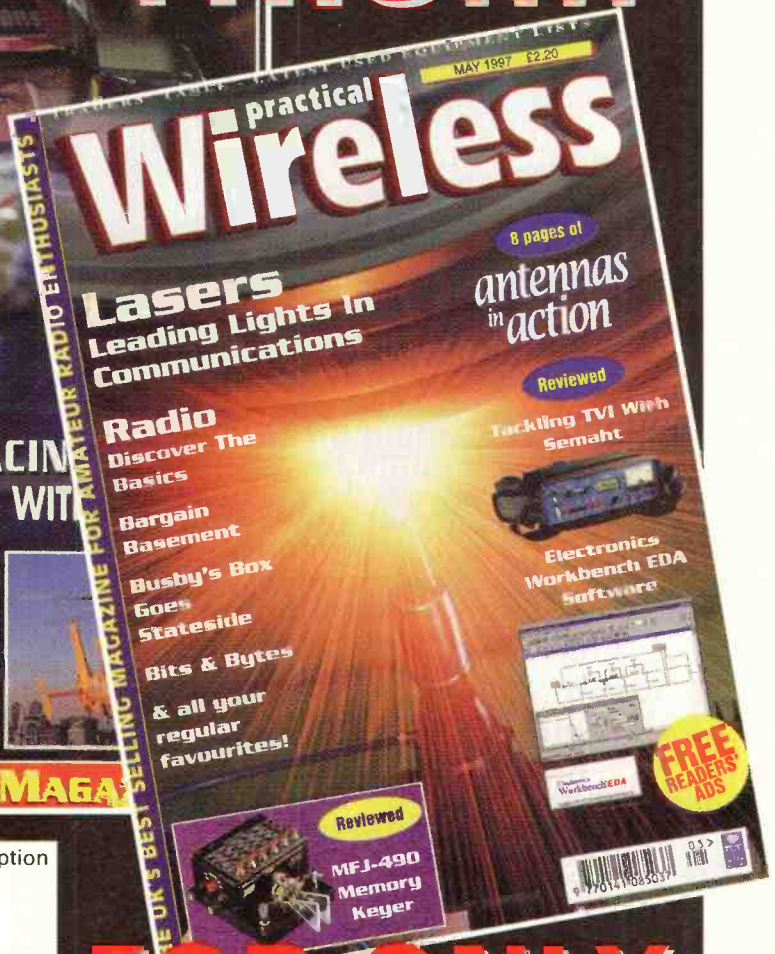

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FREQUENCY EXCHANGE

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Kevin Nice G7TZC

MHz	Mode	Time	Call	Location	Monitor	Notes
5.450	u.s.b.	24hr	-	Brampton	tt	RAF VOLMET.
10.66900	MS5	1528	???	Russian Mil, ???	mc	12-tone vocoder (3300Hz pilot), tfc on LSB.
10.69255	SITOR-A	1640	???	???, ???	mc	100bd/170/E, Opchat in EE selcals NETR, NEHQ.
10.70100	PSK	1624	???	NATO Mil, ???	mc	2400bps PSK UNID System.
10.74200	Baudot	1610	???	SOUD Station, ???	mc	75bd/500, 5LGs on link "11177 00098 25582 18154 07439".
10.81700	Baudot	1554	???	SOUD Station, ???	mc	75bd/500, 5LGs.
11.01650	TWINPLEX-1w	0844	EAE220	Spanish MFA, Madrid	mc	100bd/140, 10LGs (very weak).
11.02700	Baudot	1332	???	SOUD Station, ???	mc	75bd/500, 5LGs on link "11177 70004 80932 09837 00023".
11.02716	FEC-100	1517	D2Z***	French Embassy, Budapest	mc	192bd/400/I, 5LGs to MFA Paris.
11.03152	PICC-6	1546	MKD	Royal Air Force, Akrotiri	mc	VFT: 3ch of Piccolo-6, eng ch idle.
11.03192	PICC-6	1547	MKD	Royal Air Force, Akrotiri	mc	VFT: 3ch of Piccolo-6, crypto tfc.
11.03232	PICC-6	1548	MKD	Royal Air Force, Akrotiri	mc	VFT: 3ch of Piccolo-6, crypto tfc.
11.04450	PSK	0817	???	NATO Mil, ???	mc	2400bps PSK UNID System.
11.05100	CROWD-36	1006	???	Russian Diplo, ???	mc	crypto.
11.05900	FEC-100	1606	J5W***	French Embassy, Rabat	mc	192bd/400/E, 5LGs and MSGs in FF from "milfrance rabat".
11.14621	MS5	0927	???	Russian Mil, ???	mc	12-tone vocoder (3300Hz pilot), tfc.
11.14800	UNID	1022	???	???, ???	mc	75bd/185 FSK UNID System, sync, cont, ACF=0.
11.16800	81-81	1007	???	???, ???	mc	81bd/250, tfc.
11.17450	UNID	1314	???	???, ???	mc	250bd/150 FSK Fast ARQ System, short irregular bursts.
11.41711	c.w.	1005	OLX	Czech Intel, Prague	mc	"yyy yyy yyy de olx olx olx" marker.
11.42800	Baudot	1010	???	SOUD Station, ???	mc	200bd/500, 5LGs on link "11177 00149 68455 20430 01289".
11.43600	Baudot	0934	???	SOUD Station, ???	mc	75bd/500, 5LGs on link ID "11177 40034 07060 28582 00871".
11.43790	TWINPLEX-1w	0838	OZU25	Danish MFA, Copenhagen	mc	100bd/400, NX in DD to embassies selcals TPZX, TPOY.
11.43944	RS-ARQ	0834	???	???, ???	mc	240bd 8-tone, idle on beta.
11.45900	RS-ARQ	0755	DMK	German MFA, Bonn	mc	228.7bd/150, tfc and ALIS bursts.
11.45900	RS-ARQ	1015	???	German Embassy, Lome	mc	228.7bd/150, MSGs and crypto to MFA Bonn.
11.45900	RS-ARQ	1016	???	German Embassy, Dakar	mc	228.7bd/150, MSG in GG to Cotonou, Conakry, Accra, Lome.
11.49572	PICC-12	1203	???	British Mil, ???	mc	Piccolo-12, idle.
11.52840	SITOR-A	1157	???	Egyptian Embassy, Athens	mc	100bd/170/E, 5LGs to EGY Intel headed "jg: knsg——k".
11.53652	RS-ARQ	0724	DMK	German MFA, Bonn	mc	228.7bd/150, Crypto to "tiflis".
11.53652	RS-ARQ	1024	???	German Embassy, Tbilisi	mc	228.7bd/150, MSG to Bonn.
11.56200	CROWD-36	1104	???	Russian Diplo, ???	mc	crypto.
11.64700	Link-11	0803	???	NATO Mil, ???	mc	
12.12805	UNID	0937	???	???, ???	mc	200bd/1300 FSK UNID System, idle on reversals.
12.15621	MS5	0828	???	Russian Mil, ???	mc	12-tone vocoder (3300Hz pilot), tfc.
12.17052	PICC-6	1514	???	???, ???	mc	VFT: 3ch of Piccolo-6, eng ch idle.
12.17092	PICC-6	1508	???	???, ???	mc	VFT: 3ch of Piccolo-6, crypto.
12.17132	PICC-6	1507	???	???, ???	mc	VFT: 3ch of Piccolo-6, crypto.
12.20400	CROWD-36	0807	???	Russian Diplo, ???	mc	crypto.
12.20475	Baudot	1037	DOR***	Bulgarian MFA, Sofia	mc	75bd/500, Instructing Brussels "FOW" to meet at 1230.
12.30552	PICC-6	0809	GYU	Royal Navy, Gibraltar	mc	VFT: 4ch of Piccolo-6, eng ch "de gyu gyu gyu lololo cip cip cip".
12.30592	PICC-6	0810	GYU	Royal Navy, Gibraltar	mc	VFT: 4ch of Piccolo-6, tfc ch idle.
12.30632	PICC-6	0811	GYU	Royal Navy, Gibraltar	mc	VFT: 4ch of Piccolo-6, tfc ch idle.
12.30672	PICC-6	0811	GYU	Royal Navy, Gibraltar	mc	VFT: 4ch of Piccolo-6, tfc ch idle.
13.05400	Baudot	1339	UIW	Kaliningrad Radio, RUS	mc	50bd/170, "ryryryryryryry de uiw uiw pse 16678,5 (".
13.306	u.s.b.	1420	-	USA	tt	New York Radio.
16.01741	RS-ARQ	1341	???	German Embassy, Cairo	mc	228.7bd/150/E, Crypto after "eeeevvvv" marked "aus: kairo".
16.01742	RS-ARQ	1441	DMK	German MFA, Bonn	mc	228.7bd/150/E, Crypto ending "kkkkkkkkkkkkkkk".
16.02040	RS-ARQ	0955	???	German Embassy, Kinshasa	mc	228.7bd/150, crypto MSGs to MFA Bonn after "vvvv".
16.02040	RS-ARQ	1010	???	German Embassy, Luanda	mc	228.7bd/150, Ack'ing tfc from Bonn.
16.07000	CROWD-36	1004	???	Russian Diplo, ???	mc	5LGs.
16.12427	Baudot	0824	???	???, ???	mc	50bd/443, (1 Stopbit) crypto.
16.14300	CROWD-36	0825	???	Russian Diplo, ???	mc	tfc.
16.14700	CROWD-36	1015	???	Russian Diplo, ???	mc	crypto.
16.22770	ARQ-E	1525	RF...***	French Forces, ???	mc	96bd/400/B/E, msg in FF ordering supplies.
16.25656	PICC-6	1047	GFH	Royal Air Force, Hong Kong	mc	VFT: 2ch of Piccolo-6, eng ch "de gfh rgr m8 we qsy up".
16.25696	PICC-6	1048	GFH	Royal Air Force, Hong Kong	mc	VFT: 2ch of Piccolo-6, crypto.
16.33200	c.w.	0827	C***	SLHFB	mc	"C" continuously.
16.35200	UNID	0828	???	Russian Mil, ???	mc	200bd/500 FSK UNID System, sync, cont, ACF=0.
16.42200	Baudot	0902	???	N. Korean Diplo, ???	mc	50bd/1000, RYs followed by 5LGs headed "mf/nn".
17.40200	Baudot	0814	???	SOUD Station, ???	mc	75bd/500, 5LGs on link "11177 10042 79141 21119 01681".
17.43804	RS-ARQ	1252	???	???, ???	mc	228.7bd/120/E, idle in betas.
17.46100	RS-ARQ	0913	IPG20	Italian MFA, Rome	mc	228.7bd/150/E, Visa MSGs in II signed "jacobucci".
18.05753	PICC-12	1130	???	???, ???	mc	Piccolo-12, idle.
18.19052	PICC-12	0903	???	British Mil, ???	mc	Piccolo-12, crypto.
18.23660	UNID	1038	???	???, ???	mc	250bd/170 FSK UNID Fast ARQ System, ACF=75.
18.28762	RS-ARQ	1052	DMK	German MFA, Bonn	mc	228.7bd/150, MSGs in GG.
18.28940	RS-ARQ	1427	???	???, ???	mc	228.7bd/150, idle in IRS mode.
18.30850	FEC-100	0939	RFGW***	French MFA, Paris	mc	192bd/400/E, 5LGs to N2G (Embassy Sanaa).
18.34500	CROWD-36	1040	???	Russian Diplo, ???	mc	crypto.
18.41902	PICC-6	1420	???	???, ???	mc	VFT: 2ch of Piccolo-6, idle.
18.41942	PICC-6	1419	???	???, ???	mc	VFT: 2ch of Piccolo-6, idle.
18.42202	PICC-6	1506	MTS	Royal Air Force, Falklands	mc	Piccolo-6, "ryryryryr gec de mts qsy f3401 m8y cip cip cip".
18.50670	PACKET	1256	761***	???, North Africa?	mc	300bd Packet Radio, crypto into KAM BBS, opchat on 18505kHz u.s.b.
18.50670	PACKET	1256	801***	???, North Africa?	mc	300bd Packet Radio, crypto.
18.51170	Baudot	1015	???	Indonesian MFA, Djakarta	mc	50bd/170, 5LGs headed "indonesian all perwakilan".
18.57718	PacTOR	1513	???	???, ???	mc	200bd/200 UNID sub-mode, no sync, opchat in FF 18576kHz u.s.b.
18.68811	SWED-ARQ	1519	SAM..	Swedish Embassy, Windhoek	mc	100bd/400/9/I, MSG in SS to Stockholm.
18.81586	Baudot	1136	???	N Korean MFA, Pyongyang	mc	50bd/1000, MSGs in KK and 5LGs ending "——— qru rt ———".
19.08470	Baudot	1233	CLP1	Cuban MFA, Havana	mc	75bd/500, NX in SS ends "dpto. informacion minrex".
19.53026	ARQ-E3	0924	FJY2	DIS, Kerguelen Isl.	mc	96bd/400/B/I, Met reports from Reunion Isl to "RFGW".
19.55478	ROU-FEC	1201	???	Romanian Diplo, ???	mc	164.5bd/400, crypto.
19.69250	SITOR-A	1425	ZSC	Cape Town Radio, RSA	mc	100bd/170/E, Phasing bursts with c.w. ident.
19.93600	36-50	1217	???	Russian Navy, ???	mc	36bd/250, idle.
20.02000	RS-ARQ	1217	DMK	German MFA, Bonn	mc	228.7bd/150, MSGs in GG ending "(+/endemessage/+)".
20.02000	RS-ARQ	1244	???	German Embassy, Luanda	mc	228.7bd/150, Ack'ing MSGs from Bonn.
20.03660	ARTRAC	1241	HGX21	Hungarian MFA, Budapest	mc	125bd/170, Ack'ing MSG from UNID embassy.
20.31170	UNID	1219	???	Italian Diplo/Mil, ???	mc	1200bps FSK UNID System.
70.600	a.m.	-	YS	Warwickshire	tt	Fire Service.
70.887	a.m.	-	YG	Staffordshire	tt	Fire Service.
119.250	a.m.	-		Coventry	tt	Airport approach.
119.850	a.m.	-		Liverpool	tt	Airport approach.
130.600	a.m.	-		Birmingham	tt	Servisair.
141.462	n.f.m.	-	-	Birmingham	tt	BBC Pebble Mill O/B.
164.562	n.f.m.	-	Healthcall	Coventry	tt	Doctors on call.
165.255	n.f.m.	-	-	Tamworth	tt	Taxis - mobile 170.025MHz.
165.925	n.f.m.	-	-	Wolverh'pton	tt	Taxi firm.
167.350	n.f.m.	-	Bee	Tamworth	tt	Taxis - mobile 170.150MHz.
167.937	n.f.m.	-	Bell	Tamworth	tt	Taxis - mobile 172.737MHz.
168.975	n.f.m.	days	Manor	Tamworth	tt	Drayton Manor Park staff.
264.400	a.m.	0935	Magic 88	Central UK	tt	AWACS with 'TRIPLEX 1&2' Tornado based at RAF Conningsby.
440.255	n.f.m.	daytime	Echo	Birmingham	tt	City centre Traffic Wardens.
451.275	n.f.m.	-	-	Birmingham	tt	Airport Police.
451.675	n.f.m.	-	-	Tamworth	tt	Police - encrypted.
452.600	n.f.m.	-	KX	W. Bromwich	tt	Police.
453.900	n.f.m.	-	-	Birmingham	tt	British Rail - Internationol.
455.000	n.f.m.	matches	-	St.Andrews	tt	Central TV camera crew.
455.162	n.f.m.	-	-	Birmingham	tt	BRMB O/Bs & Flying Eye.
455.245	n.f.m.	-	-	Birmingham	tt	ITN camera crews.
456.525	n.f.m.	-	-	Birmingham	tt	Airport HM Customs & Excise.
456.875	n.f.m.	-	-	Birmingham	tt	MAS-Midland Airport services.
460.770	n.f.m.	-	-	Birmingham	tt	Airport marshalls.
461.312	n.f.m.	-	-	Atherstone	tt	TNT loading boys Birmingham City F.C.

John Griffiths, c/o 22 Ffordd Beibio, Holyhead, Gwynedd, North Wales LL65 2EH.

Scanning

This month, as promised, we're going to look at band plans. Or, to put it better, at the spread of frequencies and the general area in which you can find what you're interested in.

Of course, at this point it's wise to say that I can't be any more specific. The allocation and users portion of the band varies throughout the country. What's in in, for example, London, may not be the same in Edinburgh.

However, that's where scanning through your area is what the hobby is about. You seek and log what's on, by frequency, and so build up a local picture of who is where. Large frequency guides can help, and it is to be hoped that you would use these as a means of finding general users in a particular area.

For example, the Police transmit nationwide through one section of the band, but it's obviously not a good idea trying to get the Met, for example, on an allocated channel if you live in Portsmouth! However, on that same channel you may find something which captures your attention and log it. In this way you make up a good radio 'picture' of all that is available to you in your location.

Bandplans Simple

I've deliberately kept the bandplans simple, using general terms like 'Military Air' so as to give you an idea where to start and finish. I can't be specific on a particular user - say RAF Leeming ATIS - because that would not be heard outside of the Leeming area. You really have to just use the headers as general pointers and work in yourself. Then again, that's scanning for you! It's all about research.

The v.h.f. band starts at 30 to 300MHz and goes Ultra High Frequency (u.h.f.) from 300MHz to 3GHz. After that it becomes Super High Frequency (s.h.f.) from 3 to 30GHz (gigahertz). For our purposes, I will look at the range between 30MHz and 3GHz.

In the v.h.f. range, you can find various users, for example, 37.500 - 47.000MHz, in which portion such things as mobile military and backpacks, some cordless telephones, TV broadcasting.

Specific spots

40.050MHz Military Distress.

50MHz puts us in the amateur band. This is the 6m band, modes used are n.f.m., c.w. and s.s.b.

Various users are spread from here to the airband, on 108.000MHz,and then onto around 142.000MHz. Spot frequencies here are the civil distress frequency of 121.500MHz. 'British Rail', some old 'Gas Board' allocations, 'Electricity Boards', some bus companies.

Police can be heard around 143.000 to around 153.000 in a.m. mode, and also here can be found some government mobiles.

The Amateur 2m band is between 144 - 146.000MHz.

154.000 to around 175MHz gives us marine v.h.f. on 156 - 162.000MHz, some old ambulance allocations on a.m., Security and p.m.r. mobiles.

176 to 225.000MHz includes BR, p.m.r. mobiles, some London Transport links.

225 - 328.600 is Military Air in a.m. Spot frequency is 243.000 Military Distress. here can be found beacons paired with others in the 108 - 118MHz civil airband section.

328.000 - 450.00MHz reveals a myriad of users such as p.m.r. mobiles and bases, 70cm Amatuer Band at 430 - 440.000MHz. Some fire channels.

450 - 470.000MHz gives us some Police mobiles and sets, plus bases. Fire brigades and ambulance services. BT services, some p.m.r., on-site paging systems and short-term hire sets, some airport ground services, on-board shp mobiles, some car racing team frequencies and some outside broadcast links.

470 - 855.000MHz gives us UK Band IV TV, studio talkback, aeronavigational radar (ground) Band V TV broadcasting.

Similar things happen between there and 870.000MHz. This is where we find cellular 'phones up to around 960.000MHz.

After that, it gets technical! Above here - to 1300MHz you will find radio astronomy, radio location devices, the amateur radio 23cm band between 1296 - 1300MHz in n.f.m., s.s.b. and even wide band TV! After that, we get

Sheffield Frequencies

Now, to whet your appetites, some frequencies via the PROMA group to get you going. These are in the Sheffield area - so accusations that I favour the capital are unfounded!

441.400	R	A1 Security
441.625	R	Unid Domestic Appliance Repairs
442.225	CR	Unid Property Repairs/Security Company
447.7875	S	Sheffield City Council Dry Ski Sope
453.050	S	Sheffield City Council Emergency Gaziers
453.100	R	Stockbridge Engineering Steels
453.125	R	As Above
453.150	R	Sheffield City Council Cleaning Department C/N Cleaning
453.175	R	Sheffield City Council Park Control C/N Ranger (also other SCC)
453.200	R	Mainline Trams Inspection/Maintenance
453.475	R	Sheffield City Council Emergency Plumbers
453.500	R	Sheffield City Council Market Control C/N Esther
453.525	R	Seffield City Council Emergency Gas Fitters
453.700	R	Sheffield Wednesday Stewards
453.800	R	Stocksbridge Enegineering Steels C/N Steelfleet
453.850	R	Forge Alert Security CH1 C/N Don
453.900	R	BR Tinsley Mill Marshalling Yards
453.975	R	Stocksbridge Engineering Steels
456.050	R	Meadowhall Shops Security
456.450	R	Sheffield City Council 24hr Repairs
456.475	R	Crystal Peaks Security
456.500	R	City Centre Store Detectives C/N Track
456.525	R	University Of Sheffield CHA C/N Campus

This is a good exercise for you to try your scanning skills out. Although the frequencies are for Sheffield, you could try patching them in at your location and seeing what you come up with. The activity is likely to be the same, for example, 456.450 Sheffield Council could also be allocated to your local authority.

It's worth remembering that the short range of radio equipment on u.h.f. allows for a duplication of frequencies over the country. So, what you may hear on that channel may well be completely different to what is heard in Sheffield.

It's not uncommon, for example, for frequencies here to be heard in Europe due to lift conditions.....so, watch the barometer and let me know what you come up with! Likewise, the same lift may insert someone in the UK - but at a great distance away - on that channel. It's all about listening and logging carefully.

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really specialist and I don't know too much about what's 'beyond the fringe'!

More information - incredibly detailed - can be found in the various publications concerning scanning on sale in the magazine's book section to the rear of the magazine itself.

In truth, there is such a lot out there that I can't effectively do it justice as I haven't the space. However, simplistic as it is, you will find something to amuse you in the general headings.

Log Books

Which brings me to the next bit. What do you need to use in a log book?

Ideally, a simple sheet fastened into a binder can serve as a log, with page numbers inserted in order for you to colate the information. The following example is the one I use and, over the years, it has proved to be good enough for my purposes.

You may like to try it yourself. Using a PC or word processor is also something that makes for a good clear log book.

Date: Time: Frequency: ID: Comments:

You can, of course, vary this as you see fit. However, as a guide, it's easy enough to follow. Remember, you can - by keeping accurate records, build up a better picture of your area than by guesswork. It's also good for info swopping when you use the column or are chasing something you can never quite catch!

Mail Time

Not much this month. However, answers for **S. Brown** who asked for info on 'Starburst 1'. This is the Metro Radio Helio up on Tyneside.

Frequencies in use are 141.140 - studio uplink and also used for live broadcasts. 476.4625 - downlink from 'Starburst 1'. On air just before 8am, after take-off from Newcastle International and off air just before 9am. 473.9500 - studio talkback. Thank's to **MT** of Newcastle for that.

P. Ford asked about converters. Godfrey Manning sent in the following. Converters receive a wide range of frequencies and spread them into a wide band. They have tighter frequency ranges than scanners and also have front-end filtering. The result is a cleaner signal.

Being active devices, Godfrey suggests that the signal gain would be higher too. Godfrey also raises the question of a.t.u.s on long wires at v.h.f. It's possible - but pointless! He suggests - and I have to concur - that they are not much good when compared to a resonant antenna. (Check out 'The Long & Short Of It' in Jan '97 SWM - KN) - for a different opinion!

