

Shortwave Magazine

NOVEMBER 1997 £2.75

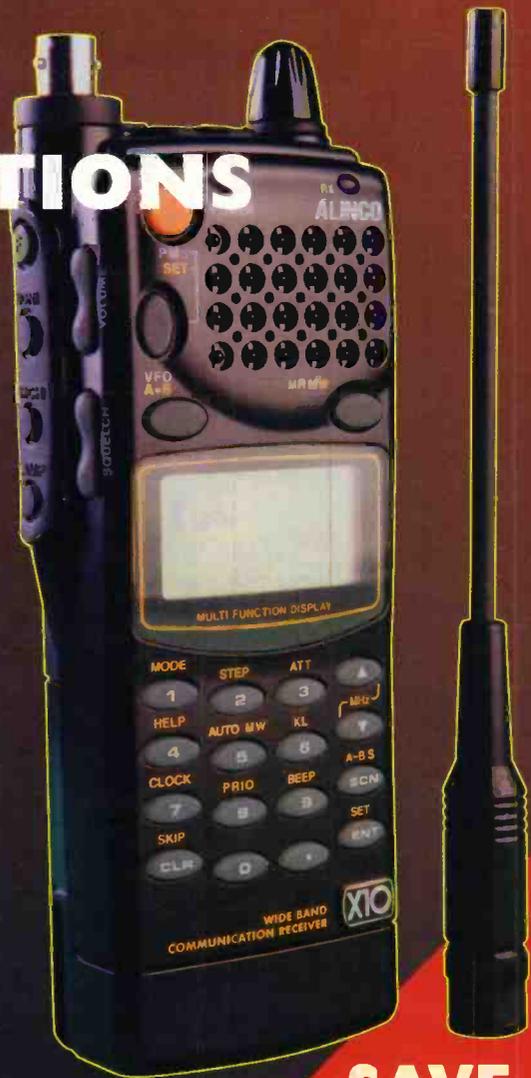
BRITAIN'S BEST RADIO MAGAZINE



JOHN WILSON REVISITS THE Yaesu FRG-100 COMMUNICATIONS RECEIVER

ALINCO DJ-X10 WIDE BAND RECEIVER REVIEWED

BUILD A SELECTIVE
MW CRYSTAL SET
THE QUAD LOOP
ANTENNA



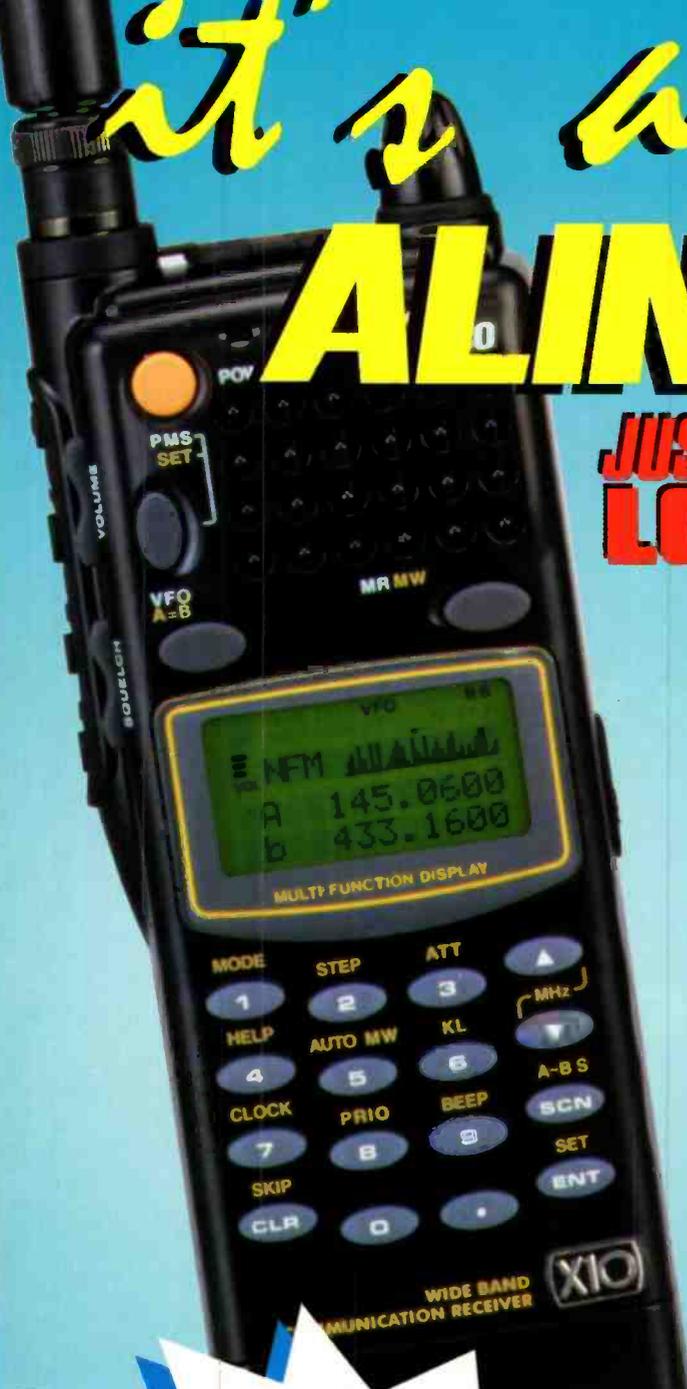
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it's arrived!