A question of law next. A reader asks: 1) - Is it illegal to listen in to most radio transmissions if they emanate from a foreign country? and 2) - Can a resident of a foreign country legally listen in to transmissions we are not supposed to? I'd be interested to hear opinions about those!

Lastly, can anyone help **J. McGahan**? He asks if anyone has codes and callsigns for Surrey Fire Brigade and also a list of frequencies? You should contact him direct at: **9 Little Green Lane, Chertsey, Surrey KT16 9PJ.**

He also sends in the following frequencies which may be of interest:
140.995 - Sound output from London TV Centre. 455.012 - C4 Racing from Kempton Park Sound link. 455.200 - C4 Racing Talkback.

News From PROMA

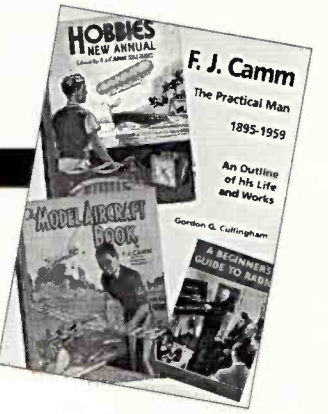
Some news in from PROMA may be of interest and is published as received at my QTH.

"The *UK Scanning Directory* will in future use our group to proof read frequency lists they receive and make ammendments for the *sixth edition.* The *fifth edition* has just been reprinted, the European frequencies have been taken out of the main guide and reprinted in a separate section in the back and also most of the double entered frequencies have been ammended. For those computer equipped our *PMR Guide* and special/government/military guide is available on disk available for £4.00 P&P, please state format". If you are computer equipped and want to recieve the report & special events on disk please write & tell me.

PROMA can be contacted via myself. Would **Paul Wey** write with contact details in order that I can sort out requests? This will ensure that he gets all replies via the column. Thanks.

In the meantime, keep writing in. Apologies to those I haven't managed to get back to but I'm busy writing my 10 000 word thesis plus a 5500 word report - and working, keeping my Mini going, etcetera! Keep any UFO aspects or 'strange signals heard' coming in and, in general, enjoy yourself and be careful! 73s.

FJ CAMM The Practical Man



Ron Ham looks at the biography of the man responsible for the creation of our sister magazine.

Throughout this century there have been many notable people, enthusiastic for their subject, who have made a great contribution in the complex fields of engineering and science. Among them were Fred and Sydney Camm, whose lives and achievements are outlined in a new illustrated book entitled *F.J. Camm, The Practical Man, 1895-1959.*

This work has been researched and written by Gordon G. Cullingham, the Honorary Archivist of the Royal Borough of Windsor. Gordon has shown that Windsor is proud of Fred, who became the famous technical author and editor, fondly known as 'F.J.' and his elder brother Sydney who designed, among other aircraft, the famous Hawker Hurricane fighter.

In March 1986 the Mayor of the Royal Borough unveiled a plaque on a small terraced house in Alma Road to commemorate the work that earned Sydney a knighthood. This for many decades was the Camm family's home, where Sydney and Fred were born in 1893 and 1895 respectively.

In 1911, Sydney and F.J. founded the Windsor Model Aeroplane Club and through the book's 104 pages, the author tells how Sydney spent his life as a designer in the aircraft industry while F.J. devoted his skills as a draftsman, model engineer and writer to the world of technical literature. He made the 'Practical' magazines famous right up until he died at the age of 63.

In addition to writing and editing many books, F.J. held editorial posts for the journals *Aeronautics, Aircraft and Flying, The Cyclist, Everyday Science, Flight, Hobbies and the Practical, Engineering, Householder, Mechanics, Moneymaker, Motorist & Motor Cyclist* and *Television and Wireless.*

Frederick James Camm edited *Practical Wireless* from its launch in 1932 until his death in 1959. *PW*, now 64 years old and another old timer, *Practical Motorist*, still being published are serving their respective readers in the true Camm tradition.

The book has much information about F.J.'s publications, for example, Newnes first published his *Practical Motorists Encyclopedia* in 1935 with nine later editions. Did you know about the 'CAMBRO' cycle car of 1919, the "Three wheeler for £20" in 1936 and the four-wheeled midget car in 1937? I bet some people still have these magazines and books tucked away in their lofts!

The cover of this new A4 publication, has photographs of three books entitled, *Hobbies New Annual, The Model Aircraft Book* and *A Beginner's Guide to Radio,* all edited by F.J. Camm, on the front and a photograph of F.J. himself on the back.

To me, Gordon's book is good reading down memory lane and a great tribute to Frederick and Sydney Camm. It's a reminder and in some ways an index for enthusiasts, collectors and historians alike.

Copies of *F.J. Camm - The Practical Man 1895-1959* are available direct from **Gordon Cullingham** (Honorary Archivist Royal Borough of Windsor) for **£7.50 plus £2 P&P (UK).** Airmail postage (surface post not recommended) is available for addresses abroad for £3 (£10.50 inc. P&P). Please send your cheques (payable to Gordon C. Cullingham) to **54 Alma Road, Windsor, Berkshire SL4 3HA. Tel: (01753) 863951, FAX: (01753) 861383.**

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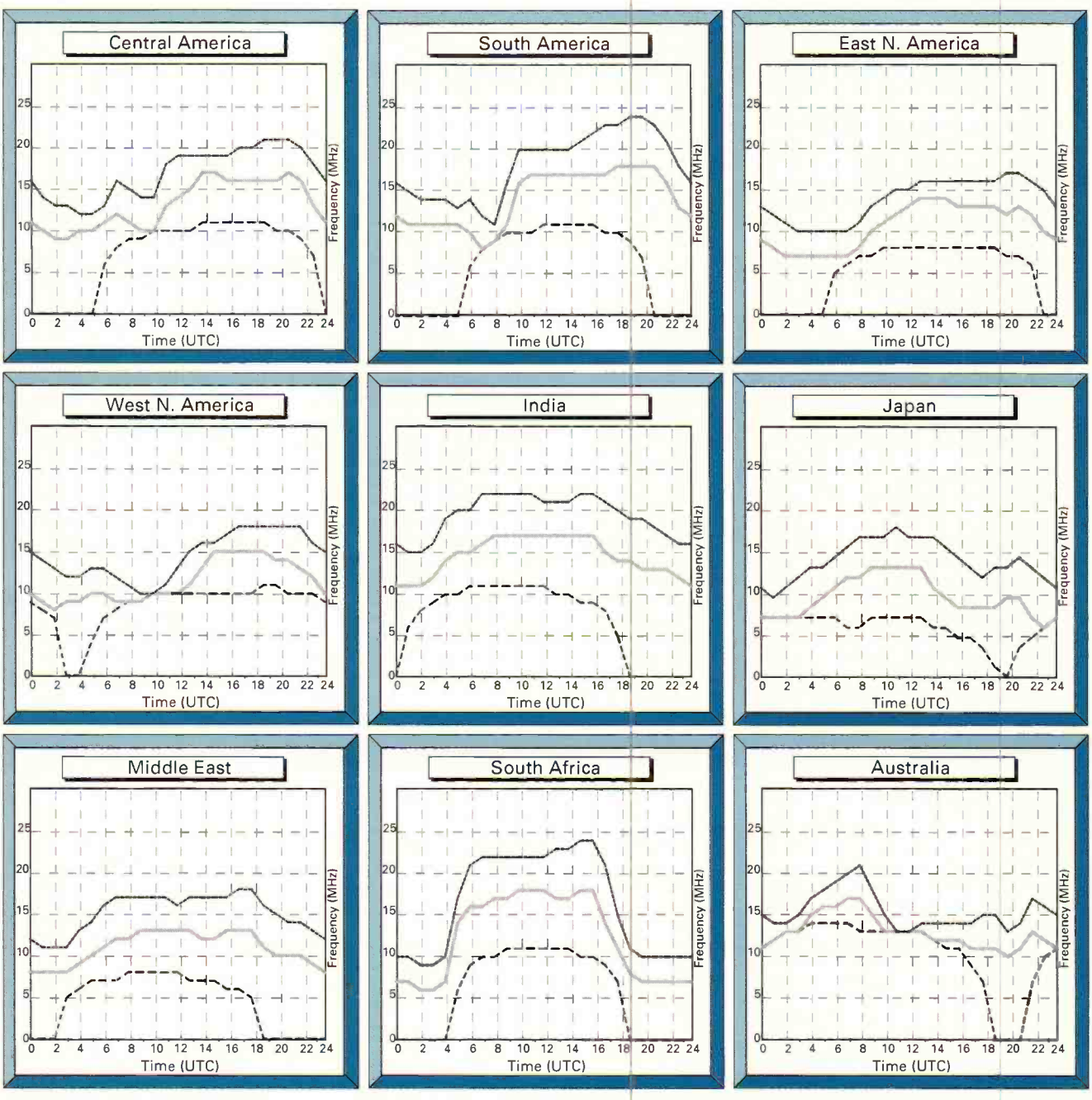
Circuits to London



How to use the Propagation Charts.

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

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

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

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

Good luck and happy listening.

Peter Bond, c/o Editorial Offices, Broadstone

MilAir

USAF 50th Anniversary

By the time you read this column, the evenings will be drawing out, the weather will hopefully be warmer and the Air Show season will be with us. The United States Air Force 50th anniversary show at RAF Mildenhall should be just a few days away, and this year it promises to be an excellent show. The USAF aerobatic team, **The Thunderbirds** will be displaying on **Saturday only,** as they have to leave to make the long journey back to the States to fulfil a midweek airshow commitment. The following is a list of frequencies used by the team in the last couple of years: **140.4, 141.055, 142.0, 283.5, 319.7, 322.6** and **392.9**. The next list is those frequencies noted more recently and were noted in use in the USA last October and November: **141.85, 143.85, 235.25, 236.55, 241.4, 250.85** and **322.95**

The attendance of President Clinton, hopefully means that they will be pulling out all the stops to ensure good aircraft participation, including hopefully a selection of aircraft from across the pond. Preliminary USAF Press information, tentatively states that there is a small chance that the big three may be in attendance. F-117A Stealth's seem to be almost certain, with attempts are being made to get the B-2A and an SR-71A across the Atlantic. Both Blackbirds are scheduled to appear at the Nellis 50th airshow in April so I suppose anything is possible - I shall remain a sceptic until I see the incandescent blue of the Blackbirds twin afterburners blasting down the runway at Mildenhall. Incidentally, with the president in the UK, this presumably means that both an VC-25A and an E-4A/B will be present at either Mildenhall or Lakenheath, so keep your ears open for any interesting frequencies!

Lakenheath

Staying in Suffolk, I have had several letters from readers regarding the changes to Approach and Departure frequencies for Lakenheath and correspondingly Mildenhall. The last few months has seen a large scale maintenance contract carried out on the Radar at Lakenheath and as a consequence, the radar unit at Honington has been reactivated. The Approach and Radar for the two airfields has been controlled by Honington using the frequencies, **135.2, 254.875** and **315.575**. Whilst this maintenance was in progress there was one frequency change, (as noted in a previous 'MilAir' column), Lakenheath Approach changed from 398.35 to **337.6**. Although Honington closed in March 1994 losing it's based squadrons, the airfield and Air Traffic Control facilities have been kept serviceable on a 'care and maintenance' basis for such contingencies as this. The frequencies in use are not new allocations but are the old frequencies used by the airfield when it was operational.

Yorkshire Frequencies

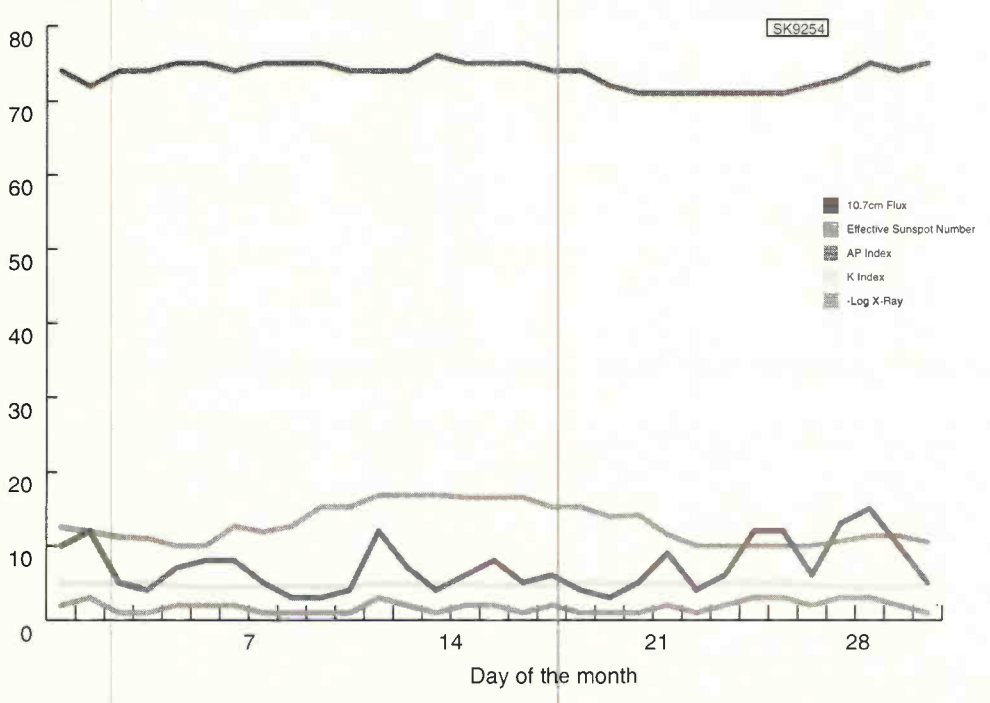
John from Sheffield writes to me, he is fairly new to the hobby and wants to know which frequencies are best to listen to for the Military traffic in his area. I do not have enough room to include extensive frequency lists, so I would suggest that you should get yourself a copy of one of the airband guides, *Airwaves 97* for example. This type of directory lists all the military frequencies that you will find of interest. If you include London Military frequencies and a selection of local airfields you should get plenty to listen to. From your location in South Yorkshire (subject to the local terrain), using your Yupiteru MVT-7100 you should easily be able to hear traffic into Leeming, Linton, Topcliffe, Church Fenton, Waddington, Wittering, Cottesmore and Coningsby. Also, you should be able to hear airfields that are further afield such as Mildenhall and Lakenheath, but don't forget Airband transmissions are based on the principal of line of site, so if you are some distance from an airfield don't expect to here the ground controller of aircraft below a certain height. Thanks John, for the favourable comments about the column.

Emergency

Sandy from Glenburn in Scotland, asks if any of our readers heard a distress call made by an aircraft using the frequency **259.775** (Scottish Military), around 1300 on 17 January. It appears to have been a practice emergency diversion into Newcastle with an engine fire. Does anyone have any more information? I personally wonder why the Mayday call was made on an ATC frequency, rather than the u.h.f. distress frequency **243.0**?

Thanks to the reader who offered help to our correspondent who is writing a book about former East German airfields, I have passed on your address and 'phone number. Lastly, I would remind all our readers that any letters will be answered within this column, I regret I do not have the time to answer letters personally - Sorry - Good frequency hunting with the Airshow season - See you next month.

Propagation Extra Compiled by Kevin Nice G7TZC



Guide to the Chart

The 10.7cm solar radio flux is used as an indicator of the general level of solar activity.

The K and AP indices are measures of geomagnetic activity.

The K index ranges from zero (very quiet) to nine (severely disturbed).

K values of five or greater correspond to geomagnetic storm conditions that can relate to poor propagation conditions.

The AP index ranges from 0 to 400. An AP of 30 is the threshold for geomagnetic storm conditions.

Data for March 1997

Graham Tanner, 64 Attlee Road, Hayes, Middlesex UB4 9JE. Internet: gmt@delphi.com

SSB Utility Listening

The 1996 London Amateur Radio & Computer Show has come and gone, and to those of you who came to the *PW/SWM* stand to say hello, a big thank you. It was very good to meet the readers of this column, to swap stories, news and information, and to get some ideas for areas to be covered in future columns.

When I first arrived early on the Saturday morning, I was surprised to see numerous boxes and boxes marked CFL, and a large display containing the latest *Ferrell's Confidential Frequency List - 10th Edition*. I was not aware that a new edition was about to be published, but I was even more surprised when I found out who the new publishers were. I got a chance to look over a copy over the course of the weekend, and I was so impressed that I decided that it deserved a review.

The 10th edition is still compiled by Geoff Halligey, but it now published by PW Publishing. It continues with its wire-bound spine so that the book open flat on your table, and I am glad to say that the typeface in this edition is now much better.

The typeface used in the 9th edition made the text look a little cramped, but the 10th edition is much easier to read. In the past two years the World Utility Network on the Internet has really made its mark on utility listening, and the 10th edition of CFL includes a large amount of updated information from WUN and its 1000 plus members, including a number of updates from January 1997.

The bulk of the book (nearly 340 pages) comprises the main frequency list, running from 1606kHz up to 29713kHz. This is divided into sections based upon the ITU band-plan.

Each entry in this part of the book contains the operating frequency in kilohertz, the operating mode (e.g., c.w., u.s.b. or just Dig for all the digital modes), the station callsign where known, the station name and location, the type of station, and finally some notes and remarks about the kind of signals to be heard on that frequency.

This is followed by a 75-page listing of callsigns, which gives the location, the type and mode of operation and a list of frequencies. This section of the book is printed on paper that is a different colour so that it is easy to find; this year it is a kind of mauve colour, the same colour as the cover of the book.

Towards the back of the book, but still in the mauve pages are listing of NAVTEX transmission schedules, international callsign allocations, frequency allocations, a list of ICAO h.f. aeronautical network allocations and maps of the world showing which of these networks cover various parts of the globe. One oddity (for me anyway), was the inclusion of a list of operating modes (e.g., A1A - c.w. Morse code, J3E - u.s.b./l.s.b.) tucked away in the mauve pages, I would have thought that this would be more useful if it were presented near the start of the frequency listing.

I have not really had the opportunity to go through the book in detail, but one entry which did stand out was that of 11.175MHz. It still lists Howard AFB (Panama) and Andersen AFB (Guam) - both part of the giant US Forces GHFS network - as having weather broadcasts at various times throughout the day. I was under the impression that these were all stopped over 5 years ago and I would have expected to have seen them reported since for them to continue being listed as such.

Finally, the introduction is now greatly reduced. In previous editions it has been used to explain how the listings are layed-out and what the various codes mean in some of the columns. Now, the information is scattered throughout the book, and the reader has to search for it.

This is a very valuable addition to your bookshelf, and makes a very good reference book. It costs £19.95 and is available from the *SWM* Book Store (see towards the back of each issue of *SWM*) or your local amateur radio dealer.

VOLMET

It would seem that the RAF has been changing its VOLMET weather broadcast frequencies again. Several changes were noted during March, as follows.

By the end of February the RAF VOLMET broadcast on 4.715MHz had moved up to the new frequency of 5.450MHz. I listened to the broadcasts on several occasions over a two-week period, and this does seem to be a permanent change, they have certainly not been back on their old frequency since then.

The new frequency is actually a fairly common RAF one, as I have heard RAF tracking exercises in the past on 5.450MHz. I first heard this frequency in use on the 25 February, but I would like to hear from anyone who heard it in use for VOLMET broadcasts in the two weeks prior to this.

The second change is the sudden appearance of the STCICS weather broadcast at 30-minute intervals on 5.693MHz. I found this during the middle of March, the transmission seems to be a simulcast of one or two of the other STCICS broadcasts.

On one occasion, the broadcast on 5.693MHz was a female voice, and the same voice was in use on two other frequencies, a male voice was transmitting the same broadcast on three other frequencies. At first, I thought that the new frequency was a replacement for 5.713MHz, but one evening I managed to hear signals on one frequency, and the same broadcast a few seconds later on the other frequency.

As yet, I have not seen an up-to-date copy of the RAF *En-Route Supplement*, so I do not know if these are permanent changes or just temporary while a more permanent home is found.

Turkey

In the March issue I mentioned a request from a reader in Turkey (Mr. Yavuz) who wanted to know about other utility stations in Turkey other than the USAF ones.

I did some research myself, and also received a letter from a reader in County Durham. I decided to limit my search to just s.s.b. stations, and all that I found were coastal marine stations.

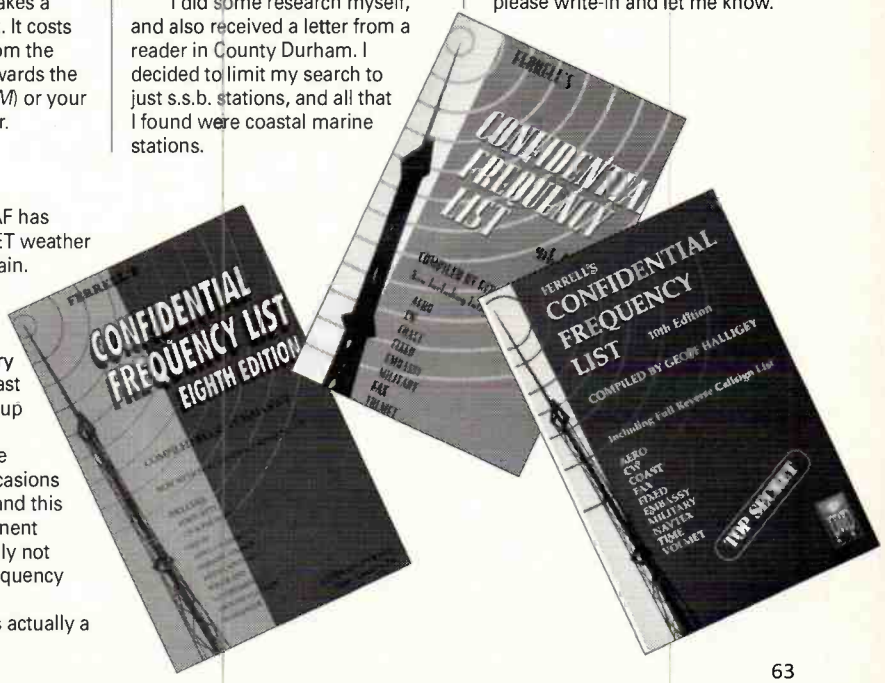
Firstly, the list received by letter. I have listed the location, ITU callsign and frequencies (in MHz) in use: Trabzon (TAO) - 2.182; Samsun (TAF) - 1.760, 2.182, 2.760; Zonguldak (TAR) - 2.182, 2.760; Istanbul (TAH) - 2.182, 2.760; Istanbul (TAR) - 8.225/8.749; Canakkale (TAT) - 2.182; Antalya (TAL) - 2.182, 2.693; Mersin (TAM) - 2.182, 2.820; Iskenderun (TAI) - 2.182, 2.629, 3.648.

The latest edition of *Ferrell's Confidential Frequency list* also lists Izmir Radio (TAN and TAN2) operating on 2.760 and 1.850, and the following frequencies for Istanbul Radio (TAH) - 2.670, 4.357, 4.363, 4.387, 4.405, 4.414, 6.510, 8.746, 8.809, 8.812, 13.092, 13.128, 13.140, 13.173, 13.191, 17.257, 17.272, 17.293, 22.732, 22.735, 22.762 and 22.783 MHz.

Another frequency that I have not seen any actual reports for, but is often listed in various publications, is the THY - Turkish Airlines LDOC frequency of 11.185MHz. This information comes from the Airwaves 96 frequency directory, which I mentioned in the past in this column. I can only presume that this is located at either Izmir or Istanbul.