ALINCO DJ-X10E SCANNER

JUST LOOK AT THESE FEATURES!



- **RECEIVES**
100kHz - 2000MHz
- **MULTI MODE RECEPTION**
AM - WFM - NFM - SSB - CW
- **1200 MEMORY CHANNELS**
- **CHANNEL SCOPE SPECTRUM ANALYSER**
that allows monitoring of 40 channels at a glance
- **CHANNEL SCOPE PEAK SEARCH**
During searches you can tune in the strongest signal displayed on the channel scope
- **ADVANCED SCANNING FEATURES**
that allow selection of these types of scanning:

Programmed Scan	VFO search
(up to 10 groups)	Dual VFO search
Programmed Memory Scan	Band excursion scan
Any Memory Scan	Priority scan
Mode Scan	Any channel ship scan

DJ X10E includes **FREE**



- **MAINS DROP IN CHARGER**
For easy and convenient use
- **NICAD BATTERY PACK**
4.8V DC 700mAH NiCad battery pack
- **BELT CLIP**
- **CARRYING STRAP**
- **FLEXIBLE LOW PROFILE ANTENNA**

- **USER FRIENDLY FEATURES**
Help messages - Personalised Channel names - Memory cloning - Auto memory write scan - Beginner/Expert Mode - Memory Tune Mode
- **LARGE CLEAR ILLUMINATED DISPLAY**
with switchable backlight for easier use at night
- **TIMER FUNCTIONS**
With auto ON/OFF facility
- **BATTERY SAVE FACILITY**
For extended use
- **SQUELCH CONTROL**
Fully adjustable and switchable squelch control
- **STYLISH CABINET WITH LARGE SPEAKER**
For clear sound quality
- **A SUPER SENSITIVE RECEIVER**
- **DUAL VFOs**
- **FACILITIES FOR CLONING ANOTHER SET**
- **BUILT IN 24 HOUR CLOCK**
- **DISPLAY - CONTRAST - CONTROL**
- **LOW BATTERY ALARM**
- **SWITCHABLE ATTENUATOR**
- **SELECTABLE CONTROL BEEP TONE**
- **KEYPAD LOCK CONTROL**

SPECIFICATIONS

Frequency.....100kHz - 2000MHz
 Memories1200
 Scan Speed...25 ch/sec
 Scan Steps....Selectable (50Hz - 500kHz) in 20 fixed steps
 Receiver.....Triple Superheterodyne
 Dimensions...57(H) x 150(W) x 25.5(D)
 Weight.....320g
 (with EBP-37N Battery pack)

OPTIONAL EXTRAS

EBP-33N...Small size 650mAH NiCad...£39.95
 EBP-34N...Long life 1200mAH NiCad...£49.95
 ESC-29...Standard Soft Case.....£7.95
 EBC-6.....Mobile Mounting Bracket....£12.95
 EME-6.....Earphone.....£10.95

£349.00

£8.00 post & packing

new!

STANDARD AX700 mkII

SCANNING RECEIVER WITH PANORAMIC DISPLAY
 A beautifully engineered radio perfect for home or mobile use. See up to 1MHz of Bandwidth at a glance on the large panoramic display plus full information on the channel being monitored.

- 50 - 904.995MHz
- 100 memories
- 12V or 240V operation with power supply supplied
- Sensitive receiver
- 2W audio output
- 10/12.5/20/25kHz scanning steps
- Price includes power supply

£449.95



£449.00

YAESU FRG-100

This receiver provides solid coverage from 50kHz to 30MHz with all mode reception of AM, SSB and CW. 50 fully tunable memory channels store frequency, mode and filter selections. The FRG-100 has twin 12 hour and 24 hour programmable clocks with on timer and sleep timer. The set requires 12V DC.
 New low price £489 £449
 FM option available - add £39



STANDARD

new!