This is a rather odd allocation, as it is right in the middle of a block of military frequencies (11.175 - 11.275MHz), but it is not alone, as I have heard Tunis Air (Tunisian airlines) on 11.178MHz in the past.

I hope that these are of use, and if anyone in the UK hears anything on these frequencies, please write-in and let me know.



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

Amateur Bands Round-up

Listening to the Amateurs

As I sit down to start this we have just come out of a spell of severe gales. Now, as readers know, I recommend regular lowering of masts, inspection of guys and so forth. However, despite this, one of my upper guys on the upwind side of the mast broke in the middle nowhere near anything else. Luckily the mast held up without it. Upon inspection of the broken ends it became clear that this was a polypropylene type which had been affected badly by ultra-violet radiation. Polypropylene normally becomes rough and 'hairy' almost immediately, but there was nothing visually obvious to say this rope had gone. The 'feel' of it was markedly changed. The whole length felt as though it had been crippled just as a riding turn on a winch will cripple a short length and make it feel different. The moral is clear. 1) Don't use polypropylene rope, and 2) Don't buy **any** rope unless you can see the label - most local shops don't know anything about the rope they sell. Boat chandlers usually know, but even they have been known to cripple a new rope by pulling the wrong end out from a new coil.

Incidentally, never even think of using Nylon rope for guys. Nylon can stretch up to 25% of its length before parting which is why its used for towing and indeed for some halyards. Terylene is the real stuff for mast guying as it does **not** stretch significantly.

What about using wire rope? Firstly it is important to break up wire rope into non-resonant lengths, and secondly do use stainless and get the end-fittings swaged on with the proper professional tools.

Letters

A return to the fold for **Ian Thorpe** who started back in 1946 and is now a resident of Haverhill in Suffolk. After a period of inactivity, Ian set the old FRG-7700/FRT-7700 up again and got interested in contests for which it is useful to have a computer program. In my reply to his letter I mentioned the obvious sources for IBM-compatible software, such as EI5DI, Paul O'Kane, G3WGV, N3EQF. Ian's second query is about how to get to know about contests. Here the main source is undoubtedly the Contest Calendar in *CQ Magazine* conducted by K1AR, John Dorr. Other places include the RSGB's *DX News Sheet* and *DX News Magazine* edited by Chris Page G4BUE (details from RSGB HQ, and note that it is available to non-members); perhaps more biased towards listeners are sources such as the International Listeners Association (via GW4OXB) and of course ISWL. And, of course, some contest 'organisers' leave it so late to mention their one that it misses the K1AR deadline; which in turn means it misses my deadline by several weeks - while other 'organisers' don't even know the K1AR column exists.

Now we turn to **Colin Dean** in Barnsley; who stuck to the l.f. bands. Colin looked into 3.5MHz sideband and found A71BY, A92FZ, DS5INM, FG5HR, FM5GU, FS5PL, HC1JQ, HR2JPQ, JA1-5-6, JX7DFA, J39JS, J75T, OD5NJ, OH0MEP, P43A, SU1SK, SU2MT, KF4AME/TI5, VK2-3-5, VP9KK, V26NA, 8R1RK, and 9N1RHM. At 7MHz the haul included AP2KSD, A92C, CE8NN, ET3BT, EK8WB, HC1DM, HP1XVH, HS1NGR, JW5NM, J52IM, OA4DAY, RA0FA, R1ANZ, S79GN, VK1-4-6, VU2PAI, V44NEF, XT2DP, YB6,YB0, YK1AO, YN5LZM, ZL1COR, Z22JE, 3B8/IK8GNW, 4S7DA, 6Y5PA, 8Q7AF, 9K2GS, 9L1IS, and 9Y4VU.

Next we must turn to **Tom Parrotte** in Weston-super-Mare who was unlucky enough to have his FRG-100 stolen. So, after the inevitable period of QRT, Tom is back again using a SONY ICF-SW7600G tacked on the end of 30 metres of wire. On 3.5MHz the crop included EA9IE, 9H1HCO, CN8ZS, K1DQV, VE3YG, VE3KPU, AC4TO, AB4YO, ZP6SC, K5MU, KA9MXL/4, V3KPU, EA1DBO, YL1XX, WO8Z, W4AXL, VK2XN, VK3ATN, CY1FG, SM7OLZ, 9H1EV, VY2SS, 7X2LS, CO8HB, 8R1AK, ZL1BOQ, KC4MC, KF4AME/TI5, HK3BZO, CP5NU, J39JS, 9H1PF, VU2DVP, FS5PL, FM5AW, OY3JE, OD5MJ, YB2BV, TI4CF, and VK3DZM. Up on 14MHz were 8R1Z, WA2GGI, OH2NRG, 9A5OO, ZP6SC, while on 21MHz Tom logged K1KW and WO8Z.

A first letter from **David Edwardson**, who normally reports to Brian Oddy's section. David runs an elderly but still good Trio R-600. On the antenna side, he runs a trap dipole for the h.f. bands, fed with balanced twin feeder and G2DYM matching network, but for medium-wave transatlantic DX chasing a 2.5m square three-turn loop is in use, resonated by a two-gang 500pF capacitor; a fourth turn is used for matching. Late in February, David 'stumbled across' - his own words - a Top Band contest, and was amazed at what he was able to log and the states from which they were operating: K3IXD(MD), AA4S(NC), W2RE(NY), K3CR(PA), NX0I(MO), W3MM(PA), N2EE(NJ), K3KY(MD), W0ALH((WS), AB2E(NJ), KF2U(NY), YS1RRD, W3MKZ((PA), N3HBX(MD), KI1N(OH), W4IZ(FL), VE3XN(ON), W4TO(TN), WL7WO(TN), WL7WO(CN), K1WW(NC), VE3PN(ON), N2WM(NJ), K4OY(GE), N3MLV(PA), and K2WS(NJ, helped by the fact that all but W4IZ were working GI3UJG) and all logged between 0640 and 0657. Thus encouraged, a good shot next morning was made, between 0550 and 0750UTC, when K4YJO(ALB), W3GH(PA), K2WK(NJ), W3TS(PA), V47KP, VE1PZ(NS), K1NG(RI), W2VO(NY), K2YR(NY), WA2ROD(NH), K3ANS(PA), K4PI(GE), AA1AA(MA), W2GD(NJ), VE3EJ(ON), K3MD(PA), and WR8C(OH) were all booked in. Altogether, some 50 stations were noted, 43 good enough for the log from 16 states, plus Ontario and Nova Scotia in Canada, plus St. Kitts and El Salvador. The loop then clearly outperformed the trap dipole. Basically, this is because the loop, for various reason picks up less noise in proportion than it does signal, so that the signal-to-noise ratio is improved considerably. One could hazard a guess that all those signals were being picked-up by both antennas, but that on the trap dipole they were totally buried under noise. Although David's loop is fixed in direction, there is a lot to be said for making the loop rotatable, so the sharp null can also be used to 'null out' any directive noise sources. In fact most Big Guns on Top band use loops or Beverages on receive, and only use the main skywire for transmission.

Another form of QRT is noted this month by **Ted Hear** in Chesterton, Newcastle, Staffs; Ted has had to drop his antenna to enable new windows to be installed - a job which took longer than he had hoped. On Top Band Ted noted DK5VO, G0EQV, 9A2VR, GI0UJG, DF0RU, while a switch to Eighty yielded CU2CE, EA8RR, GW4RIB, HA5OEL, IN3BAO, JX7DFA, K2RR, LA6WEA, RV6APP, SP7IIT, SU2MT, TI5RU, YL2DZ, Z37FAD, 4Z5DW and 9A4A. Up again, and 7MHz produced EA6AW, HS1NGR, LX1FJ, LY2BUU, RX3RY, UT3UA, ZL4BO, and 9A5Y. As usual the best crop came from 14MHz where A51AM, A61AM, C21NJ, CN8NK, EL2AB, EL2RR, EM2I, EW4XA, HL3VQ, IT9PKO, JA6CM, LY3CW, SQ9DEK, S0RSD, TG1TZC, UT7MD, VK4VA, Z31ET, ZL1BZL, ZL1PC, ZS4AE, 4Z4UR and 9G1PD.

Back in the January issue I mentioned the thought of re-starting the HPX Ladder. The only response came from **Ray Dix** (High Wycombe) who put in a starting list of 222 prefixes of which I have serious doubts about just one - a YY4GLF who might be legitimately in Venezuela as a 'special' of some sort but equally might be Venezuela Slim - anyone comment on this one?

Incidentally, it'll need a couple more entries before we can run it as a Table - so what about it, folks?

Now we turn to the letter from **Ted Trowell** on the Isle of Sheppey. Ted is c.w. all the way, and on Top Band around 0600 he noted P40W, N1NY, W2RE, N9US, N4AR, P4/K2LE, OY9JD, W2GD, W4ZV, W3LPL, N2RM, EA6ACC, while a look at 2000 produced OY1CT, and at 2300 OY3QN, PJ9/W1WEF, and VK3IO. On 3.5MHz OY3QN again plus OY1G were found around 2000, while on 7MHz at 0100 6Y5/W4SO, CO3BN, PY2BW, HK7AAG, V5/ZS6YG, PY6WLS, KP3A were booked in; at 0700z ZL2CD, JA8BOF, ZL1DYC, ZB2/G4ZVJ; at 1000 Ted noted A71CW, VK3BG, TA2IJ. At 1900 KD7V, 4X4NJ, OY3QN again, K1SS, K2SG, VO1SA; at 2000 V2/DL2SDS, and at 2200 P4/K2LE, ZS6FOC, and 9Y4VU. A peep at 10MHz: at 1700 3W5FM and 9K2MU, and at 1900 PY1ZFO/PY0F were logged.

Snippets

Scarborough Reef seems to be on the cards for a one-week effort as BS7H starting around April 30. A wee bit further ahead, to November, and it is understood that AA8U is looking to operate from Manihiki Atoll for a week, as far away as November.

Now to a question of cards; *DX News Sheet* notes that that several EK amateurs report mail to Armenia being opened and the contents stolen. They have approached the Armenian Ministry of Communications who have promised to try to do something about it. They can still be got at by E-mail at **ampr@arminco.com**

HPX Ladder.

A reminder that you need to log and list 200 prefixes to start - about a good weekend's work - and then to send 'em in. There's in excess of 2000 of them to go at, and we'll make it 'All Time Post War'. A formal set of Rules is in the pipeline, updated from the original.

Finale

That's it for another time. Letters, comments, Ladder entries; the lot; please send 'em to reach me by the beginning of the month at PO Box 4, Newtown, Powys SY16 1ZZ.

Roger Bunney, 35 Grayling Mead, Fishlake, Romsey, Hants SO51 7RU

Satellite TV News

Heavenly Sightings.....

After the move to the new location still no DXing dish has been installed though the unit has been ordered, a 'Reference' 1.2m prime focus with H to H silenced motor drive to sit atop a concreted-in post at 1.6m height. By that time a builder should have knocked a hole through the side of the house and fitted a clay air vent as a cable duct for the dish(es), TVDX antenna system and s.w. antenna. I stress 'silenced motor drive'! Previously the 600mm actuator arm that drove my dish produced a noticeable rasping whine and reports from other readers suggest that drive arms, particularly if fitted on tracking wall mounted dishes produce dramatic surface noise 'propagation', sufficient to annoy neighbours in semis/terrace dwellings. Another magazine ran a series of 'how to silence your system' and it became apparent that tracking dish noise is a major problem. One easy means of at least 50% noise transmission loss was simply to fill vertical support masts with builders plastics foam filler - having blocked the lower end to prevent it all flowing out!

Again I'm relying on reader's letters this month to fill out my own lack of activity! **Bob French** (Warwickshire) recently installed a 3.1m IRTE dish to allow C-Band reception of NASA TV via the 'Spacenet-2' bird at 69°W. Unfortunately bad news has been received from **Alan Davidge** (Honiton) advising that a recent Internet *Florida Today* news rundown - **http://www.flatoday.com** - detailed a transfer of the NASA TV programming from the 1984 vintage Spacenet-2 to the newly launched GE-2 bird at 85°W, 3.880GHz vertical with audio at 6.8MHz on March 15th. This takes NASA-TV over our South Western horizon and out of UK access though improves sight lines across North America. NASA point out that 44 agency dishes will require realignment though reception quality will improve. NASA-TV transmit live coverage of all Shuttle missions, rocket launches, news, press conferences and educational programming. I personally monitor Astra's BR German transponder (Bayerisches Fernsehen @ 11.141GHz H) as their *Spacenight* programme will always feature live rocket launches from around midnight onwards, recently Intelsat 801's launch was fully covered live (28 February '97). The new craft incidently will be slotted at 64°E (Indian Ocean) and provide high power Ku/C-Band downlinks.

SWM reader **John Thierjung** lives in rural Thailand and uses a 3.6m dish with a 600mm actuator drive arm, 20K C-Band LNB feeding several receivers (Drake 700XT, old Drake manual 324E) though his Strong 1500 Mk.2 performs the best with its wide range of threshold extension/IF bandwidth settings. Results for example on BBC World Service via PAS-4 @ 68.5°E with both Drakes give a barely watchable picture, even with the 700XT bandwidth down to 10MHz, the Strong mk.2 and its threshold extension comes into its own. Receiver power supplies need to be versatile since the nominal 220V a.c. falls to 175V during evening rice cooking time! Equipment prices are remarkably low, a 3.6m American KTE dish costs £295 and a local equivalent only £220, both include the polar mount and ground stand. A 2.4m locally manufactured dish weighs in at £165 with 20K C-band LNBs costing only £40.

Odds to relate but within a couple of days another letter arrived from **Alan Smith**, a few miles down the road at Chonburi, Thailand. Alan has just visited his friends a Ipoh, Northern Thailand who in turn have subscribed to the MEASAT-1 Astro digital satellite service. The £400 deal includes the digital receiver, 600mm dish and installation with a £20 monthly subscription for programming, currently some 22 jTV channels are available including the Star TV package, BBC, HBO, Discovery, Disney, etc., etc. Signal quality is excellent with none of the colour blocking as happened in South Africa. The 600mm dish is the maximum allowed in Malaysia, a less than subtle means of censorship since it prevents folk from turning their dishes and watching other 'counter cultural'n programmin, it's just too small to receive anything else!

An interesting story from **Bob Cooper** in New Zealand who comments on problems seen on the BBC TV programme (MPEG-2 digital) via the PAS-2 satellite. Problems have been noted with lip sync - that is the sound is heard slightly prior to the picture. The cause has now been established, the outgoing PAL video signal feed is converted to NTSC which introduces a delay to the picture. Unless a digital audio delay is introduced then the sound signal is transmitted slightly ahead of the picture. The PAS-2 feed however was unusual in that the two audio subcarriers carried on a) audio with delay and b) the original non delayed (PAL pre NTSC conversion). Viewers watching the BBC service in a stereo mode with both audio tracks have heard the rather odd echo effect of the non-sync + in-sync tracks. Lip-sync problems have also been noted by Hugh Cocks (Portugal) on BBC Prime via Intelsat 1°W which is an MPEG re-uplink via Norway, similar effects have been observed on other digital news feeds which suggests an inherent problem with the system?

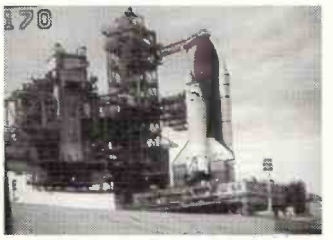
Fred Pilkington (Malaga, Spain - previously Newmarket) is both a licensed amateur, TVDXer and satellite zapper. Odd things have been happening to Fred's reception from Intelsat 707 @ 1°W after fitting a Nokia D2MAC decoder 3002-CS to his Nokia 1700 Mk 2 receiver. Despite the equipment being set up correctly reception was very poor - just as if the decoder wasn't in circuit. Even TV Norge was poor 11.016GHz in PAL. Late afternoon leaving the receiver running the picture suddenly jumped into good quality for no apparent reason! Successive days the same effect happened and noting times Fred established that local darkness was at 1845 (1745UTC) but darkness would hit the satellite around 1907 (1807UTC) and pictures would 'jump up', the 'jump up' timing being later each evening as we leave the Northern Hemisphere Winter. Any ideas for this effect?

Into Spring and the usual Solar Outage period across 2-8 March produced dropout on satellite downlinks as the Sun passed behind each satellite across the Clarke Belt. As **John Locker** (Wirral) comments it is possible to see two Solar Outages on a single satellite such as with the CNN feed across the Atlantic via Intelsat 601 @ 27.5°W which feeds the Astra downlink.

Still overseas but nearer to home at Sandown, Isle of Wight and **Roy Carmen** has been extremely busy with his 1.2m Channel Master dish tracking the Clarke Belt. Fewer news feeds are now being logged, suggesting the increasing use of digital uplinking but there is much activity if you hunt around. Roy has queried about satellite enthusiasts (*SWM* readers) on the Island, if there are any Vecta sat-zappers out there and would like to contact Roy then drop me a line. Over February Roy has noted much activity via PanAmSat 3R @ 43°W, as satellite which has been very quiet and now seems to be coming to life with analoague signals. Most activity seems to be in Telecom band, check out these downlinks - 12.575GHz V; 12.592 V; 12.670 H and 12.702 H. The latter carried a real 'DX' feed, that of 'SATCOM-SNG from ALASKA', standard colour bars and a German news feed in pitch darkness from mega snowy wastes! Another 'bird' worth checking out is Orion 1 - 37.5°W - corporate feeds are often carried via this satellite for clients such as IBM, car companies and the like. Roy noted two transponders carrying a Shell Oil corporate at lunchtime in NTSC ex London reporting their record profits announcement in London. Both

RTP International moves to Hot Bird @ 13°E leaving her former Eutelsat II F2 home at 10°E.

Via Eutelsat I F4 @ 25.5°E, Arena is a UK based facility outside broadcast company.



Most of the American space shots are found somewhere on European satellite, here STS-80 simmers via Eutelsat II F4 @ 7°E.

Rarely seen these days in analogue, the Reuters news room via Intelsat K @ 21.5°W.

Customer information menu via 7°E.

On-going seige footage ex-Lima, Peru, via PAS-3R @ 43°W.

Keith Hamer & Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.

DX Television

Heavy rain and severe gales certainly kept the signals at bay during February. Optimists can only assume that reception conditions will only get better! The only respite was RTP-1 (Portugal) on the 11th identified on Channels E2 and E3 by **Peter Barber** (Coventry). The Sporadic-E opening was short-lived lasting from 1035-1046UTC. **Tim Bucknall** (Congleton) reports weak fluttery signals from the Channel 5 transmitter at Mendip on Channel 37. Test transmissions consisted of a pretty amateur, optically-derived 'Give Me 5' caption which was out of focus towards the bottom!

Fig. 1: Peter Barber's DXing shack in the attic.

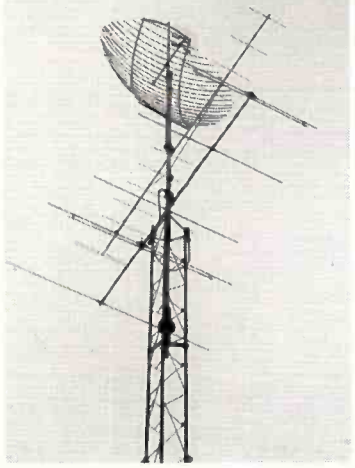


Fig. 2: A selection of antennas used by Roger Bunney during the early Seventies. Note the u.h.f. antenna with a 2m parabolic reflector!

Missing Signals

The lack of activity during the winter months can be very frustrating. **Bob Brooks** (South Wirral) has not seen anything in Band I since last October and wonders if his antenna system is the culprit. Band III seems fine with daily results from RTE-1 on Channel E from Kippure.

If you feel there is something wrong, tuning between 49 and 50MHz should reveal fairly strong multiple carriers, sometimes producing a pulsating effect which interferes with Channel R1 signals. These appear to be data transmissions and are present throughout the UK. If these signals are not visible then suspect something is wrong with either the antenna or the receiver.

In central parts of the United Kingdom, the Dutch NED-1 signal from Lopik on Channel E4 can be detected hovering at noise-level even under flat conditions. Although it might not sound very exciting its presence confirms that the equipment is working OK.

Fig. 3: An example of tuning simplicity: an outboard v.h.f./u.h.f. tuner with simple rotary tuning knob.

Antenna Checks

The first signs of the Sporadic-E season are usually towards the end of April with a larger influx of signals around mid-May. If you have not been monitoring since last summer then now is the time to ensure that the equipment is in working order.

It is advisable to check the condition of the antenna system at least once a year, especially if its performance does not appear to be as lively as it was. **Vincent Richardson** (Gwynedd) noticed a drop-off in Band I reception over a couple of seasons so he decided to investigate. Severe corrosion of the dipole junction box terminals of his crossed dipole array was the culprit. Corrosion had also affected his domestic antenna.

A corroded coaxial plug is a sure sign that water has penetrated the downlead and capillary action has caused water to reach the set-end of the cable. In such cases, the coaxial cable should be replaced and a fresh coaxial plug soldered to the cable. Most dipole junction boxes can be stripped and cleaned, although replacement ones do not cost the earth.

The aluminium antenna rods can also be cleaned until they shine by using a Brillo pad, plenty of soap and a liberal amount of elbow grease. However, this advice carries a warning: remember to remove the bits of wire wool from the Imperial Leather before the head of the house decides she wants to use it again!

Greasing all nuts and bolts associated with the dipole connector box is advisable. Also, apply a generous dollop of grease to the cable entry glands of the connector box lid and ensure that the lid forms a tight fit.

Equipment Run-Down

S.M. Hockenhull (Bristol) can detect weak f.m. radio signals from Croydon under flat conditions on 105.4 and 106.2MHz. A Roberts R817 receiver with a telescopic antenna is used and during recent tropospheric conditions, several French f.m. transmitters were heard including Lille on 105.2MHz. A Roadstar TV400N TV receiver with a telescopic rod antenna is used for u.h.f. TV reception. There is an excellent take-off to the east from Bristol so if you live in that area and want to try DXing then success seems assured.

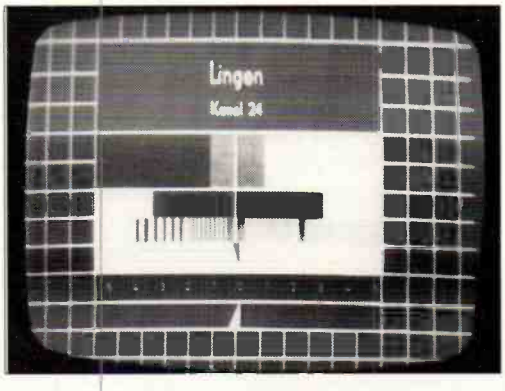
Peter Barber (Coventry) houses all his DXing gear in his loft - see **Fig. 1**. For TVDXing a small-screen Yoko portable is used fed from a tuneable Band I loop antenna. This is visible in the top-left of the photograph. The tuneable loop is very sensitive and low-level Dutch Ned-1 signals on Channel E4 are visible on most days. Other pieces of equipment in use include a Binatone minivision TV receiver and a PRO-2004 Realistic scanner.

Shaun Taylor (Howden) uses a D-100 DXTV converter coupled to a monochrome receiver for monitoring signals. Crossed-dipoles for Band I are currently in use providing multi-directional coverage but a compact VF-100 directional antenna for Bands I/II and III is soon to be installed in time for the Sporadic-E season.

Stephen Michie (Bristol) has been experimenting with an indoor loop antenna for Band I DXing. This feeds a 'Fringe Electronics' Band I amplifier which is connected to a D-100 DXTV converter with reduced i.f. bandwidth. An indoor six-element Band III array and a wideband grid are pressed into service for tropospheric reception. Stephen is able to receive the NED-3 signal from Goes on Channel 35 on an almost daily basis.

Pertti Salonen (Finland) has installed separate outdoor arrays for Channels E2 to R1 and E3 to E4 with

Fig. 4: An unusual FuBK variation from the Lingen ZDF transmitter in Germany.



DX TV Continued From P.67

Fig. 5: Alexanderplatz (in former East Berlin) TV tower photographed by Nick Brown (Rugby).

home-built m.o.s.f.e.t. preamplifiers fitted to each antenna. PIN diode switching is used for antenna selection. Depending on the frequency, the gains of the amplifiers are around 10-15dB with a noise figure in the region of 1dB.

Mast For Disposal

Roger Bunney (Romsey) has moved to a new location and has several dismantled mast sections for disposal. Anyone interested should contact Roger (send an s.a.e.) at the address shown at the top of his 'Satellite TV News' column featured on **page 66** of this magazine.

Band I Interference

Neil Purling (Hull) reports disruption to Channels E2, R1 and E3. He suspects it is caused by two mobile radio channels operating within Band I. In such cases it is necessary to establish what is actually happening.

If an antenna amplifier is used, this must first be removed to conduct further tests since this will only exaggerate the problem. Most commercially available amplifiers use bi-polar technology

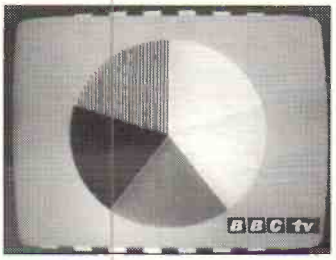


Fig. 6: Does anyone remember this one from the archives? The BBC-tv Schools Tuning Signal used in the early Sixties.

and are, therefore, prone to being driven into cross-modulation by nearby transmitters, e.g. taxi, CB, etc., even though they may operate on frequencies outside Band I. In such cases a bandpass filter connected to the input of the amplifier may help. This will only allow Band I signals through. The use of coaxial stub filters is also another remedy.

Sometimes 6m (50MHz) transmissions can play havoc with Channels E2, R1 and IA especially if a receiver with a wide i.f. bandwidth is used. In such cases a notch filter can work wonders, although some attenuation of the Channel R1 vision carrier at 49.75MHz may be unavoidable. Notch filters are of little use if the interfering signal is on the same frequency as the wanted transmission.

It is possible to connect a second antenna at the input of the receiver and by careful orientation, cancellation is achieved. This technique was particularly successful for removing the UK's Channel B2 sound carrier from the E2 vision frequency (both at 48.25MHz) in the days of 405-lines.

Let us know what interference problems you have had and how you managed to resolved them, assuming that you have been successful!

Keep On Writing!

Please send DXTV reception reports, equipment news, off-screen photographs and general information to arrive by the 3rd of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS, England.

Satellite TV News Continued From P.66

12.585 V and 12.689 H were used for these West bound circuits.

The vintage Eutelsat I F4 @ 25.5°East is also worth checking for UK feeds though she is in an inclined orbit and signal variation over a period of hours will be seen. A good time is approaching 1800 hours prior to the main news and regional magazine programmes. At 1720 the ITN South of England Bureau one evening was seen up at 11.134GHz H via UKI 131 with a news insert from the Winchester Crown Court after the football goal trial. The BBC were seen also carrying goal trial material but they opted for leased ciruits on the French Telecom 2C bird. Telecom 2C is also used for live OB (outside broadcast) feeds for the BBC *Noel's Houseparty* programme between the distant victim and the studio. Sound in Sync (SIS) is often used on the feed so the pictures will jump about unless an SIS stabiliser is in circuit. The OB feed has been seen several times at 12.524GHz vertical. Intelsat K still is active with analogue circuits despite several of the Reuters uplinks having gone digital. The 21.5°W bird has been carrying Westbound alpine skiing in recent times (from Trondheim) for the American networks in parallel with European distribution of the same material on Eutelsats 7 and 10°E. With Portugal's RTP International programme now entrenched via Hot Bird at 13°E, so the old RTP transponder on Eutelsat II F2 10°E (11.656GHz vert) has been pressed into service for several alpine sporting OBs.

News In Orbit

TV channel France 3 opened recently via Telecom 2B - 5°W @ 12.732GHz, check their teletext for programme schedule - and a further satellite channel is now promised. 'Free One' will be carried on the CanalSatellite digital programme package and also via the CGV cable system around France. It's described as a 'popular youth channel' and will target young audiences between the mid-teens and mid-thirties. Disney Channel and Euronews has also joined the French 'Canal Satellite Numerique' package, a programme company that is actively undercutting subscription charges of their main French rival TPS to gain subscribers. Canal Plus are seeking the French government's approval to add both France 2 and 3 channels to the 'Canal Satellite Numerique' digital package. Currently the two public channels are carried on TPS (Television Par Satellite digital package) and Canal Plus want also to include them in its own package.

The new channel 'Style', entrenched in the Viacom digital programme package, has just hit the air waves as part of the Gulf DTH (direct to home) service. 'Style' is aimed at an affluent women's audience and offers fashion, romance, beauty and glamour with a dash of fitness and fun! Viacom now transmit nine channels in their current package.

Czechoslovak TV operator Premiera TV has just commissioned an uplink station for their programme distribution into cable systems across the country. Using MPEG-2 the new earth station has been installed by Advent Comms. and uplinks onto Kopernikus 2 and is the first stage in coverting from the present analogue to digital operation.

It's good news for satellite viewers across Australasia as predicted coverage maps for the late '97 launching AsiaSat-3 will include C-Band footprint coverage into Australia at 35dBW, extending into New Zealand with 31dBW. Similar level footprints meander across India and the Middle East, limiting across Egypt, Turkey and the Ukraine at the horizon. An extensive audience for a single satellite TV transmission coverage! Slotting at 105.5°E trade sources suggest the bird will test prior to Christmas following a tentative early December rocket launch. At the time of writing both digital and analogue channels have booked capacity, AS-3 is replacing the AsiaSat-1 bird.

The claim by the Spanish PAY-TV operator 'Canal Satelite Digital' that it's recently developed digital decoder box will be compatible with other decoders in Spain has produced political reaction from the EU who in turn are seeking a European wide DVB decoder standard. The Spanish government had sought a common standard across Spain and including state broadcaster TVE who are also shortly offering a satellite digital package 'Digital Television Distribution'. The EU have advised the Spanish government to reconsider their present schedule of draft rulings relating to digital TV.

India's state broadcaster Doordarshan has dropped plans to operate a satellite channel on grounds of cost, instead the broadcaster will open a 4th terrestrial channel DD4, financed in part from private investment into the DD3 network. Doordarshan will assist private broadcasters and satellite operators to uplink news feeds from within the Indian boundaries, previously the government had refused any uplinking other than by the established state broadcaster Doordarshan.

The Indian government is about to pass a new Broadcasting Bill restricting foreign ownership/capital in any Indian channel to 49%. Several American media operators have threatened to withdraw broadcasting interests from the region if the act is passed. The new bill will also make compulsory all uplinking for Indian direct channels to be from mainland India itself rather than 'offshore' as is currently practiced.

After much negotiation, the UK's BSKYB has withdrawn from the proposed digital partnership with German operator Kirch/DF1. Instead it's likely that Sky will opt for discussions with the rival Premiere - who in turn has a partnership with the Canal Plus and Bertelsmann media groups.

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

Airband

F-GHJE (070) ATR-42 of Brit Air. ***Chrstine Mlynek***

It's interesting to see our theoretical knowledge of airband procedures working out in practice. On January 9 an S76 helicopter was flying over the North Sea towards an oil rig when there was an engine fire warning.

A distress ('Mayday') call was transmitted to Anglia Radar who in turn contacted the Distress and Diversion Cell at LATCC and also the Coastguard. Two other helicopters (presumably working Anglia at the time) were diverted to the area.

All this is described in *Air Accidents Investigation Branch Bulletin* 3/97 page 53. All ended well, the warning was spurious due to faulty fire detectors.

Around The World

D.P. (North Wales) kept up with the news when in Cyprus on British Forces Broadcasting, 89.9 and 92.1MHz f.m. Aeronautically, a long list of frequencies is in operation, but picking out the more unusual ones (all MHz) we find RAF Akrotiri (Approach 340.25, Ops 358.6, Radar 370.1 & 360.65 and Tower 386.8). Nicosia Area Control Centre includes 123.1 & 124.2 as lesser-known secondary frequencies with military 353.8. Tel Aviv Area Radar is on 121.4.

A long list of London frequencies comes from **A.H. Harrison** (Chester-le-Street) and this appears to up-date some of the published material. So, I've picked out the ones that don't seem to be in the usual publications yet.

Going, then, by what A.H.H. tells me (all MHz): London Mil (East) might include 131.225; other possible London Mil 135.075, 135.625, 135.925, 251.625, 254.825, 263.075, 275.675, 276.775, 277.775, 279.3, 284.3, 291.775, 293.475.

Up till now, London hasn't had that many military frequencies so I wonder if some are for purposes other than *en-route*/airways control? If anyone finds out more details then please clarify!

Again, possible new ones queried by A.H.H. but this time for Scottish Airways are 252.475, 259.175, 259.725, 259.775, 268.925, 292.675.

If flying, A.H.H. would correctly ask for a course change to avoid cumulo-nimbus (CB) thunder-cloud build-ups. These are localised and show up on airborne radar.

They can be hard to spot visually if buried in other cloud layers. Characterised by strong vertical convection currents (that's what's meant by an unstable airstream), often containing hail, lightning and other undesirable conditions, it is easily understood why pilots don't like to fly through them.

I'll list the new Scottish sectors in the next paragraph, but to help **John Weir** (Edinburgh) I'll explain that 123.95, 127.65 & 135.525 are Shanwick Oceanic Clearance Delivery frequencies and 135.575MHz is a LATCC allocation. John sent a list including these and the Scottish Airways frequencies that I give below.

Scottish Airways

En-route sector frequencies changed extensively at the Scottish Oceanic and Area Control Centre (see March 'Airband'). Anonymous of Northern Ireland sends the list of frequencies by sector: Antrim 123.775, Central 132.725, Dean Cross 129.225, Forth High 134.775, Forth Low 124.5, Hebrides 133.675, Moray 126.25, Southwest 125.675, TMA Inbound 126.3, TMA Outbound 124.825, West Coast 127.275MHz.

Where are the sector boundaries? A nice map is provided by **Manager ATC (Airways), National Air Traffic Services Ltd., Scottish and Oceanic ACC, Atlantic House, Sherwood Road, Prestwick, Scotland KA9 2NR**, remember to send a pre-paid reply envelope to hold one A4 sheet.

The low/high divide is FL255 and the April 'Airband' did not list the low sectors. Not all new sectors correspond to the old ones that they replace. At quiet times, Central and Southwest will bandbox onto Dean Cross, whereas Forth Low would bandbox onto Forth High.

Hebrides carries traffic in transit to/from the oceanic control area (under Shanwick) and Reykjavik. TMA inbounds arrive in the Dean Cross sector under control of LATCC, are handed over to Scottish and descended before leaving the sector and handed off to TMA Inbound. Outbounds climbing to at least FL250 will be handed off to Dean Cross for further climb to cruise level prior to being taken over by LATCC.

A.H.H. reminds us that 133.875 was Border Radar but the new arrangement is Pennine Radar 128.675 south of W911D (actually handled by Manchester sub-centre) and Scottish 124.5MHz north of the airway.

Frequency & Operational News

Martin Sutton (CAA) keeps us up-to-date. As described above, it will come as no surprise that B2, B5 and B226 are now on 124.5 (was 133.875MHz) Scottish Airways (Forth Low), I think reverting to an old frequency but new sector boundary.

On the airways, Inverness inbounds may now hold at BONBY on W3D. LATCC frequency changes affect A34, A37, A47, B1, B3, B4, B29, B321, G1, G27, H51, H52, H53, H54, UN564, R1, R8, R12, R14, R37, R41, UR41, R77, UR77, R84, UR84, R123, R126 and W70. As usual, no room here to print all frequencies, but I do have a current list.

If there's one you need, please write in. So far, no-one has sent me such a request so I assume you all have the up-to-date information anyway.

We will all be sorry to learn of the demise of the North Atlantic track broadcast (133.8MHz). I suspect most aircraft receive the information via ACARS now (if not during flight planning).

Oil/gas platforms (as listed in the RAF *En-route Supplement*). A new platform is Glas Dowr with n.d.b. GLD (418kHz) and 130.875MHz for communications.

Other n.d.b. changes: Ravenspurn North RVN now 359.5, Windermere WDN now 424kHz.

Other comms changes: Ravenspurn A,B,C and North now 129.875, Windermere 125.175MHz. Argyll and Forbes AW platforms withdrawn.

Visual reference point Lessay has been renamed St. Germain (Channel Islands). I also have the latest list of s.s.r. transponder codes. If you have a squawk number and want to know what it applies to, write in.

Flight Operations

A local source tells me that Frenchay Hospital, outside Bristol, will soon have 122.375MHz air/ground allocated to its helipad. I'm not sure who at the hospital will operate the ground station.

If I remember correctly from my brief visit there in early 1981, Frenchay has a specialist neuro-surgery unit that might require patients to be flown in. Does anyone know if it's changed much since then?

The RAF produce a booklet of *Hospital Helicopter Landing Sites* and to obtain one, contact the RAF direct. How? Details are in my *Airband Factsheet* and I'll tell you how to obtain that in a moment.

Mark Doyle (County Wexford, Eire) is senior fleet captain at Doyle Air. What do you fly, and do you visit the UK? I think a 160km path from Wexford to Anglesey is too far for v.h.f./u.h.f. propagation except under enhanced weather conditions called lifts.

However, it is a largely sea path so such anomalies are quite possible. If flying to Dublin, says Mark, remember that the "Victor" routes are for VFR traffic.

One of the LATCC relays, as noted by **Ian McDowell**, is at

Airband Continued from page 70

Grantham (131.05MHz), 50km away from Peterborough over flat terrain. This is a marginal path for ground signals to propagate but aircraft transmissions will always be stronger as they are from high enough up to be line-of-sight. I'm not aware of any changes in the ground relay arrangements.

Also on airways, band-boxing was described in March. I can assure **Richard Gosnell G4MUF** (Swindon) that there is nothing new in this technique. The idea is that pilots don't need to be concerned that the system is in operation as they hear all that they need to on the one frequency.

Airports, on the other hand, rarely employ band-boxing except to enable airband ground movements and u.h.f. airside vehicle frequencies to be co-ordinated. Some airshows operate v.h.f. and separate u.h.f. frequencies but without band-boxing.

Heathrow Zone Low Flying

This has received plenty of coverage in the past, not so much recently. Strictly speaking the Zone would only be available to traffic under instrument flight rules but a concession is available to visual traffic. If traffic and weather conditions permit, the controller might allow aircraft through as Special VFR (controlled by radar 119.9MHz).

Unlike general VFR, a radar transponder is required and routes are limited so as to stay clear of Heathrow's own traffic. Clearances are for low altitudes which prevents single-engine aircraft from flying over built-up areas. Traffic often hands off to Thames Radar 132.7 and helicopters have their own routes that pass over Northolt with a call to the Tower there on 124.975MHz.

Interested in these operations is **D.A. Rile** (Hornsey) who needs (might already have?) the chart of *Helicopter Routes in the London Control Zone* from the CAA. To order? Send a self-addressed pre-paid envelope, to hold two A4 sheets, to the Broadstone Editorial offices (not to me!) and ask for *Airband Factsheet*. This lists suppliers such as the CAA and you can now contact them for latest mail-order prices.

While on the subject, G-HEMS, the London Hospital helicopter, has been active round this way in mid-February. However, the medical press is asking whether or not sufficient lives are saved for each pound spent.

Only in the last 18 years or so have I noticed human life to be thought of in this way; before then, it was priceless. I wonder why? Anyway, Richard Branson's Virgin group might be coming to the rescue and negotiations about funding are underway.

Other visitors to the Zone are privately-owned machines belonging to companies such as Lynton and Tarmac. I don't know anything about a landing site at St. Paul's or the frequency for Chelsea Barracks so I throw this open to readers. And, can anyone confirm that London Fire Brigade's new helicopter is still with us?

The next three deadlines (for topical information) are May 19, June 16 and July 21. Replies always appear in this column and it is regretted that no direct correspondence is possible.

Abbreviations

ACARS	Aircraft Communications Addressing and Reporting System
CAA	Civil Aviation Authority
FL	flight level
f.m.	frequency modulation
kHz	kilohertz
km	kilometres
LATCC	London Area & Terminal Control Centre
MHz	megahertz
n.d.b.	non-directional beacon
S	Sikorsky
s.s.r.	secondary surveillance radar
TMA	Terminal Manoeuvering Area
u.h.f.	ultra high frequency
VFR	Visual Flight Rules
v.h.f.	very high frequency

Lawrence Harris, 5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB E-mail: lawrenceh@ndirect.co.uk

Info In Orbit

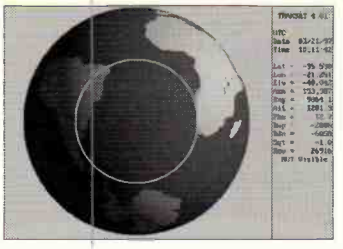


Fig. 1: Footprint on 21 March at 1011UTC.

Fig. 2: NOAA h.r.p.t. image from Martin van Duinen.

I write this opening paragraph on the first day of spring. Images from the various WXSATs have improved dramatically, as they always do in the northern hemisphere every March. The near country-wide blizzard which seemed to paralyse most of the nation just after Christmas has all but faded from memory.

EUMETSAT announced a new transmission schedule for METEOSAT-6 WEFAX and PDUS (low and high resolution images respectively) to come into effect on 1 April (and 1 May). The schedule includes new slots for many re-transmission formats. GMS formats have changed, mainly due to the limit on transmission slot availability. Gone are the GMS A, B, C and D (WEFAX) slots - replaced by GMSN (north) and GMSS (south). The original formats are received via the UK Meteorological Office, from the Bureau of Meteorology in Melbourne, Australia. Some GMS PDUS formats are now included - having the prefix J. PDUS re-transmission slots (from GOES-E and -W WXSATS) come into effect on 1 May - using the prefix E or W.

GOMS whole-disk, infra-red images are now included after acquisition from the Russian Hydrometeorological Service operated by RPO Planeta in Moscow, and acquired three-hourly. These images will be transmitted after the LY, LR and LZ formats from GOES.

METEOSAT-7 is scheduled for launch later this year.

Looking at my satellite dishes in the yard is a little disconcerting! My original 1m METEOSAT dish (some ten years old) is still in routine operation. My old satellite TV dish is now waiting to be sold. The 1.6m METEOSAT PDUS dish lies upside down to prevent wind problems while awaiting sale. I have a new 1.8m dish which is waiting for me to fit a new METEOSAT feed (for my PDUS system), and I recently acquired a new 1.2m drivable dish for satellite television. Most fortunately my neighbours are very understanding! To keep them co-operating, I showed them comet Hale-Bopp - see **Fig. 5** - through my 250mm telescope, followed by a live picture from NOAA-12!

Fig. 3: From Steve Blackmore.

Current WXSATS

METEOR 3-5 was scheduled to be switched off between 20 March and 21 April during the period in which - because of its current orbital plane - it's solar cells receive minimal illumination. Glance at its current footprint - see **Fig. 1** (a screen dump from Traksat v4.01) - or using one of the many satellite tracking programs; the satellite is near the terminator. If you also check METEOR 2-21 you will notice that it is travelling in a similar orbital plane - also under minimal solar illumination. The slow change of the plane of the orbit gradually moves into stronger sunlight, allowing the operators to switch it back on.

METEOR 3-5 Image Quality

The variability of METEOR 3-5 images is fairly well-known. Sometimes the images are properly synchronised (that is, they have two straight edges with clearly defined bars). At other times synchronisation drifts causing picture 'sliding' - non-synchronised image. My suspicion was that the 2.4kHz subcarrier (which carries the image content) was probably unstable. I contacted Timestep's software engineer **Peter Arnold** and asked him about the nature of the problem of synchronising METEOR 3-5 images - as I have experienced using PROsatII. I also asked about the possibility of software using the bars for synchronisation.

Peter kindly explained: "There are problems with the METEOR 3-5 satellite. The subcarrier, which used to be solid, now wanders all over the place. There also seems to be some sort of scanning problem giving fuzzy images even when the synchronisation is perfect. The asynchronous reception mode was designed for older METEOR satellites which didn't have a line rate synchronised to the subcarrier. Unfortunately, the image layout of each satellite is slightly different, which makes reliable synchronisation difficult. The problem with looking for a black/white transition is that there are lots on each line so it is hard to always pick the right one, especially in the presence of noise".

Dave Cawley of Timestep added the following interesting comment on METEOR 3-5 images: "You will notice that the left hand edge (of a sample image) is always perfectly synchronised. Occasionally the right hand edge appears not to be. This is because occasionally the satellite throws a wobbly and sends a line with too few pixels, hence the left edge is OK and there is a progressive slip until it becomes very obvious on the right hand stripes. The satellite has various phases and in its worse state almost every line has a different number of pixels, hence the ragged land/sea boundaries experienced last week".

A few days after my E-mail discussion with Peter, he made available an updated version of PROsatII for me to test. I used it to monitor METEOR 3-5 passes (and a few NOAA ones!). The upgrade includes an extra METEOR 3-5 async mode, and it performed considerably better than the usual sync. mode which is required for METEOR 3-5. The image now syncs within a few line scans, and noise bursts merely force re-synchronisation to take place - losing just a few lines while this happens.

NOAA GOES Launch Imminent

The third in a series of five advanced geostationary US weather satellites is being prepared for a 24 April 1997 launch from Cape Canaveral Air Station, the Commerce Department's National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) recently announced.

The Geostationary Operational Environmental Satellite, now called NOAA GOES-K, will be renamed NOAA GOES-10 once orbit is achieved. It is being processed for launch at a payload processing facility near Cape Canaveral.

NOAA GOES-9 was launched on 23 May 1995, and is currently overlooking the West Coast, out into the Pacific, including Hawaii. It is over the Equator at 135° west longitude at an altitude of 22 239 statute miles. NOAA GOES-8, launched in April 1994, is overlooking the east coast out into the Atlantic Ocean and is positioned at 75° west. NOAA GOES-10 will be stored on orbit at 105° west longitude and placed into operation when needed as a replacement for GOES-8 or -9.

Correspondents' Contributions

There are still few people with high resolution picture transmission (h.r.p.t.) equipment, so when **Dr. Martin van Duinen** of Holland sent me two disks of images, I used one immediately and saved a second for later. Here is the second from his batch of 'Greenland' images, this one showing the eastern coast several months ago. Martin uses a Hansen system which runs on his Pentium PC. This is used to decode the incoming data while he manually tracks the 1.2m dish on a Yaesu G 5400 B rotor.

The image shows a number of features which are barely resolved in a.p.t. images. There is an inlet visible on the south-east coast, which usually becomes visible when the winter coastline has partly melted. This image shows detail down to small iceberg level.

Steve Blackmore uses a Cirkit receiver and has been writing software to utilise the soundboard fitted in his PC. He is one of three authors (that I know about) who have written this type of WXSAT image decoding software. Christian Bock, another author, released his original program on the Internet. Called 'Wxsat', it has recently been issued in an English version. It runs under Windows-95 and NT, and I am currently attempting to configure my soundcard - which came without instructions - to use it. Hopefully I shall be able to describe it in more detail next month. Meanwhile, Steve sent in **Fig. 3**, a picture of Norway and Sweden taken using his own software.

I believe that Les Hamilton was the 'Wxsat' user who suggested to Christian Bock that an English version of his software would be

Frequencies

NOAA-14 transmits a.p.t. on 137.62MHz
NOAA-12 transmits a.p.t. on 137.50MHz
NOAAs transmit beacon data on 137.77 or 136.77MHz
METEOR 3-5 (or 2-21) use 137.85MHz
OKEAN-4 and SICH-1 use 137.40MHz
METEOSAT-5 (geostationary) uses 1691 and 1694.5MHz for WEFAX
GOES-8 (western horizon) uses 1691MHz for WEFAX
MIR 143.625MHz and 145.55.

popular; he sent me **Fig. 4**, an infra-red NOAA image taken with the new version.

Tracking Software - Computer Requirements

I have received a number of requests for tracking software to be run on old 286 computers. Satellite tracking programs are generally written for running on PC-compatible computers, such as those using the 386 chip or better. I have successfully run Instant Track, Track II, PC Track, STS Plus, Traksat and Winorb on my older 386 computer before I upgraded the motherboard. That computer is now an 486DX2 running at 66MHz and all these programs worked acceptably fast during testing. The latest versions of these programs (those which have been upgraded) run well on the Windows-95 platform and (where appropriate) under DOS.

Those with older 286 motherboards can usually upgrade their machines to an 486 processor at minimal cost; this opens up a much wider choice of software for satellite tracking and decoding. The main caution is that some proprietary computer chassis are not of standard dimensions, so if you are contemplating such an upgrade, do check with your supplier that the new motherboard will physically fit inside. With prices having fallen considerably during the last two years, machines with fast processors, such as the Pentium, can easily cope with heavy calculation demands, including those required when running a program displaying multiple satellite footprints. You may also need to buy new RAM chips for the upgrade.

Beginners - Kepler Elements (part two)

Many letters have requested an explanation of Kepler elements - the data sets used to keep satellite tracking programs accurate. Last month I discussed the term 'Epoch', usually the first parameter in a set of elements; it is the time at which the measurements were made and processed. The element sets themselves can be presented in various ways and, perhaps somewhat confusingly, may not be totally consistent. We have NASA 'two-line elements' and the AMSAT format - each conveying the same data but in differing ways.

Fig. 4: NOAA-14 image from 3 March from Les Hamilton.

NASA's 'two-line elements' are sets containing two lines of orbit data per satellite, (prefixed by a short line giving the common name of the satellite) and written to a specific format. The following example shows a sample of 'two-line' data for the Russian Space Station MIR:

MIR
1 16609U 86017A 97070.54145337 (remaining data excluded)
2 16609 51.6506 (remaining data excluded).

Line 1 starts with the satellite's object number - which for MIR is 16609. The second parameter (86017A) gives its International Designator (catalogue number) which relates to its launch date (1986) and hierarchy. The 'A' indicates that this part (MIR) was the main payload in the launching rocket. The third term in line one is the Epoch (explained last month) - shown here as day 70 (with decimal .54145337) in 1997. Other parameters in line one include derivatives and drag coefficients (to be summarised in future months). Line 2 repeats the catalogue number, then gives the satellite's orbital inclination, RAAN, Argument of perigee, mean anomaly, mean motion, revolution number, and finally, a checksum. To decode two-line elements for manual entry (unusual these days because most computer programs accept the data as a file on a disk) you therefore require the information to extract the data. I provide such a sheet to those requesting the bulk Kepler files on disk (see near end of column).

The AMSAT format lists these parameters line by line and is therefore more convenient for manual data entry. The monthly Kepler printouts that I post, give each parameter separately, so require no decoding.

Having defined the Epoch, the next parameter - inclination - is straight forward; it defines the orbit's tilt with respect to the earth's equatorial plane. To illustrate this, consider a satellite in an orbit having an inclination of zero degrees. It orbits above the equator, with an orbital period (the time taken for one orbit) that is related to its height above the equator. Geostationary satellites orbit at about 35 780km above the earth, an orbit in which the revolution period is just under 24 hours.

Fig. 5: Comet Hale-Bopp as seen by Lawrence.

Imagine a satellite with an orbital inclination of 51°. It will pass over latitude 51°, both north and south on each orbit. MIR has such an inclination, so it passes over Britain several time per day. A satellite having an inclination near 90° passes over both poles on every orbit. NOAA and METEOR satellites have orbital inclinations near 90° so that they pass over every place on earth at least once each day.

Internet Site Update

Those familiar with the Internet may know of many software packages which users can set to visit 'search engines' on the Internet. These programs are freely available and use the engines to quickly find web sites, using little more than key words. I acquired a selection of such software, both commercial and freeware. Using 'WebFerret' I recently collected a list (well, the first 45 anyway!) of sites containing the word 'satellite'. Amongst the numerous satellite television, GPS and other contenders, I found the 'International Weather Satellite and Imagery Centre'.

This is a web page maintained by L. David Baron of Conestoga High School, which is located about 32km from Philadelphia in Pennsylvania. It is a well laid out web site, including essential information about WXSATs and has a selection of images, though in some cases they were rather elderly. Delving more deeply into the links I found that David had included forecasting and meteorological theory, so it is far from merely being another 'pretty pictures' site. There are a large number of links to sites having original images, which helps makes the site worth a visit.

http://www.t-e.k12.pa.us/~dbaron/satellite/

Shuttle Launch Schedule

Flight STS-84 is currently scheduled for launch on 15 May at 0807UTC. This will be the sixth MIR-Shuttle link-up and includes delivery of the Spacehab double-module.

STS-85 (Discovery) is scheduled for launch on 17 July at 1506UTC.

Kepler elements - MIR and Shuttle

1) For a print-out of the latest WXSAT elements, MIR, and the Shuttle (if in orbit), send a stamped addressed envelope and secured 20p coin or separate, extra stamp. Transmission frequencies are given for operating satellites. This data originates from NASA. Kepler elements are sent by return-of-post.
2) I also send monthly Kepler print-outs to many people. To join the list please send a 'subscription' of £1 (secured, plus four self-addressed, stamped envelopes) for four editions.
3) You can have the data as a computer disk file containing recent elements for the WXSATs, and a large file holding elements for thousands of satellites. A print-out is included, identifying NASA catalogue numbers (for the WXSATs, Amateur Radio satellites, and others of general interest), ideal for automatic updating of your tracking software. Please enclose 50p with your PC-formatted disk and stamped envelope.

Monitoring The Shuttle

John Sharman of Reading was one of many readers asking for information on Shuttle monitoring. This fascinating project requires a general purpose receiver and suitable antenna, selected for the particular band which you wish to monitor. By far the easiest method (at least I think so!) is to aim to tune into WA3NAN, the amateur radio group at Goddard which re-transmits live Shuttle voice telemetry. They may be heard on 3.860, 7.185, 14.295, 21.395 and 28.650MHz depending on propagation conditions and a wealth of other parameters

A comprehensive listing of all Shuttle flights and payloads, together with associated information, is available from me as the *Shuttle Pack*. Launch information is updated from NASA's daily STS press releases. The booklet gives hints from WA3NAN on the best methods to hear them. Please include a secure £1 and stamped s.a.e. for the A4 booklet.

Mike Richards G4WNC, PO Box 1863, Ringwood, Hants BH24 3XD. Internet: mike.richards@dial.pipex.com

Decode

All the Data Modes

Hells Bells!

Now what's he on about?" I hear you say! No, I haven't gone completely off my trolley, but I am going to talk about a very old utility mode that I'm trying to reintroduce. If you read my 'Bits & Bytes' column in *Practical Wireless* you will find that the latest edition devotes quite a lot of space to describing this antique communications system. The systems has its origins before the Second World War when the German scientist, Dr. Rudolf Hell, designed a novel form of printing telegraph. Being designed by Dr. Hell and used to transmit script, it became known as the Hell-scripter or Hellschreiber. The important difference between this system and RTTY as we know it lies in the way the message is encoded and subsequently transmitted. Whereas a RTTY teleprinter responds to a keypress by generating a five-unit code to represent the character, the Hellschreiber employs a FAX-like system. When the operator presses a key a rotating encoding drum produces a representation of the character based on a matrix of fourteen horizontal lines and seven vertical lines. You can see what I mean by taking a look at **Fig. 1** where I've shown the letter 'A'.

For transmission over a radio link this is converted to a series of on/off transmissions rather like Morse code. The transmission starts from the bottom of the first vertical line and follows through to the bottom of the next and so on until the message is complete. The great beauty of this system is that it can be sent using the most basic of transmitters. It's simple nature also makes it surprisingly effective under poor signal conditions, but more of that later. At the receive end, the electromechanical system employed a fast spinning heilical screw thread was coated in ink. A small hammer was then used to tap the paper into contact with the thread in synchronisation with the incoming signal. This action combined with the slow movement of the paper past the screw caused the message to gradually build-up. The result was a printing telegraph that was really a hybrid between a teleprinter and FAX machine.

One of the technical difficulties with the system was the lack of any speed synchronisation between the transmitter and the receiver. If the machines operated at a slightly different speed the message would print diagonally across the tape rather than neatly along its length. This was a potentially serious problem but Dr. Hell applied a very elegant solution to this potential show-stopper. He doubled-up on the receive mechanism so that the received message was printed twice, one above the other. Although this didn't overcome the speed problem, it did make sure that all parts of the message were readable. As one line of the message started to fall off the bottom of the paper strip, you simply carried-on reading from the line above.

In operational conditions the Hellschreiber proved to be extremely resilient for such a simple system and it's worth taking a look at why this should be. The first point is it's very simple transmission system. With a comparatively slow data rate it only needs a narrow bandwidth to operate effectively. In addition all the transmission power is used to carry information unlike speech broadcasts where much of the energy is taken-up by superfluous sidebands. Perhaps the main reason for the Hellschreiber's resilience is the creation of the FAX-like image at the receiver. Whereas RTTY attempts to work-out the transmitted character and then prints a perfect copy, the Hellschreiber just produces a series of dots in the general shape of the letter. In this way it takes advantage of the brain's excellent pattern recognition skills to make out the letter. In a RTTY system the teleprinter has to do the conversion and it's nowhere near as smart as you or I!

Now having whetted your appetite, you're probably wondering what I expect you to do about it! Well, I've located some software on the Web that recreates this fascinating mode on an ordinary PC. The program is called Hell Script and can be found by visiting: **http://www.ife.ee.ethz.ch/~sailer/pcf/** and downloading the file hs-v9610.zip. The other great advantage of this program is that it has been designed to use a standard Hamcomm/JVFAX comparator interface which makes it extremely easy to use. If you'd rather build your own interface there are a number of designs included in the program files. Once you have your interface connected-up, literally all you have to do is load the software, read the set-up instructions and away you go.

Just one thing though - where can you find a Hellschreiber transmission to monitor? Thanks to a few enthusiastic amateurs, the system is being kept alive and active. The times to listen are Sunday at 1330CET on 7.035MHz and in the evenings at 1630CET on 3.580MHz. It's also rumoured that Beijing Radio use the system for internal news. The frequencies I have are: 5.5264, 8.122, 10.117, 14.367, 14.545, 16.025, 16.032 and 18.237MHz. As far as I can tell the transmissions have ceased, but if you know of any active commercial frequencies, I'd be very pleased to hear from you. The Hell Script program appears to be very well thought out and even includes a nifty little bandpass filter. This has been created in software and includes fully adjustable upper and lower cut-off frequencies. If you have any more information on Hellschreiber transmissions or software please write and let me know.

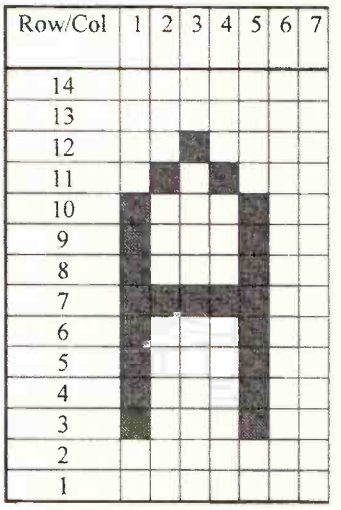


Fig. 1: Hellschreiber Character Matrix

Secrets For Sale!

No not really, but a welcome relaunch of what was always one of the most popular utility frequency lists. Yes, It's the all new 10th edition of *Ferrell's Confidential Frequency List.* Publication of the list has now been taken over by PW Publishing Ltd. and the compiler, Geoff Halligey has made full use of data from a number of well respected sources. Both Stephen Newlyn and Day Watson have assisted and Geoff has been given use of the vast array of up-to-date information available from the World Ute News Club (WUN). This provides the frequency list with good credibility though it can never be completely up-to-date.

I'm glad to see that the publishers have kept the wire binding as this is a real boon for both making the list easy to use, and preserving its working life. Without this neat binding a 450-page book, such as this, develops a remarkably strong will to automatically close itself! The layout of the list has been kept very simple and uses a common format throughout. The first 340 pages are devoted to a straightforward, no nonsense frequency listing running from 1605kHz through to 30MHz. Excluded from the list are all broadcast stations and anything below the 1605kHz lower limit. This latter point should be noted if you have an interest in the v.l.f. utility transmissions.

The main frequency listing is separated out into the broad ITU service bandings with good use of abbreviations to keep the listing readable. Each listing starts with the frequency in kHz followed by mode, callsign, location, type and a remarks column. Where the mode section indicates a digital transmission the remarks column is used to provide further clarification. For example the entry for DDH9 on 11039kHz includes the remarks "400/50:Nav. wngs. & Meteo 0600-2100". This indicates that the station was using 400Hz shift RTTY at 50 baud and could be found sending navigational and meteorological warnings between 0600 and 2100hrs.

The basic frequency listing is supplemented by what is called a reverse listing, indexed by callsign. This listing uses a pink paper and for each listed callsign provides the station location, type, mode plus all the frequencies used by that callsign. The final few sections contain a selection of reference information including callsign allocations to country, location indicators, frequency allocation summary, GMDSS dedicated channels and a full NAVTEX listing.

Readers Special Offers

If you'd like a copy of Hamcomm/JVFAX, etc. I've arranged a very special offer with the Public Domain and Shareware Library (PDSL). They have put together a library set of all five disks for just £12.00, all inclusive. Using PDSL also makes ordering simpler as they accept all the usual credit cards so you can order by 'phone - you don't even have to write a letter. Please direct all orders and enquiries about this disk set to **PDSL, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: (01892) 663298** and request library volume:H008739abcde. IBM PC Software(1.44Mb disks): Disk A - JVFAX 7.0, HAMCOMM 3.1 and WXFAX 3.2 Disk B - DSP Starter plus Texas device selection software. Disk C - NuMorse 1.3 Disk D - UltraPak 4.0 Disk E - Mscan 1.3 and 2.0

This latter list shows the transmission time, identification letter, station name and country. The new *Ferrell's Confidential Frequency List* is very well presented and will, I'm sure prove to be a very popular choice for many utility listeners. *Ferrell's Confidential Frequency List* costs £19.95 and is available from the *SWM* Book Store. My thanks to the publishers for supplying the review copy.

Less Noise

This is something that all listeners strive for, but how to achieve it is the question. A look through the adverts in this magazine will reveal a host of different products all claiming to help. At the very top of the range you will find the very latest in digital signal processing filters. I've had the opportunity to play with a number of these and they really are quite amazing. If you want to eliminate a number of interfering tones then the automatic multiple notch offered by these systems can't be beaten by any analogue system. If you're into digital utility listening the multiple notch isn't a lot of good as the filter can't tell the difference between interference and the wanted signal and so wipes out the lot! However, the other filtering options in these DSP systems still make it a first choice for noise reduction.

Next in line comes the more traditional analogue filters the most popular of which is probably the Datong range. These excellent compact systems are worth their weight in gold when it comes to striking the best balance between bandwidth and error rates.

Now my real reason for this preamble is to introduce you to a new, but extremely effective, little filter from Lake Electronics. Alan Lake has been in the business for a good few years and has built himself a reputation for producing excellent value for money products for short wave listeners and radio amateurs alike. The latest from this stable is the NRF2 noise reduction filter. This comes supplied in a small 72 x 50 x 26mm plastics box with a toggle on/off switch, a flying lead with a 3.5mm jack and a 3.5mm socket on the side panel. The idea is that you connect this filter between your receiver and either an external speaker or your headphones. The unit is completely passive so there are no batteries to buy and it's extremely simple to use. Once it's been connected in the appropriate lead, you can switch it on and off using the toggle switch. Although it was originally designed to link to headphones or a speaker, there's no reason why it shouldn't be connected in the lead to your utility decoder.

So what does it do? The principle is really very simple and is based around controlling the range of frequencies that emanate from your receiver. Research over the years has shown that effective communication of the human voice requires a frequency range of 300Hz through to 3kHz. This band has become known as the speech band and the majority of the digital systems we receive on the h.f. bands have been specifically designed to operate within that constraint. However, many receivers, especially the cheaper ones, often have poor filter characteristics that allow a much wider frequency range to pass through. Whilst this might at first seems a good thing the extra signals that get through are unnecessary so can be considered as noise. The Lake filter tackles this problem by adding another stage of well controlled filtering after the signal leaves the receiver. As a result, these extraneous noises are reduced and you get a subsequent improvement in the performance of your decoder. The really great thing about the NRF2 is its price, which at just £16.50 plus £1.00 post and packing represents very good value for money. For more information please send an s.a.e. to **Lake Electronics at: 7 Middleton Close, Nuthall, Nottingham NG16 1BX.** My thanks to Alan Lake for supplying the review model.

Fig. 2: Sample Hellschreiber Message from LA9IHA.

Start-up

I often feel I'm repeating myself, but there really is constant supply of new listeners that want to have a go at utility monitoring, so here we go with a very brief introduction to getting started. The very simplest way to start is to make use of an IBM PC, preferably one with a 286 processor or better, though some of the programs will work on the slower processors. Next you need a half decent communications receiver. The bottom end is something like the popular AKD Target 3 and the top end is probably something from NASA! Now you need to lay your hands on a copy of HAMCOMM and JVFAX. These two shareware programs provide access to RTTY, ARQ, NAVTEX, FAX and SSTV so cover all the main modes you need. Obtaining a copy is really very simple. You can take advantage of the Reader's Offer at the end of this column, or you could pick-up a copy from the Internet or one of the many shareware supplies that can be found at a radio rallies. Now you need to sort out the connection between your receiver and the computer. Both these programs use a very simple interface that's available from various suppliers in kit form or ready built. With many of these suppliers you will find that they can also supply the software, thus making a one-stop-shop. From personal experience and letters from readers I can recommend Pervisell as having provided a very good service at a reasonable price for a number of years. Once you have all the bits all you have to do is keep reading 'Decode' to learn where to look!

Amiga Software

I'm always being asked for details of software suppliers for computers other than the standard PC so I was particularly pleased to hear from **Jim Prestoe** of Priory Software. He read my request for help in the March issue and has supplied a complete catalogue of the range of Amiga software that he supplies. Included within this list are a number of programs that I'm sure will appeal to 'Decode' readers. Whilst there were no direct off-air decoding systems like Hamcomm or JVFAX there were a few supplementary programs that could prove useful. One such program was WeatherDecoder. This relied on the use of an external decoder such as the PK-232 or the ASCII output from a microreader. This was fed to the Amiga's serial port and the program would then decode SHIP and SYNOP weather transmissions into plain text. A second program called Aero-WXDecoder performed a similar function but was designed to handle ARP reports from Bracknell Met. To supplement these secondary decoding programs are a selection of database systems that have been tailored for the utility enthusiast. These could be used for aircraft spotting, logging and Selcall records. The programs seemed to be very reasonably priced with those mentioned here ranging from £6.00 - £9.00. For more details send an s.a.e. to **Priory Software at 7 The Priory, 137 Priory Road, Hungerford, Berks RG17 0AP**. My thanks to Jim Prestoe for supplying this information.

Jerry Glenwright, 23 Downland Avenue, Southwick, West Sussex BN42 4RF. Internet: j.glenwright@ndirect.co.uk

ShackWare

As I write, the evenings are lighter and the barometer is swinging wildly from high to low and back again but one or two high-pressure afternoons have provided some excellent utilities signals, especially from one of my favourites: 9.318MHz, the US Navy station in Iceland.

Apologies to anyone who has had to wait longer than is reasonable for a personal reply. We're moving house having sold this one but without actually having found another to buy. That means that we're packed but still resident, and digging out computers and receivers to test ideas as answers to queries is not easy!

Mailbag

The last 'ShackWare' instalment consisted of nothing but letters such was the backlog from my mail bag. This time, I'm keeping them brief but, as always, anyone who requested one (and included an s.a.e.) has already had a personal reply.

First out of the bag then, is another letter from **Geoff Chance** of Redruth, Cornwall who noticed **Andy Hall's** plea for help with Spectrum decode hard and software in the last instalment. Geoff included a letter to Andy that I forwarded for him and has a number of J & P Electronics items as well as several Spectrums that he would like to pass on to s.w.l.s. Interested 'ShackWare' readers can write to Geoff care of me. Thanks for your help Geoff.

Mike Huson owns a Spectrum +3 and an Amstrad PPC512 and would like to know if there's radio software to support the machines - I think you probably all know my answer to *that* one by now! I answered Mike's letter with details of the excellent Technical Software's decode packages which handle everything from FAX to RTTY, SSTV to c.w.. Mike's other computer, the PPC512, is an interesting beast by the way - see the 'Quarterly Computer Cameo' elsewhere on this page.

After reading about the Atari ST's lack of support software, **Steven Overall** of London dropped me a line, describing himself as a "great Atari ST fanatic" who uses "a PD library which has simply loads of radio-related and comms programs on offer". What's more says Steven, disks are just £1.50 each. Contact **LAPD** at **PO Box 2, Heanor, Derbyshire DE75 7YD. Tel: (01773) 605010/761944**. Steven also suggests joining the FAST Club which offers "a good few ham programs". Contact **FAST** at **PO Box 101, Nottingham NG2 7NN. Tel: 0115-945 5250**. Thanks for that Steven.

Thanks also to **Alan Burnett-Provan** of Solihull who read of 'neighbour' **Keith Cope's** difficulty decoding utilities and wrote to me with his phone number and an offer of help which I duly popped into the mail to Keith.

Arthur Timeley of Maidstone writes to say he's returning to the s.w.l. fold after an absence of several years and has a BBC with which he used to control his receiver, but which is now surplus. Would any s.w.l. like it? I'll forward all letters.

Finally, **Ron Haste** of Exeter writes detailing his experiences with Technical Software's hard and software solutions over the years. Intriguingly, Ron now owns the actual BBC that Technical Software used for development. What's more, he also has the latest RX8 program, on disk, and *permission to copy it for anyone interested!* An offer that can't be refused. I've requested a copy which I've yet to receive but I watch the letterbox with barely disguised excitement. Ron also has a couple of spare BBCs complete with RX8 ROMs. I'll forward your letters...

This leads on to something which I've been considering for some time: acquiring the rights to 'obsolete' commercial decode and other radio software and making it available once again via the column for a nominal sum (say, £50 per disk ... I'm joking!). The Technical Software offerings for various machines are perfect examples as is say, Timestep's BBC WXSAT software. While it's no longer commercially viable to reproduce and distribute this stuff, it's still wanted by many enthusiasts. If any commercial supplier who has now moved on to pastures and platforms new is reading this, please get in touch.

Power, But at a Price?

Last time, I talked about the dearth of decent radio software available for the Atari ST which seems a great pity given the machine is a capable computer with reasonable graphics and i/o ports. I mentioned that the one competent decode program I'd seen for the machine appeared in Mike Richards' 'Decode' column a year or two ago but had disappeared without trace. That mention was by way of casting a fly upon the water in the hope of attracting a suitable fish...

A week or two ago, I had a very interesting E-mail from **Dave Miller** who cheerfully informed me that he was indeed the programmer. Here's an abridged version of his missive:

"[As well as FAX] I got the APT code working and decided to try decoding c.w. also. The software uses a comparator interface similar to JVFAX but the input is CTS instead of DSR which is not supported on the Atari. This made it very susceptible to noise between the c.w. tones which I wasn't happy with so I had a go at RTTY instead. The RTTY decoding worked fine but unfortunately that is where it stopped..."

A job move, house sale and new baby forced the project onto the back burner but, says Dave, he's now programming again.

"I have now got back into programming and have decided to start by up-dating a program I wrote several years ago. It is a RTTY/SITOR decoder using a standard RTTY tuning unit. It works OK but uses a fairly basic and non-standard user interface. I am working on a GEM interface which will use normal drop-down menus and dialogue boxes. When that is finished I will get back to the FAX program."

Dave concludes by saying "it's great to own computers that don't cost thousands, but it is good to be able to write your own software which hasn't all been done before, as with PCs."

Now I think what Dave needs is plenty of encouragement to finish his software. I know many of you will want a copy of the fruits of Dave's labour so why not drop him some cheering words of goodwill (care of me) which will help spur him to complete the project?

More power to your programming Dave - I can't wait to see the results (and a copy of your original FAX program would be very welcome in the meantime!).

Amstrads

Launched by Amstrad sometime around 1988, the PPC was one of the first of the new breed of PC compatible luggable lap-tops, and sported a variety of configurations including a top of the range 640K machine with twin 3.5inch disk drives, a V22bis 2400 baud modem (state of the art at the time), full size keyboard and l.c.d. screen. Behind a fold-down flap at the rear, there was a full compliment of i/o ports including a standard parallel port, a serial port (fine for use the Hamcomm comparator interface), a nine-pin CGA monitor port (remember this was the '80s) and a user port giving access to the bus.

It was a reasonable stab at portable computing for its time, but the PPC's unusual shape – *very* oblong and with a handle at one end, rather than the now universal A4 size – together with its hard to read non-back lit screen ensured a swift end, though it was always treated with affection in the computer press of the day (I know because I was writing for the computer press at the time!).

I have a PPC640K with modem and, running Hamcomm, it makes a fine portable decode station when coupled to my Sony SW100E and powered from the 12V outlet in a car, though Hamcomm's 'scope functions refuse to do anything other than freeze and the computer's plastics case emits a *lot* of noise. Presumably, a version of JVFAX earlier than the current 7.xx (ie. one that supports CGA graphics) would also work too, though I've yet to try.

PPCs are widely available and never for more than say, a 'tenner' or thereabouts. There's a range of add-ons, including an expansion box for 8-bit PC cards, a hard drive unit, 5.25in drive and even a backlight modification for the screen. Look out for PPC job lots in magazines such as *Micro Mart*.

Satellites For Windows

Trawling the 'net a few months ago I happened on a link to an excellent bit of weather satellite decode software which makes use of a Soundblaster-compatible card for signal rectification, thereby obviating the need for a separate interface between receiver and computer. Rather unusually, the software ('Wxsat' if you're using a 'web search engine) works under Windows (even 'legacy' versions 3.xx) and offers one or two noteworthy features such as a comprehensive selection of synching options and a save to disk feature which enables you to digitally record an entire pass as a .WAV file.

Space prohibits me from giving you a full review of this program so suffice it to say that despite being entirely in German, it's perfectly possible to navigate your way through it and the results are excellent. I'll try to provide a review with greater depth in a future 'ShackWare'.

Until next time, keep the letters coming (s.a.e. for a personal reply), good listening and good luck mating old silicon to high-tech receivers!

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

LM&S

Long, Medium and Short Waves

If you enjoy searching the broadcast bands and use LM&S as a guide, then do bear in mind that some broadcasters may alter their short wave transmission schedules in March, May, September and/or November to compensate for seasonal changes in propagation.

Some of the s.w. data herein may no longer apply when this article arrives on the bookstalls. If you encounter any changes please make a note of them and then send the details to me for inclusion in LM&S.

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT).
Unless otherwise stated, all logs were compiled during February.

Because the 2MW transmitter at Allouis, France on 162kHz was inoperative for a few hours on February 3 **Tony Stickells** (Thornton Heath) was able to hear the co-channel Turkish Radio Television (TRT) 1MW transmission from Agri, Turkey. At 2352UTC it rated SINPO 32223. On the 9th the signal from DLF via Donebach on 153kHz was weaker than usual and he was able to log R.Romania via Bod as 41222 at 2226.

During at least two evenings the sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanisseta, Italy on 189kHz reached the UK. On the 2nd **Norman Thompson** (Oadby) noted them as 'just discernible' at 2045 and on the 11th **Tony Stickells** logged them 32333 at 2221.

Medium Wave Reports

Favourable conditions for the reception of m.w. broadcasts over transatlantic paths were noted during some nights. Those from CHAM on 820 were heard around 0200 on the 6th, 9th & 10th by **Robert Connolly** in Kilkeel, a typical rating being 22332. On the 10th **Harry Richards** (Barton-upon-Humber) used an 'unaided' Grundig Yacht Boy 210 to log WLPZ on 1440 as 24232 at 0245 and WNRB on 1510 as 34333 at 0300. Tony Stickells compiled his interesting list between 0100 & 0130 on the 16th & 17th. In Wallsend, **David Edwardson** searched the band during the nights of 1-3, 6-9, 14-21 & 26th. Several stations in C/S.America were heard on the 15th but only R.Dos Mil, Venezuela on 1500 was identified, which peaked 25552 at 0535. In the extended portion of the band he found WJDM on 1660, which rated 25552 at 0659.

Broadcasts from some of the m.w. stations in the Middle East and N.Africa also reached the UK after dark - see chart. Those from VOA via a 600kW relay in Kuwait on 1548 were received on the 8th by **Clare Pinder** in Appleby. They rated 42222 at 2149.

Over on the Isle of Wight, **George Millmore** (Wootton) found the conditions exceptionally good on the 20th - at 2130 the 2000kW transmission from Duba, Saudi Arabia on 1521 rated SIO444. During the month he logged 47 Spanish outlets, although many were weak.

The sky waves from the JRTV 2000kW outlet at Ajlun, Jordan on 801 were picked up by Tony Stickells on the 21st - at times they were quite strong (42322 at 2353) but there was co-channel interference from a German station.

Some information about a new ILR station called 'Magic 1548' has been sent to me by **Eric Shaw** in Chester. The new station is intended to serve listeners in N.Wales, Cheshire and Merseyside and replaces Radio City 1548 AM, which ceased operation on March 16.

New names have been adopted by some ILR stations. **Brian Keyte** (Bookham) tells me that Chiltern is now just 'Classic Gold', but 792 and 828 are added during local advertisement breaks. Up in Galashiels **Ross Lockley** has noticed that Max AM in Edinburgh on 1548 is now called 'Forth AM'. Also that Great Yorkshire Gold has become '1278 and 1530 AM West Yorkshire'.

Short Wave Reports

Until the propagation conditions in the **25MHz (11m)** band improve it may not be used for broadcasting.

Daily variations in propagation occur in the **21MHz (13m)** band. When favourable the Voice of Turkey 21.715 (Tur to W.Asia, Australia 0500-1000) was rated 55555 at 0830 by **Vic Prier** in Colyton; R.Australia via Darwin on 21.725 (Eng to Asia 0630-1100) 44545 at 0930 in Oadby and 35543 at 1021 in Wallsend; R.Prague via Litomysl 21.705 (Eng to S.Asia, W.Africa 1000-1030) 25342 at 1015 by **Michael Griffin** in Ross-on-Wye; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 25433 at 1031 by **Darren Beasley** in Bridgwater; BSKSA Saudi Arabia 21.495 (Ar [Holy Quran] to S.E.Asia 0900-1200) 55444 at 1040 by **John Slater** in Scalloway, Shetland; RFI via Issoudun 21.620 (Fr to E.Africa 0800-1500) 24422 at 1207 by **Rhoderick Illman** in Oxted; BBC via Ascension Is 21.660 (Eng to W/E/S.Africa 1100-1700) 34333 at 1250 by **Stan Evans** in Herstmonceux; RFI via Allouis? 21.580 (Fr to Africa 0900-1600) 23222 at 1325 in Kilkeel; UAER, Dubai 21.605 (Eng to Eur 1330-1355) 45243 at 1334 by **Eddie McKeown** in Newry; BBC via Limassol, Cyprus 21.470 (Eng to S/E.Africa 1300-1700) 15341 at 1520 in Chester; WYFR via Okeechobee, USA 21.525 (Eng to Eur, Africa 1600-2000?) 25333 at 1653 by **Fred Pallant** in Storrington.

The propagation conditions in the **17MHz (16m)** band also vary daily. During the morning R.Australia via Darwin 17.715 (Eng to Asia 0000-0830?) rated 34333 at 0740 in Herstmonceux; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) 25333 at 0900 in Storrington; DW via Sri Lanka 17.820 (Eng to Australia 0900-0950) 32232 at 0945 in Scalloway; DW via Sri Lanka 17.845 (Ger 0600-1355) 32222 at 0930 by **Bernard Curtis** in Stalbridge; RFI via ? 17.650 (Fr to M.East 0700-1500) 45444 at 0956 by **Tony Hall** in Freshwater Bay, IoW; R.Prague, Czech Rep 17.485 (Eng, Cz to W.Africa 1000-1057) 35343 at 1020 in Ross-on-Wye; V of Russia 17.860 (Eng [WS] to S/S.E.Asia 0900-1400?) SIO222 at 1100 by **Tom Smyth** in Co.Fermanagh; BBC via Cyprus 17.705 (Eng to Eur 0900-1200?) 45243 at 1103 in Newry; R.Pakistan, Islamabad 17.900 (Eng to Eur 1100-1120) 45545 at 1105 in Oadby.

After mid-day R.Kuwait via Kabd 17.885 (Ar to Far East 0900-1505) was 34443 at 1230 in Kilkeel; Voice of Greece, Athens 17.525 (Eng to Africa 1240-1250) 54444 at 1240 by **Sheila Hughes** in Morden; R.Romania Int, Bucharest 17.745 (Eng to Eur 1300-1355) 35443 at 1300 in Galashiels; RFI via Moyabi, Gabon 17.560 (Eng to M.East 1400-1500) 24333 at 1415 in Bridgwater; RCI via Sackville, Canada 17.820 (Fr to Eur, Africa 1500-1600) 34433 at 1559 in Oxted; WYFR via Okeechobee, USA 17.555 (Eng to Eur 1600-2000) 33333 at 1605 by **Peter Pollard** in Rugby; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) 34332 at 1630 in Chester; WYFR Okeechobee, USA 17.760 (Fr to Africa 1800-1900) SIO333 at 1828 by **Philip Rambaut** in Macclesfield; R.Nederlands via Bonaire, Ned.Antilles 17.605 (Eng to S/E/W.Africa 1830-2025) 32232 at 1830 in Colyton.

The conditions in the **15MHz (19m)** band have been more reliable than in the higher frequency bands and many stations in several continents could usually be heard during the day. Among those noted before noon were R.Japan via Moyabi, Gabon 15.165 (Eng 0700-0800) rated 55444 at 0700 in Appleby; R.Pyongyang, Korea 15.180 (Eng to S.E.Asia 0800-0850) 22222 at 0845 by **Chris Shorten** in Norwich; Voice of Armenia, Yerevan 15.270 (Eng to Eur, M.East 0930-1000 Sun only) 44333 at 0940 in Scalloway; AIR via ? 15.050 (Eng to NE.Asia 1000-1100) 24432 at 1036 in Bridgwater; BBC via Ascension Is 15.400 (Eng to Africa 0700-1130) 34434 at 1038 in Freshwater Bay; R.Norway Int, Oslo 15.270 (Norw to Eur, N.America 1100-1130) 44344 at 1100 by **Bill Griffith** in W.London; R.Pakistan, Islamabad 15.470 (Eng to Eur 1100-1120) 43333 at 1100 in Morden.

During the afternoon RNB Brazil 15.445 (Eng to N.America 1200-1320) was SIO211 at 1235 in Macclesfield; BBC via Seychelles 15.420 (Eng, Som, Swa to E.Africa 1300-1700) 23222 at 1320 in

Long Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	D*,H*
153	Donebach DLF	Germany	500	A,B*,C,D,G
153	Bod	Romania	1200	G*
162	Allouis	France	2000	A,B*,C,D,F*,G*,H*
162	Agri	Turkey	1000	G*
171	Nador Medi-1	Morocco	2000	D*,G*
171	B'shakovo etc	Russia	1200	A*,B*,C,D*,G,H*
177	Oranienburg	Germany	750	B*,C,D,G*
183	Saarlouis	Germany	2000	A,B*,C,D,F,G,H*
189	Caltanissetta	Italy	10	G*,H*
198	BBC R-4 via ?	UK	?	H*
198	Droitwich BBC	UK	500	A,B*,C,F,G*
207	Munich DLF	Germany	500	A,B*,C,D,F,G
207	Azilal	Morocco	800	D*
216	Roumoules RMC	S.France	1400	A,B*,C,D,F,G,H*
225	Raszyn Resv	Poland	?	A*,B*,C*,D,G*,H*
234	Beidweiler	Luxembourg	2000	A,B*,C,D,E*,G*,H*
243	Kalundborg	Denmark	300	B*,C*,D,G
252	Tipaza	Algeria	1500	A*,C*,D*
252	Atlantic 252	S.Ireland	500	A*,B*,C,D,F,G*,H*
261	Burg(R.Ropa)	Germany	200	C,D*,G
261	Taldom Moscow	Russia	2500	B*
270	Topolna	Czech Rep	1500	A*,B*,C,D,G*
279	Minsk	Belarus	500	A*,B*,C*,D*,F*,G,H*

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

Listeners:-
(A) Sheila Hughes, Morden.
(B) Eddie McKeown, Newry.
(C) George Millmore, Wootton, IoW.
(D) Fred Pallant, Storrington.
(E) Harry Richards, Barton-on-Humber.
(F) Tom Smyth, Co.Fermanagh.
(G) Tony Stickells. Thornton Heath.
(H) Norman Thompson, Oadby.

Medium Wave Chart

Freq (kHz)	Station	Country	Power (kW)	Listener
520	Hof/Hurzburg (BR)	Germany	0.2	D*
531	Ain Beida	Algeria	600/300	J*
531	Leipzig	Germany	100	D*,E
531	RNE5 via ?	Spain	?	D*,J*
531	Beromunster	Switzerland	500	E*,J
540	Wavre	Belgium	150/50	E,D*,J,K*
540	Solt	Hungary	2000	D*
540	Sidi Bennour	Morocco	600	E*,J*
549	Les Trembles	Algeria	600	D*,E*,J*
549	Thurnau (DLF)	Germany	200	D*,E,J
558	Espoo	Finland	100	D*,K*
558	RNE5 via ?	Spain	?	D*,E*
567	Berlin	Germany	100	D*,J,K*
567	Tullamore(RTE1)	Ireland (S)	500	A*,C,E,I,J*
576	Muhlacker(SDR)	Germany	500	D*,E,J*
576	Riga	Latvia	500	E*
576	Barcelona(RNE5)	Spain	50	E*,J*
585	Paris(FIP)	France	8	E,J,K*
585	Madrid(RNE1)	Spain	200	D*,E*,J*
585	Dumfries(BBCScot)	UK	2	C,D*
594	Frankfurt(HR)	Germany	1000/400	D*,E*,J*,K*
594	Oujda-1	Morocco	100	E*
594	Muge	Portugal	100	D*,E*
603	Lyon	France	300	I,J,K*
603	Sevilla(RNE5)	Spain	50	D*,E*
603	Sousse	Tunisia	10	E*
612	Athlone(RTE2)	Ireland (S)	100	A*,C,E,J*
612	Sebaa Aioun	Morocco	300	E*
612	RNE1 via ?	Spain	10	E*,J*
621	Wavre	Belgium	80	D*,E,J
621	RNE1 via ?	Spain	10	J*
621	Barcelona(DCR)	Spain	50	D*,E*
630	Dannenberg(NDR)	Germany	100	K*
630	Vigra	Norway	100	D*,E*
630	Tunis-Djedeida	Tunisia	600	E*,J*
639	Praha(Liblice)	Czech	1500	D*,E,J,K*
639	RNE1 via ?	Spain	?	D*,E,J*
648	RNE1 via ?	Spain	10	D*,E*
648	Orfordness(BBC)	UK	500	E,I,J*
657	Neubrandenburg(NDR)	Germany	250	J*
657	Napoli	Italy	120	E*,J,K*
657	Madrid(RNE5)	Spain	20	D*,E*,J*
657	Wrexham(BBCWales)	UK	2	C,D*,J
666	MesskirchRohrd(SWF)	Germany	150	D*,J*,K*
666	Lisboa	Portugal	135	D*,E*
666	Barcelona(COPE)	Spain	10	J
675	Marseille	France	600	J
675	Lopic(R10 Gold)	Holland	120	A,D,E,J,K*
684	Sevilla(RNE1)	Spain	500	D*,E*,J*
684	Avala(Beograd-1)	Yugoslavia	2000	E*,J*,K*
693	Tortosa(RNE1)	Spain	2	D*
693	Droitwich(BBC5)	UK	150	E,I,J,K*
702	Flensburg(NDR)	Germany	5	D*,J*
702	Monte Carlo	Monaco	40	E*,J,K*
711	Rennes 1	France	300	D*,E,J
711	Heidelberg	Germany	5	K*
711	Laayoune	Morocco	600	D*,E*,J*
720	Lisnagarvey(BBC4)	Ireland (N)	10	E*
720	Norte	Portugal	100	D*
720	Lots Rd,Ldn(BBC4)	UK	0.5	E,I,J
729	Cork(RTE1)	Ireland (S)	10	C*,D*,I,J*
729	RNE1 via ?	Spain	?	D*,E*,J*
738	Paris	France	4	E,K*
738	Poznan	Poland	300	D*,J*,K*
738	Barcelona(RNE1)	Spain	500	D*,E*,I,J*
747	Flevo(Hilv2)	Holland	400	D*,E,I,J,K*
756	Braunschweig(DLF)	Germany	800/200	D*,E,J*
756	Bilbao(EI)	Spain	5	E*,J*
756	Redruth(BBC)	UK	2	D*,E
765	Sottens	Switzerland	500	D*,E,J*,K*
774	RNE1 via ?	Spain	?	D*,E*,J*
783	Leipzig(MDR)	Germany	100	D*,J*,K*
783	Miramar(R.Porto)	Portugal	100	E*
792	Limoges	France	300	D*,E,J,K*
792	Lingen(NDR)	Germany	5	D*
792	Sevilla(SER)	Spain	20	D*,E*
792	Londonderry(BBC)	UK	1	I
801	Munchen-Ismaning	Germany	300	D*,E*,J*
801	Ajlun	Jordan	2000	E*,J*
801	RNE1 via ?	Spain	?	D*,E*,J*
810	Madrid(SER)	Spain	20	D*,E*,J
810	Westerglen(BBCScot)	UK	100	A,C,E,I,J,K*
819	Batra	Egypt	450	E*,J*
819	Toulouse	France	50	D*
819	Trieste	Italy	25	J*
819	Rabat	Morocco	25	J*
819	Warsaw	Poland	300	J*
828	Hannover(NDR)	Germany	100/5	D*
828	Rotterdam	Holland	20	D*,J
837	Nancy	France	200	E,I,J
837	COPE via ?	Spain	?	D*,E*,J*
846	Rome	Italy	540	E*,J*,K*
855	Berlin	Germany	100	D*,J*,K*
855	RNE1 via ?	Spain	?	D*,E*,I,J
864	Santah	Egypt	500	E*,J*
864	Paris	France	300	E,J
864	Socuellamos(RNE1)	Spain	2	E*,J*
873	Frankfurt(AFN)	Germany	150	C,D*,E,J*,L*
873	Zaragoza(SER)	Spain	20	D*,E*,J
873	Enniskillen(R.UI)	UK	1	D*,I
882	COPE via ?	Spain	?	D*,E*,J
882	Washford(BBCWales)	UK	100	C,E,I,J,K*
891	Algiers	Algeria	600/300	D*,E*,J
891	Huisberg	Netherlands	20	D*,J
900	Brno(CRo2)	Czech Rep	25	D*,E*
900	Milan	Italy	600	D*,E*,J
900	COPE via ?	Spain	?	D*,E*
909	B'mans Pk(BBC5)	UK	140	E,I,J,K*
918	Plesivec(Sloven'nR)	Slovenia	600/100	D*,E*,K*
918	Madrid(R.Int)	Spain	20	E*,J
927	Wolvertem	Belgium	300	D*,E,J,K*
936	Bremen	Germany	100	D*,E*,J*,K*
936	Venezia	Italy	20	E*
936	RNE5 via ?	Spain	?	D*,E*,J*
945	Toulouse	France	300	D*,I,J,K*
954	Brno (CRo2	Czech Rep.	200	E*
954	Madrid(CI)	Spain	20	E*,J
963	Pori	Finland	600	D*,E*,K*
972	Hamburg(NDR)	Germany	300	D*,E*,J,K*
972	RNE1 via ?	Spain	?	D*,J*
981	Alger	Algeria	600/300	D*,E*,J*,K*
990	Berlin	Germany	300	D*,E*,J*
990	R.Bilbao(SER)	Spain	10	D*,E*,I,J*
990	Redmoss(BBC)	UK	1	D*
990	Tywyn(BBC)	UK	1	C,K*
999	Schwerin (RIAS)	Germany	20	D*
999	Torino	Italy	20	J*
999	Madrid(COPE)	Spain	50	D*,J,K*
1008	SER via ?	Canaries/Spain	?	D*,J*
1008	Flevo(Hilv-5)	Holland	400	D*,E,J,L*
1017	Rheinsender(SWF)	Germany	600	D*,E*,I,J*
1017	RNE5 via ?	Spain	?	D*,E*
1026	SER via ?	Spain	?	D*,E*
1035	Lisbon(Prog3)	Portugal	120	D*,K*
1044	Dresden(MDR)	Germany	250	D*,K*
1044	S.Sebastian(SER)	Spain	10	E*
1053	Zaragoza(COPE)	Spain	10	D*
1053	Talk R.UK via ?	UK	?	E,I,J,K*
1062	Kalundborg	Denmark	250	D*
1062	R.Uno via ?	Italy	?	E*
1071	R.France via ?	France	?	D*
1071	Brest	France	20	E
1071	Lille	France	40	J
1071	Riga	Latvia	50	D*,E*
1071	Bilbao(EI)	Spain	5	E*,J
1071	Talk Radio UK via ?	UK	?	J
1080	Katowice	Poland	1500	E*,J*
1080	SER via ?	Spain	?	D*,E*,J*
1089	Krasnodar	Russia	300	D*
1089	Talk Radio UK via ?	UK	?	E,I,J
1098	Nitra(Jarok)	Slovakia	1500	D*,E*,J
1098	RNE5 via ?	Spain	?	E*,J*
1107	AFN via ?	Germany	10	C,D*,J*
1107	Talk R.UK via ?	UK	?	E,J
1116	Bari	Italy	150	E*,J
1125	La Louviere	Belgium	20	D*,E*,J
1125	Deanovec	Croatia	100	J*,K*
1125	RNE5 via ?	Spain	?	E*,J
1134	COPE via ?	Spain	2	D*,E*,J
1134	Zadar(Croatian R)	Yugoslavia	600/1200	D*,E*,J*,K*
1143	AFN via ?	Germany	1	C,D*,E*,J*
1143	Bolshakovo(Mayak)	Russia	150	J
1143	COPE via ?	Spain	2	D*,E*,J
1152	RNE5 via ?	Spain	10	E*
1161	Strasbourg(Flnt)	France	200	D*,E*,I,J*
1179	Solvesborg	Sweden	600	D*,E*,L*
1188	Kuurne	Belgium	5	D*,E*
1188	Reichenbach(MDR)	Germany	5	B
1188	Szolnok	Hungary	135	E*
1197	Munich(VOA)	Germany	300	D*,K*
1197	Virgin via ?	UK	?	E,J
1206	Bordeaux	France	100	D*,E,J
1206	Wroclaw	Poland	200	D*,E*
1215	Virgin via ?	UK	?	I,J
1224	Vidin	Bulgaria	500	E*,J
1224	Lelystad	Holland	50	D*,J
1224	Manningtree(V)	UK	0.5	E
1233	Liege	Belgium	5	D*,E*
1233	Virgin via ?	UK	?	J
1242	Marseille	France	150	D*,K*
1251	Marcali	Hungary	500	D*
1251	Huisberg	Netherlands	10	D*
1260	SER via ?	Spain	?	D*,E*
1260	Guildford (V)	UK	0.5	E,J
1269	Neumunster(DLF)	Germany	600	D*,E*,J,K*
1278	Dublin/Cork(RTE2)	Ireland (S)	10	A*,C,E*,I,J,K*
1287	RFE via ?	Czech Rep.	400	D*,E*,J
1287	Lerida(SER)	Spain	10	D*,E*
1296	Kardzali	Bulgaria	150	D*
1296	Valencia(COPE)	Spain	10	D*,E*
1296	Orfordness(BBC)	UK	500	C,I
1305	Rzeszow	Poland	100	D*,E*,I
1305	RNE5 via ?	Spain	?	E*
1314	Kvitsoy	Norway	1200	D*,E,J,L*
1323	Zyyi(BBC)	Cyprus	200	J*
1323	W'brunn (V.Russia)	Germany	1000/150	D*,I
1332	Rome	Italy	300	D*,E*
1341	Lisnagarvey(BBC)	Ireland (N)	100	A*,B,C,E*,J
1341	Tarrasa(SER)	Spain	2	E*
1350	Nancy/Nice	France	100	D*,E*
1350	Cesvaine/Kuldiga	Latvia	50	E*
1359	Arganda (RNE-FS)	Spain	600	D*
1368	Foxdale(Manx R)	I.O.M.	20	A*,C,D*,E*,H,I
1377	Lille	France	300	D*,E,I,J
1386	Bolshakovo	Russia	2500	D*,E*,J*,L*
1395	Lushnje(Tirana)	Albania	1000	D*,E*
1395	Lopic	Netherlands	120/40	E,J,L*
1404	Brest	France	20	B,D*,E,J*
1413	Masirah Is(BBC)	Oman	1500	J*
1413	RNE5 via ?	Spain	?	D*,E*
1422	Heusweiler(DLF)	Germany	1200/600	B,D*,E*,J
1422	Valmiera	Latvia	50	D*,J*
1440	Marnach(RTL)	Luxembourg	1200	B,D*,E*,J*,M*
1440	Moscow via ?	Russia	?	J*
1440	Damman	Saudi Arabia	1600	D*
1449	RAI via ?	Italy	?	J*
1449	Redmoss(BBC)	UK	2	C
1467	Monte Carlo(TWR)	Monaco	1000/400	D*,E*
1476	Dubai	UAE	1500	J*
1485	SER via ?	Spain	?	J*
1494	Clermont-Ferrand	France	20	E,J*
1494	St.Petersburg	Russia	1000	D*,E*,J*
1503	Stargard	Poland	300	J*
1503	RNE5 via ?	Spain	?	E*
1512	Wolvertem	Belgium	600	B,D*,E*,J*,L*
1512	Jeddah	Saudi Arabia	1000	D*
1521	Duba	Saudi Arabia	2000	E*
1530	Vatican R	Italy	150/450	D*,E*,J*,L*
1539	Mainflingen(ERF)	Germany	350(700)	B,D*,E*,J*
1548	? (VOA)	Kuwait	600	F*
1557	Nice	France	300	B,J
1566	Sarnen	Switzerland	300	B,D*,E*,J*,L*
1575	SER via ?	Spain	5	E*,J*
1584	SER via ?	Spain	2	E*,J*
1593	Holzkirchen(VOA)	Germany	150	B,C,D*,E*,G
1602	SER via ?	Spain	?	E*
1602	Vitoria(EI)	Spain	10	E*,J*
1611	Vatican R	Italy	15	J*

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

Listeners:-
(A) Nicola Hutchings, Wellington.
(B) Rhoderick Illman, Oxted.
(C) Brian Keyte, Bookham.
(D) Eddie McKeown, Newry.
(E) George Millmore, Wootton IoW.
(F) Clare Pinder, while in Appleby.
(G) Harry Richards, Barton-on-Humber.
(H) Chris Ridley, Co.Sligo, Eire.
(I) Tom Smyth, Co.Fermanagh
(J) Tony Stickells, Thornton Heath.
(K) Norman Thompson, Oadby.
(L) Thomas Williams, Truro.
(M) Tom Winzor, Plymouth.

Kilkeel; R.Algiers Int via Bouchaoui 15.160 (Eng to Eur, M.East 1400-1500) 43433 at 1400 in Galashiels; RCI via Sines, Portugal 15.325 (Eng to Eur, M.East, Africa 1430-1500) 44444 at 1430 by **Gerald Guest** in Dudley; VOA via Kavala? 15.205 (Eng to M.East 1400-1800) 42432 at 1515 in Ross-on-Wye; VOA via Botswana 15.445 (Eng to Africa 1600-1800) 44344 at 1527 in Rugby; WEWN Vandiver, USA 15.665 (Eng to Eur 1200-1756) 54544 at 1545 in Herstmonceux; WWCR Nashville, USA 15.685 (Eng to Eur 1100-0000) 33333 at 1552 by **Tom Winzor** in Plymouth; Channel Africa via Meyerton 15.240 (Eng to C/W Africa 1600-1700) 34444 at 1600 in Chester; LJB Sabrata, Libya 15.415 (Various 1600-1715) 44545 at 1630 in Oadby; BBC via Ascension Is 15.400 (Eng to Africa 1430-2100) 43333 at 1700 in Stalbridge; Africa No.1, Gabon 15.475 (Fr to W.Africa 1600-1900) 35444 at 1700 in Storrington.

Later, RNB Brazil 15.265 (Port, Eng, Ger to Eur 1630-2020) was rated 22222 at 1800 by **Thomas Williams** in Truro; WYFR via Okeechobee, USA 15.565 (Eng, Ger to Eur, Africa 1600-2300) 43334 at 1800 in Colyton; WYFR via Okeechobee 15.695 (Eng to Eur, Africa 1600-1900) 34333 at 1831 by **Vera Brindley** in Woodhall Spa; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 45243 at 1845 in Newry; RAE Buenos Aires, Argentina 15.345 (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1900-2300) 25532 at 2140 in Wallsend.

Broadcasts from several continents were also received in the **13MHz (22m)** band. They came from Croatian R, Zargreb 13.830 (Cr, Eng to Pacific 0600-1000), rated 43333 at 0955 in Stalbridge; R.Finland via Pori 13.645 (Fin to E.Asia, Far East 1000-1100) 33333 at 1015 in Truro; R.Australia via Darwin 13.605 (Eng, Chin to Asia 0800-1430) 34333 at 1029 in Bridgwater; UAER, Dubai 13.675 (Eng to Eur 1030-1055) 43324 at 1045 in Oadby; SRI via Sottens? 13.635 (Eng, Fr, Ger, It to Far East 1100-1245) 24332 at 1130 in Oxted; WYFR via Okeechobee

Transatlantic DX Chart

Freq (kHz)	Station	Location	Time (UTC)	DXer
		USA		
660	WFAN	New York, NY	0601	B
850	WEEI	Boston, MA	0102	B,D
880	WCBS	New York, NY	0650	B
1030	WBZ	Boston, MA	2355	B
1130	WBBR	New York	0128	D
1440	WLPZ	Portland, MA	0245	C,D
1500	WTOP	Washington, D.C.	0205	A,B,D
1510	WNRB	Boston, MA	0130	B,C,D
1560	WQEW	New York	0704	B
1660	WJDM	Elizabeth, NJ	0659	B
		CANADA		
590	VOCM	St.John's, NF	2353	A,B,D
620	CKCM	Grand Falls, NF	2350	B
650	CKGA	Gander,NF	0116	B
710	CKVO	Clarenville, NF	0140	A
740	CHCM	Marystown, NF	2346	B
820	CHAM	Hamilton, ON	0200	A
850	CKVL	Montreal, PQ	0659	B
920	CJCH	Halifax, NS	0123	B,D
930	CJYQ	St.John's, NF	0126	B,D
940	CBM	Montreal, PQ	0022	D
990	CBY	Corner Brook, NF	0215	A
1375	RFO	St.Pierre/Miquelon	0240	B
1400	CBG	Gander,NF	0200	B
		SOUTH AMERICA		
1500	R.Dos Mil (2000)	Cumana, Venezuela	0535	B

DXers:-
(A) Robert Connolly, Kilkeel.
(B) David Edwardson, Wallsend.
(C) Harry Richards, Barton upon Humber.
(D) Tony Stickells, Thornton Heath.

13.695 (Eng to N.America 1300-1400) 33333 at 1325 in Kilkeel; UAER, Dubai 13.675 (Eng to Eur 1330-1355) 44444 at 1330 in Morden; R.Prague, Czech Rep 13.580 (Eng to E.Africa, N.America 1400-1427) 45344 at 1402 in Newry; ISBS Reykjavik 13.860 (Ic [u.s.b.+ p.c] to N.America 1410-1440) 44444 at 1420 in Scalloway; R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) SIO333 at 1443 by **Ted Walden-Vincent** in Gt.Yarmouth; SRI via Sottens? 13.635 (Eng, Fr, Ger, It to S.Asia 1500-1645) 54444 at 1515 in Chester; WWCR Nashville, USA 13.845 (Eng to E.USA 1300-0100?) 34323 at 1540 in Woodhall Spa; R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eur 0400-1800) 55555 at 1547 in Plymouth; WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2200) 44433 at 1600 in Herstmonceux; VOA via Selebi-Phikwe, Botswana 13.710 (Eng to Africa 1600-2230?) 45434 at 1620 in Ross-on-Wye; VOA via Sao Tome 13.600 (Eng to Africa 1600-1800) 44334 at 1635 in Rugby; RCI via Sackville 13.650 (Fr, Eng to Eur, Africa 2000-2200) 24323 at 2111 in Freshwater Bay.

Logged in the **11MHz (25m)** band during the morning were Channel Africa via Meyerton 11.900 (Eng to W.Africa 0500-0555), noted as 35222 at 0500 in Newry; VOA via Kavala? 11.805 (Eng to Eur, M.East, N.Africa 0600-0700) 44333 at 0635 in Morden; R.Georgia via Dusheti 11.910 (Eng to Eur 0830-0900) 33333 at 0830 in Scalloway; RFI via Issoudun? 11.670 (Fr to Eur 0900-1700?) 33333 at 0920 in Stalbridge; KTWR (TWR) Agana, Guam 11.830 (Eng to S.Pacific 0855-1000) 14341 at 0929 in Bridgwater; R.Finland via Pori 11.755 (Fr, Ger, Fin, Sw to Eur 0700?-2000?) 55555 at 1120 in Oadby.

During the afternoon R.Oman via Seeb 11.890 (Ar to M.East, E.Africa 0800?-1300?) was 33232 at 1226 in Oxted; R.Romania Int, Bucharest 11.940 (Eng to Eur 1300-1400) 54444 at 1325 in Norwich; WYFR via VOFC Taiwan 11.550 (Eng to Asia 1302-1502) 32332 at 1350 in Kilkeel; RCI via Sines, Portugal 11.915 (Eng, Fr to Eur, M.East, Africa 1430-1600) 33333 at 1430 in Truro; R.Jordan via Al Karanah 11.690 (Eng to W.Eur, E.USA 1400-1630) 54554 at 1505 in Herstmonceux & 44444 at 1620 by **Mahendra Vaghjee** Rose Hill, Mauritius; WWCR Nashville, USA 12.160 (Eng to N.America, Eur 1400-2300) 35444 at 1538 in Storrington; R.Australia via Darwin 11.660 (Eng to Asia 1430-1800) SIO322 at 1545 in Macclesfield; R.Pakistan, Islamabad 11.570 (Eng to M.East 1600-1630) SIO222 at 1600 in Co.Fermanagh.

Later, R.Japan via Sri Lanka 11.880 (Eng to M.East. N.Africa 1700-1800) was 34323 at 1710 in Rugby; R.Nederlands via Meyerton 11.655 (Eng to Africa 1730-2025) 44444 at 1755 in Appleby; AIR via Bangalore 11.620 (Eng, Hi to Eur 1745-2230) SIO333 at 1801 in Gt.Yarmouth; Monitor R.via WSHB 11.550 (Eng to Eur, M.East, Africa 1800-1958) 44244 at 1829 in Woodhall Spa; China R.Int, Beijing 11.715 (Eng to Eur, M.East, Africa 2000-2100) 44444 at 2010 by **Ron Damp** in E.Worthing; BBC via Ascension Is 11.835 (Eng to W.Africa 1930-2315) 35444 at 2040 in Chester; RCI via Sackville 11.945 (Fr, Eng to Eur, Africa 2000-2230) 44434 at 2047 in Freshwater Bay; R.Globo, Rio de Janeiro, Brazil 11.805 (Port 0900-0330) 34333 at 2100 in Galashiels; RAE Argentina 11.710 (Sp 1900-2200) 25542 at 2134 in Wallsend; HCJB Quito, Ecuador 11.960 (Eng to Eur 1900-2200) 22222 at 2148 in Plymouth.

During some mornings R.New Zealand's broadcast to Pacific areas in the **9MHz (31m)** band has reached the UK. Their 100kW transmission on 9.700 (Eng 0816-1206 Mon-Fri, 0758-1206 Sat/Sun) was rated 32222 at 0858 in E.Worthing & 24322 at 1030 in Chester. R.Australia has also been heard here whilst beaming to Pacific areas on 9.710 (Eng 0730-0900). Their transmission from Shepparton was rated 34543 at 0803 in Wallsend.

Also noted in the reports were HCJB Quito, Ecuador 9.445 (Eng to S.Pacific 0700-1100) 43333 at 0813 in Norwich; SRI via Sarnen 9.535 (Eng, Ger, Fr, It to SW.Eur 1100-1400) 42223 at 1100 in Dudley; R.Norway Int, Oslo 9.590 (Norw [Eng Sun] to Eur 1300-1330) was 55555 at 1300 in Appleby; WWCR Nashville,

Local Radio Chart

Freq (kHz)	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	E,G,J
585	R.Solway	B	2.00	A
603	Cheltenham R.	I	0.10	A,C,E,G,J
603	InvictaSG,Litt'brne	I	0.10	B*,E,G,J
630	R.Bedfordshire(3CR)	B	0.20	C,E,G,J
630	R.Cornwall	B	2.00	A,G,J
657	R.Clwyd	B	2.00	A,E,G,J
657	R.Cornwall	B	0.50	A,G
666	Gemini AM, Exeter	I	0.34	A,B,E,G,J
666	R.York	B	0.80	A,B,E
729	BBC Essex	B	0.20	E,G,J
738	Hereford/Worcester	B	0.037	E,G,J
756	R.Cumbria	B	1.00	A,F
756	R.Maldwyn, Powys	I	0.63	A,E,G,J
765	BBC Essex	B	0.50	E,G,J
774	R.Kent	B	0.70	A,E,G,J
774	R.Leeds	B	0.50	A,E
774	3 Counties SG, Glos	I	0.14	C,G
792	Classic Gold 792	I	0.27	E,J
792	R.Foyle	B	1.00	H,I
801	R.Devon & Dorset	B	2.00	E,G,J
828	Classic Gold 828	I	0.20	A,C,E,J
828	Magic 828, Leeds	I	0.12	A,C*
828	2CR CG, Bournemouth	I	0.27	G
828	Townland R, Ulster	I	0.80	H
837	R.Cumbria/Furness	B	1.50	A,F
837	Asian Netwk Leics	B	0.45	A,E,J
855	R.Devon & Dorset	B	1.00	G
855	R.Lancashire	B	1.50	A,F
855	R.Norfolk	B	1.50	B,E,J
855	Sunshine 855,Ludlow	I	0.15	C,E
873	R.Norfolk	B	0.30	B,E,G,J
936	Brunel CG, W.Wilts	I	0.18	A,E,G,J
945	S.Coast R, Bexhill	I	0.75	B*,E,G,J
945	Derby (Gem AM)	I	0.20	A,B*,C*,E
954	Gemini AM, Torquay	I	0.32	A,C,E,G,J
954	Wyvern AM, Hereford	I	0.16	E,G,J
963	Asian Sd,Manchester	I	0.80	A
963	963 Liberty (Viva)	I	1.00	C,E,G,J
990	R.Devon & Dorset	B	1.00	A,E,G,H
990	WABC, Wolverhampton	I	0.09	E,J
999	Gem AM, Nottingham	I	0.25	E
999	Red Rose G, Preston	I	0.80	A,H
999	R.Solent	B	1.00	E,G,H,J
1017	WABC, Shrewsbury	I	0.70	A,E,J
1026	R.Cambridgeshire	B	0.50	E,J
1026	Downtown, Belfast	I	1.70	A,H,I
1026	R.Jersey	B	1.00	E,G,J
1035	RTL Country 1035	I	1.00	C*,E,F*,G,H,J
1035	N.Sound, Aberdeen	I	0.78	A,C*,E*,F
1035	W.Sound, Ayr	I	0.32	C*
1107	Moray Fth,Inverness	I	1.50	F,I
1116	R.Derby	B	1.20	A,B,C*,E,F,H
1116	R.Guernsey	B	0.50	B,C,E,G,J
1116	Valleys R.	I	?	C,H
1152	Amber, Norwich	I	0.83	C*,F*,J
1152	Clyde 2, Glasgow	I	3.06	F,H
1152	LBC 1152	I	23.50	B*,C*,E,F*,G,J
1152	Pic'ly 1152,Manch'r	I	1.50	A
1152	PlymSnd AM,Plymouth	I	0.32	C
1152	Xtra-AM, Birmingham	I	3.00	C*
1161	R.Bedfordshire(3CR)	B	0.10	E,J
1161	Brunel CG, Swindon	I	0.16	A,E,G
1161	Southern Counties R	B	1.00	E,F,J
1161	Tay AM, Dundee	I	1.40	F,H
1170	Amber SGR, Ipswich	I	0.28	F*
1170	GNR, Stockton	I	0.32	A,C*,F
1170	SCR, Portsmouth	I	0.50	E,G,J
1170	Signal G,Stoke-on-T	I	0.20	B*
1170	Swansea Snd,Swansea	I	0.58	C,H
1170	1170AM,High Wycombe	I	0.25	B*,E,J
1242	InvictaSG,Maidstone	I	0.32	C*,E,J
1242	IoW Radio, Wootton	I	0.50	G
1251	Amber SGR,Bury StEd	I	0.76	E,F*,J
1260	Brunel CG, Bristol	I	1.60	G
1260	Marcher G, Wrexham	I	0.64	C*
1260	R.York	B	0.50	A,J
1278	1278 AM W.Yorkshire	I	0.43	C*,F
1296	Radio XL,Birmingham	I	5.00	A,C*,E,F,G,H
1305	Gt.Yks G, Barnsley	I	0.15	A
1305	Premier via ?	I	0.50	B*,E,F,G,J
1323	S.Coast R,Southwick	I	0.50	B*,E,G,J
1332	Premier, Battersea	I	1.00	A,E,F,J
1332	Wiltshire Sound	B	0.30	E,G
1359	BreezeAM,Chelmsford	I	0.28	E,J
1359	CG 1359, Coventry	I	0.27	E,H*
1359	R.Solent	B	0.85	E,G
1368	R.Lincolnshire	B	2.00	E
1368	Southern Counties R	B	0.50	E,G,J
1368	Wiltshire Sound	B	0.10	E,G
1413	Premier via ?	I	0.50	A,E,G,H*
1431	Breeze AM, Southend	I	0.35	C*,D,E,F,G,J
1431	Cl.Gld 1431 Reading	I	0.14	C*,E,G,J
1449	R.Peterboro/Cambs	B	0.15	A
1458	R.Cumbria	B	0.50	A,F
1458	R.Devon & Dorset	B	2.00	A,F,G
1458	1458 Lite AM Manch'	I	5.00	H,I
1458	R.Newcastle	B	2.00	B*,E*,F
1458	Sunrise, London	I	50.00	B*,C*,E,G,J
1458	Asian Netwk Langley	B	5.00	H
1476	CountySnd,Guildford	I	0.50	A,C*,E,F,G,H*,J
1485	Cl.Gld 1485 Newbury	I	1.00	E,J
1485	R.Merseyside	B	1.20	A,B*
1485	Southern Counties R	B	1.00	E,F,G,H,J
1503	R.Stoke-on-Trent	B	1.00	A,B*,C*,D,E
1521	R.1521 Craigavon,NI	I	0.50	A,C*,F,H,I
1521	Fame 1521, Reigate	I	0.64	C*,E,F,G,J
1530	R.Essex	B	0.15	E,G
1530	1530 AM W.Yorkshire	I	0.74	A,E,F,H
1530	Wyvern, Worcester	I	0.52	A,B*,C*,G,H
1548	R.Bristol	B	5.00	E,G,H*
1548	Capital G, London	I	97.50	C*,E,G,H,J
1548	City G, Liverpool	I	4.40	A,C*,I
1548	Forth AM, Edinburgh	I	2.20	F
1557	R.Lancashire	B	0.25	A,F,H*
1557	Mellow, Clacton	I	0.125	E
1557	Northants CG	I	0.76	E,F*,H*
1557	S.Coast R, So'ton	I	0.50	B*,D,E,G,H,J
1584	KCBC, Kettering	I	0.04	C*,E
1584	London Turkish R	I	0.20	C*,E,G,J
1584	R.Nottingham	B	1.00	B*,E,H
1584	R.Shropshire	B	0.50	A,E
1584	Tay, Perth	I	0.21	F,I
1602	R.Kent	B	0.25	E,F,G,J

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

Listeners:-
(A) Robert Connolly, Kilkeel.
(B) Sheila Hughes, Morden.
(C) Nicola Hutchings, Wellington.
(D) Rhoderick Illman, Oxted.
(E) Brian Keyte, Bookham.
(F) Ross Lockley, Galashiels.
(G) George Millmore, Wootton, IoW.
(H) Chris Ridley, Co.Sligo, Eire.
(I) Tom Smyth, Co.Fermanagh.
(J) John Wells, East Grinstead.

Tropical Bands Chart

Freq (MHz)	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	1635	Q
2.325	ABC Tennant Creek	Australia	2030	G,Q
2.485	ABC Katherine	Australia	1639	Q
2.850	KCBS Pyongyang	N.Korea	1640	Q
3.210	Em.Nacional, Maputo	Mozambique	0533	J,N
3.220	Channel Africa	S.Africa	0256	J,P
3.223	AIR Simla	India	1650	N,Q
3.230	SABC Meyerton	S.Africa	0055	B,P
3.232	RRI Bukittinggi	Indonesia	1500	Q
3.240	TWR Shona	Swaziland	0259	J,Q
3.245	AIR Lucknow	India	1652	N
3.255	BBC via Meyerton	S.Africa	2100	A,D,J,K,N,P,Q
3.265	RRI Bengkulu	Indonesia	1404	Q
3.270	SWABC 1, Namibia	S.W.Africa	2035	A,B,K,N,Q
3.287	R.Malagasy	Madagascar	1525	Q
3.290	Namibian BC,Windhoek	S.W.Africa	2035	A,B,J,K,N,Q
3.300	R.Cultural	Guatemala	0225	F,J
3.306	ZBC Prog 2	Zimbabwe	2027	A,J,K,N,P,Q
3.315	AIR Bhopal	India	1630	B,N,P,Q
3.316	SLBS Goderich	Sierra Leone	2115	A,N
3.320	SABC (RSG) Meyerton	S.Africa	2121	B,K,N,P,Q
3.325	FRCN Lagos	Nigeria	2247	N
3.330	Christian Voice	Zambia	2022	D,G,J,N,Q
3.335	CBS Taipei	Taiwan	2025	K,N,Q
3.345	AIR Jaipur	India	0215	B,Q
3.345	AIR Jammu	India	1705	N
3.345	Channel Africa	S.Africa	1922	Q
3.356	R.Botswana	Gabarone	1959	A
3.365	GBC R-2	Ghana	2025	A,B,D,E,J,K,N
3.365	AIR Delhi	India	1610	N,Q
3.377	R.Nacional, Mulenvos	Angola	2140	B
3.390	AIR Gangtok	India	1540	Q
3.395	RRI Tanjung Karang	Indonesia	1542	Q
3.395	ZBC Gweru	Zimbabwe	2257	N
3.900	Hulunbei'er, Hailar	China	2334	E,N
3.905	RRI Banda Aceh	Indonesia	1700	N
3.915	BBC via Kranji	Singapore	2100	B,E,J,P,S
3.925	NSB (R.Tampa)	Japan	0840	N,Q
3.945	AIR Gorakhpur	India	1515	Q
3.945	R.Tanpa 2, Tokyo	Japan	0830	N
3.950	Qinghai PBS, Xining	China	2341	E,Q
3.955	BBC via Skelton	England	2000	B,E,H,J,Q
3.955	R.Budapest	Hungary	2300	P
3.960	Xinjiang PBS, Urumqi	China	1520	Q
3.965	RFI Paris	France	1830	B,E,J,P
3.970	R.Korea via Skelton	England	1945	B,C,L,M,Q
3.975	R.Budapest	Hungary	2000	E,H,J,L,O,Q,S
3.985	Nexus, Milan	Italy	0750	I,J
3.985	China R via SRI	Switzerland	2145	B
3.985	SRI Beromunster	Switzerland	1900	P
3.995	DW via Julich	Germany	2122	B,E,I,J,M,P,Q,S
4.003	RRI Padang	Indonesia	1635	N,Q
4.005	Vatican R.	Italy	1720	B,E,H,P
4.035	Xizang PBS, Lhasa	Tibet	0030	J,N,P
4.330	Xinjiang BS, Urumqi	China	0031	B,E,N
4.500	Xinjiang BS, Urumqi	China	0027	B,J,N,Q
4.725	R.Myanmar, Yangon	Burma	1428	N
4.735	Xinjiang, Urumqi	China	0027	B,J,N,Q
4.750	Xizang BS, Lhasa	China	0140	B
4.753	RRI Ujung, Padang	Indonesia	1550	Q
4.755	R.Educ CP Grande	Brazil	0027	B,N
4.760	AIR Port Blair	India	1550	N,Q
4.760	TWR Manzini	Swaziland	0257	J
4.765	R.Integracao	Brazil	0023	N
4.770	FRCN Kaduna	Nigeria	2137	A,B,D,E,H,J,K, L,N,P,Q,S
4.775	AIR Imphal	India	1617	B,N,Q
4.775	RRI Jakarta	Indonesia	1655	Q
4.775	R.Tarma	Peru	0025	N,R
4.777	R.Gabon, Libreville	Gabon	2137	A,B,H,K,N
4.783	RTM Bamako	Mali	2046	A,B,E,H,J,K,N
4.790	AIR Itanagar	India	1555	Q
4.790	Azad Kashmir R.	Pakistan	1721	B,K,N,Q
4.790	R.Atlantida	Peru	0210	B,N
4.800	CPBS 2 Beijing	China	1553	E
4.800	AIR Hyderabad	India	1723	B,K,N,Q
4.800	LNBS Maseru	Lesotho	2136	A,J,K,N,Q
4.805	R.Nac.Amazonas	Brazil	0000	A,N,P
4.815	R.diff TV Burkina	Ouagadougou	2136	A,B,K,N
4.820	R.Botswana, Gaberone	Botswana	2030	J,L
4.820	La Voz Evangelica	Honduras	0115	B
4.820	AIR Calcutta	India	1605	B,Q
4.820	Xizang, Lhasa	Tibet	0055	H,N
4.828	ZBC R-4	Zimbabwe	2134	A,K,Q
4.830	China Huayi BC	China	1611	Q
4.830	R.Bangkok	Thailand	1635	N
4.830	R.Tachira	Venezuela	0135	B,E,F,N
4.832	R.Reloj	Costa Rica	0758	I,N,P
4.835	ABC-Alice Springs	Australia	2135	B,K
4.835	R.Tezulutlan, Coban	Guatemala	0210	B
4.835	RTM Kuching, Sarawak	Malaysia	2239	R
4.835	RTM Bamako	Mali	2135	A,B,E,J,K,Q
4.840	AIR Bombay	India	1724	B,K,N,Q
4.845	R.Fides, La Paz	Bolivia	0026	B,E
4.845	RTM Kuala Lumpur	Malaysia	1630	N,Q
4.845	ORTM Nouakchott	Mauritania	2044	A,B
4.850	R.Yaounde	Cameroon	2101	A,B,H,J,L
4.850	CNR 1	China	1015	N
4.850	AIR Kohima	India	1608	B,N
4.860	AIR Kingsway(Feeder)	India	1647	E,K,N,Q
4.865	PBS Lanzhou	China	2335	A,H,N
4.865	L.V. del Cinaruco	Colombia	0110	B
4.870	R.Cotonou	Benin	2042	A,J,K,N
4.870	Voz del Upano	Ecuador	0220	B
4.875	R.Roraima, Boa Vista	Brazil	0135	B,N
4.879	R.Bangladesh	Bangladesh	0145	B
4.880	AIR Lucknow	India	0035	N
4.885	R.Clube do Para	Brazil	2124	A,B,E,I,J,K,N
4.885	R.Difusora Acreana	Brazil	0115	B
4.885	KBC East Sce Nairobi	Kenya	1725	A,N,Q
4.890	RFI Paris	via Gabon	0356	J
4.890	R.Port Moresby	New Guinea	1635	K,N,Q
4.890	ORTS Dakar	Senegal	0510	N
4.895	Voz del Rio Arauca	Colombia	0135	N
4.895	Pakistan BC	Pakistan	1629	K
4.900	Haixia 2	China	1605	N
4.900	SLBC Colombo	Sri Lanka	1640	N
4.905	R.Nat.N'djamena	Chad	2134	A,J,K,N
4.910	Tennant Creek	Australia	2132	K
4.910	R.Zambia, Lusaka	Zambia	1926	A,F,J,K,N,Q
4.915	R.Anhanguera	Brazil	0120	B,N
4.915	GBC-1, Accra	Ghana	2059	A,B,E,J,K,N
4.915	KBC Cent Sce Nairobi	Kenya	1950	K,Q
4.920	R.Quito, Quito	Ecuador	0750	E,F,I,N
4.920	AIR Madras	India	0020	E,K,N,Q
4.925	R.Mozambique,Maputo	Mozambique	1817	Q
4.927	RRI Jambi	Indonesia	1659	N
4.935	KBC Gen Sce Nairobi	Kenya	2040	B,F,K,N,Q
4.935	R.Tropical, Tarapoto	Peru	0120	B
4.940	Haixia 1	China	1635	Q
4.940	AIR Guwahati	India	0110	B,N
4.950	R.Nacional, Mulvenos	Angola	0505	N
4.950	AIR Srinagar	India	1702	K,N,Q
4.950	R.Madre de Dios	Peru	0135	B
4.950	VOA via Sao Tome	Sao Tome	1930	K,M,N
4.955	R.Nac. de Colombia	Colombia	0120	B,N
4.960	Hanoi 2	Vietnam	2036	K,N
4.970	PBS Xinjiang	China	0030	B,E,N
4.970	AIR Shillong	India	0130	B
4.975	R.Uganda, Kampala	Uganda	1958	G,K,N,Q
4.980	PBS Xinjiang, Urumqi	China	1434	N
4.980	Azad Kashmir R.	Pakistan	1641	Q
4.980	Ecos del Torbes	Venezuela	2326	A,B,E,J,K,N
4.985	R.Brazil Central	Brazil	0130	B,K,N
4.990	Hunan 1, Changsha	China	2350	B
4.990	AIR Ext.Service	India	0025	J,N
4.990	FRCN Lagos	Nigeria	1910	N
5.005	R.Nacional, Bata	Eq.Guinea	1943	A,K,Q
5.005	R.Nepal, Kathmandu	Nepal	1600	N
5.009	R.TV Malagasy	Madagascar	1655	N,Q
5.010	R.Garoua	Cameroon	1832	N
5.010	AIR Thiru'puram	India	0032	B,E,J,N
5.020	PBS-Jiangxi Nanchang	China	0005	B,H,N
5.020	La V du Sahel,Niamey	Niger	2127	A,E,J,K,N,Q
5.020	SLBC Tamil Home Sce.	Sri-Lanka	1523	E
5.025	ABC Katherine	Australia	2131	K
5.025	R.Parakou	Benin	2127	A,E,K,N
5.025	R.Pakistan, Quetta	Pakistan	1646	Q
5.025	R.Uganda, Kampala	Uganda	0259	J
5.030	BBS Thimpu	Bhutan	1510	N
5.030	AWR Latin America	Costa Rica	0312	B,J,N
5.030	RTM Kuching	Sarawak	2126	K
5.035	R.Bangui	C.Africa	2137	N
5.040	PBS Fujian, Fuzhou	China	1445	N
5.045	R.Cultura do Para	Brazil	0225	B,N
5.047	R.Togo, Lome	Togo	2128	A,B,E,J,K,N
5.050	Guangxi FBS, Nanning	China	1442	N
5.050	AIR Aizawl	India	0145	E
5.050	R.Tanzania	Tanzania	0328	J,N
5.055	RFO Cayenne(Matoury)	French Guiana	2130	B,J,K,N
5.060	PBS Xinjiang, Urumqi	China	1543	B,E,N
5.075	Caracol Bogata	Colombia	0444	A,B,J,N
5.090	Taiwan 2 Sce,Beijing	China	1415	N
5.095	R.Caracol, Bogata	Colombia	2354	E
5.100	R.Liberia, Totota	Liberia	2259	H,L
5.125	Taiwan 1 Sce,Beijing	China	1416	N

DXers:-
(A) Darren Beasley, Bridgwater.
(B) Robert Connolly, Kilkeel.
(C) Bernard Curtis, Stalbridge.
(D) Ron Damp, Worthing.
(E) John Eaton, Woking.
(F) David Edwardson, Wallsend.
(G) Bill Griffith, S.W.London.
(H) Sheila Hughes, Morden.
(I) Rhoderick Illman, Oxted.
(J) Eddie McKeown, Newry.
(K) Fred Pallant, Storrington.
(L) Clare Pinder, while in Appleby.
(M) Peter Pollard, Rugby.
(N) John Slater, Scalloway.
(O) Tom Smyth, Co.Fermanagh.
(P) Norman Thompson, Oadby.
(Q) Mahendra Vaghjee, Mauritius.
(R) Ted Walden-Vincent, Gt.Yarmouth.
(S) Thomas Williams, Truro.

USA 9.475 (Eng to N.America 1100-2200) SIO333 at 1620 in Macclesfield; R.Australia via Shepparton 9.580 (Eng to Pacific 1430-2058) 22342 at 1630 by **John Eaton** in Woking; R.Pyongyang, Korea 9.325 (Eng to Eur, M.East, Africa 1700-1750) 34333 at 1700 in Galashiels; R.Australia via Darwin 9.615 (Eng to Asia, Pacific 1500-1755) 54454 at 1715 by **Martin Cowin** in Kirkby Stephen.

Later, Voice of Vietnam, Hanoi 9.840 (Eng to Eur 1800-1830) was 33322 at 1819 in Woodhall Spa; Voice of Indonesia, Jakarta 9.525 (Eng to Eur 2000-2030) 11111 at 2005 in Truro; R.Nederlands via Madagascar 9.605 (Eng to S/E/W.Africa 1730-2025) 45444 at 2024 in Freshwater Bay; R.Havana, Cuba 9.620 (Eng to Eur 2100-2200) 32223 at 2100 in Colyton; R.Cairo via Abis 9.900 (Eng to Eur 2115-2245) SIO322 at 2115 in Co.Fermanagh; Voice of Turkey, Ankara 9.560 (Eng to Asia, Pacific 2300-2358) SIO444 at 2317 by **Francis Hearne** in N.Bristol; BBC via Antigua, W.Indies 9.590 (Eng to S.America 2200-0130) SIO333 at 2345 in Gt.Yarmouth.

In the **7MHz (41m)** band R.Australia via ? 7.330 (Eng to S.Asia 1800?-2100) was 42442 at 1857 in Bridgwater; R.Thailand via Udon Thani 7.295 (Eng to Eur 1900-2000) 42243 at 1945 in Colyton; Vatican R, Italy 7.365 (Eng to Africa 2000-2030) SIO333 at 2000 in Co.Fermanagh; Israel R, Jerusalem 7.465 (Eng to Eur, N.America 2000-2030) 54544 at 2000 in Galashiels; VOA via Selebi-Phikwe, Botswana 7.415 (Eng to Africa 1900-2230) 44344 at 2010 in Woking; VOIRI Tehran 7.260 (Eng to Eur, M.East 1930-2028) 44434 at 2015 in E.Worthing; R.Bulgaria via Plovdiv 7.335 (Eng to Eur 2000-2100) 444444 at 2032 in Woodhall Spa; Monitor R.Int, via WSHB 7.510 (Eng to Eur, Africa 2100-0000) 44434 at 2113 in Rugby; BBC via Woofferton? 7.325 (Eng to Eur 2000-2200) 33333 at 2120 in Kirkby Stephen; R.Romania Int, Bucharest 7.195 (Eng to Eur 2100-2156) 54444 at 2150 in Norwich; R.Bulgaria via Plovdiv 7.390 (Eng to Eur 2200-2300) 55555 at 2245 in Appleby; Voice of Russia 7.125 (Eng to N.America 2300-0000) 54444 at 2330 in Morden; KTBN via Salt Lake City 7.510 (Eng to N.America 0000-1600) 23332 at 0135 in Kilkeel.

Many broadcasts in the **6MHz (49m)** band are intended for European listeners. Some come from WEWN Vandiver 5.825 (Eng 2100-1000), rated SIO333 at 0641 in Gt.Yarmouth; HCJB Quito 5.860 (Eng 0700-0900) 43333 at 0715 in Stalbridge; R.Vlaanderen Int, Belgium 6.035 (Eng 1000-1030 Mon-Sat) 55555 at 1007 in Bridgwater; R.Austria Int, via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) 34333 at 1137 in Oxted; R.Nederlands via Julich 6.045 (Eng 1130-1325) 55555 at 1205 in Herstmonceux; R.Prague via Litomysl 5.930 (Eng 1700-1727) 55555 at 1717 in Norwich & 5.835 (Eng 1800-1827) 44444 at 1800 in Woodhall Spa; R.Tirana, Albania 6.270 (Eng 1930-2000) 43334 at 1930 in Dudley; RAI Rome 6.030 (Eng 1935-1955) 44554 at 1940 in Wallsend; China R.Int 6.950 (Eng 2000-2157) 44434 at 2006 in E.Worthing; BBC via Limassol, Cyprus 6.180 (Eng 1900-2200) 43344 at 2030 in Colyton; Polish R, Warsaw 6.035 (Eng 2030-2125) 43343 at 2046 in Kirkby Stephen; Vatican R, Italy 5.882 (It, Esp, Fr, Eng, Sp, Port 2000-2158) 54444 at 2106 in Plymouth; AWR via Slovakia 6.055 (Eng 2100-2158) 44333 at 2106 in Newry; RCI via Skelton, UK 5.995 (Eng 2100-2230) 34444 at 2130 in Appleby; R.Sweden 6.065 (Eng 2130-2200) SIO444 at 2130 in Co.Fermanagh; VOFC Taiwan via WYFR 5.810 (Eng 2200-2300) 44444 at 2215 in Morden; Croatian R. via Deanovec 5.895 (Cr [News in Eng hourly]) 43443 at 2215 in Oadby; WHRI South Bend, USA 5.745 (Eng 2200-0400) 45444 at 2304 in Woking.

Amongst those noted to other areas were R.Nederlands via Ned.Antilles 5.965 (Eng to Pacific, E.Asia 0830-1025), rated 33333 at 0830 in Truro; VOA via Thailand 6.015 (Tib to E.Asia 1400-1500) SIO111 at 1500 in Macclesfield; SRI via Lenk? 5.850 (Eng, Ger, It, Fr to E.Africa 1700-1845) 33233 at 1700 in Rugby; R.Veritas Asia, Philippines 6.190 (Man 2100-2255) 44333 at 2250 in Scalloway; R.Nederlands via Ned.Antilles 6.165 (Eng to N.America 2330-0125) 53544 at 2338 in Ross-on-Wye; WYFR Okeechobee, USA 6.085 (Eng to N.America 0000-0100) 44444 at 0015 in Kilkeel; R.Tirana via Cerrik 6.140 (Eng to N.America 0230-0300) SIO444 at 0231 in N.Bristol.

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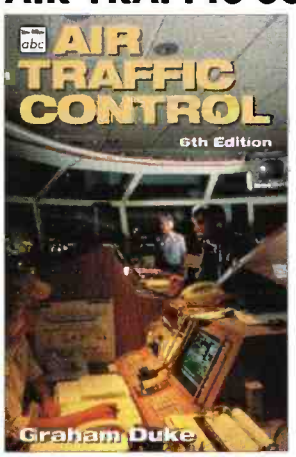

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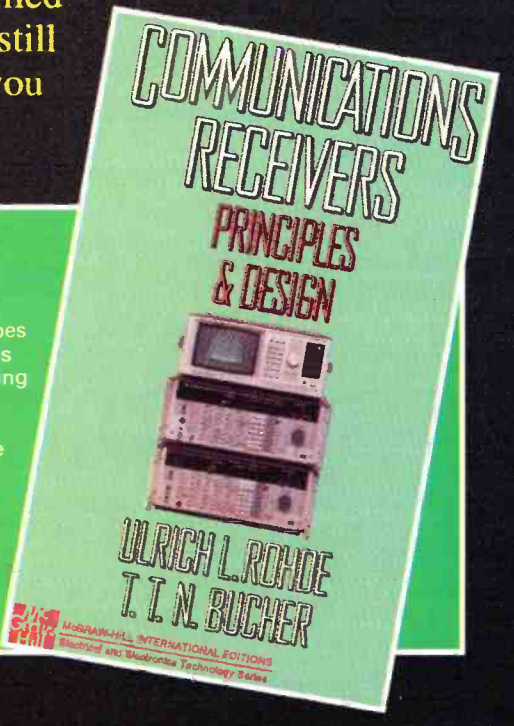

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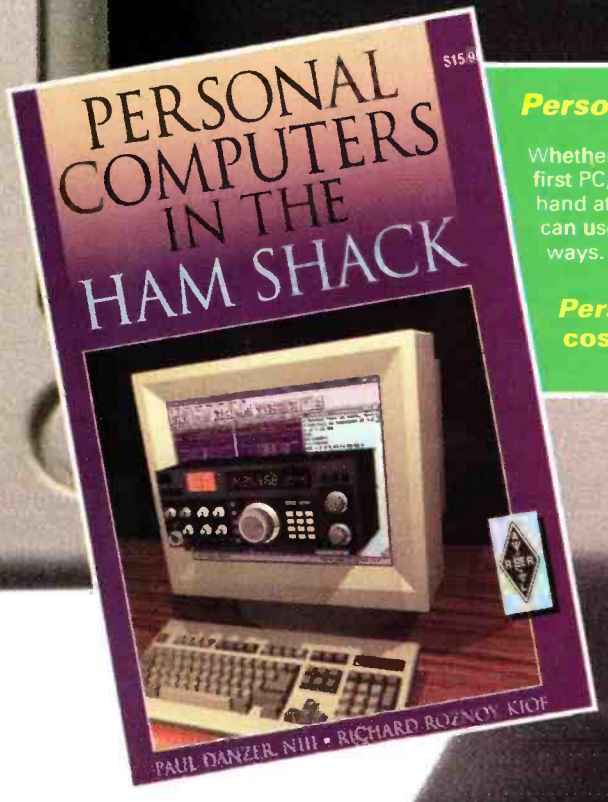

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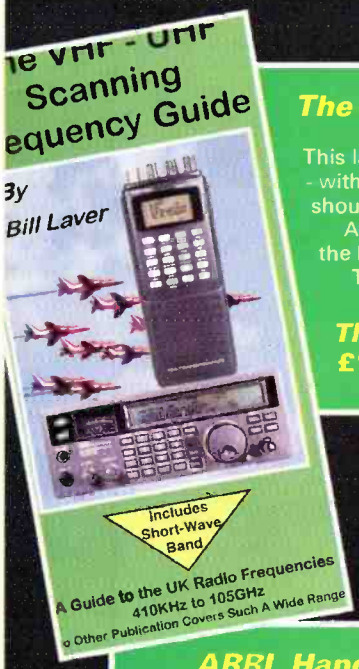

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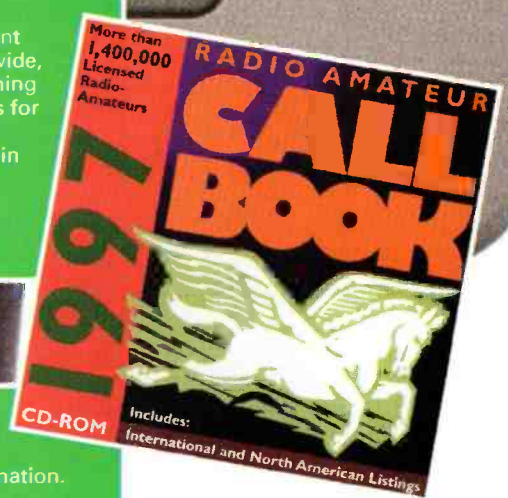

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