£499.00



DRAKE SW2

A new low cost receiver from this famous American manufacturer with exceptional sensitivity, selectivity and dynamic range. A ruggedly built radio that is easily transported with optional carrying handle or vehicle mounted for mobile use.

- 100kHz - 30MHz
- AM/SSB
- 100 memories
- Easy tuning
- Selectable Sideband
- Synchronous detection
- Dual antenna inputs
- Long wire short wave antenna
- 12V DC operation

£795.00

JRC NRD 345G

A cracking new receiver aimed at the Broadcast and Shortwave listener. JRC build some of the World's finest receivers and this is no exception. Designed to give clarity and interference free reception.

- AM synchronous detector
- Low noise PLL chip
- Wide dynamic range
- Sensitive receiver
- Noise blanker
- RS232 computer I/F
- 100 memories
- Clock/Timer functions
- Supplied complete with AC mains adaptor

UK FAVOURITES!

YUPITERU MVT 9000 EU

With a range exceeding 2000MHz, a real time bandscope, twin VFO receiver, and a host of other features, this will be Yupiteru's flagship model in 1997! Note the EU version is especially designated by Yupiteru for the UK and Europe to meet full EMC specifications and is supplied with Yupiteru's own original English handbook.



£395.00

YUPITERU MVT 7100 EU

Yupiteru's own EMC version of this popular radio.

- 530kHz-1650MHz
- AM/FM/WFM/SSB/CW
- 1000 Memories
- C/w NiCads & charger

PRICE MATCH PROMISE

£269.00



AOR AR8000

STILL the N°1 seller!

- All mode FM, WFM, SSB, CW, AM
- 500kHz-1900MHz
- Computer control
- Data clone
- 1000 Memories
- C/w NiCads & charger

£299.00



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- 100kHz - 1300MHz *plus LOTS MORE!*
- ALL MODE RECEPTION

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now in stock!



ICOM IC-R10

- All mode - FM, WFM, SSB, CW, AM Receiver
- Newly designed 'BUSY CATCH SCAN'
- Wide band coverage with all mode receive capability (0.5MHz - 1300MHz)
- 1000 memory channels with memory name function
- VSC (Voice Scan Control)
- Full computer access capability
- Auto mode and tuning step for simplified operation
- 4 AA NiCads or 4.5-16V external power supply

£295.00



NEW LOW PRICE!

YUPITERU MVT 3300

- Frequency: 108kHz- 170, 300 - 470, 806 - 1000MHz
- 200 memories
- Selectable steps: 6.25, 10, 12.5, 25kHz

"OUTSTANDING RECEIVER PERFORMANCE" CALL FOR DETAILS



DEALERS! - for further details contact **Phil Jeffery** in our **TRADE DEPARTMENT**

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The new **R11**
Test Receiver...

...If there's RF, you'll catch it!

The **NEW R11** is a Nearfield FM Test Receiver capable of sweeping **30MHz - 2GHz** in less than one second. The R11 can lock onto a **5 watt UHF signal** as far away as **500 feet** and demodulate the signal through its built-in speaker. A unique feature of the R11 is its ability to determine what band the frequency is transmitting in and display it on its LED indicator. When speed is an issue, reach for the R11 Test Receiver, **You won't find a faster nearfield FM test receiver anywhere.**

FEATURES

- Frequency Range: Analog FM, 30MHz - 2GHz
- Locks onto 5 watt UHF signals as far away as 500 feet
- Easy to use keypad functions: Frequency Hold, Frequency Skip, Frequency Lockout, and the Shift key feature for Audio Mute, Enable/Disable Lockouts, and Lockout Clear
- Squelch and Volume control knobs
- LED frequency range indication display
- Built-in speaker for instant frequency demodulation and headphone jack for earphone audio
- Interface with the Scout for Reaction Tune
- TA100S Telescoping whip antenna included
- Built-in NiCad batteries (4 hour discharge) and power supply included



Reaction Tune with Scout using optional CB-RT



Patent Number 5,471,408

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Simply add the forename of the person you wish to contact. For example:

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Cover Subject

John Wilson revisits the Yaesu FRG-100 communications receiver and Alan Gardener looks at the new Alinco DJ-X10 scanner.



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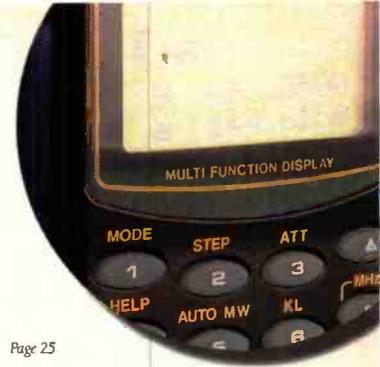
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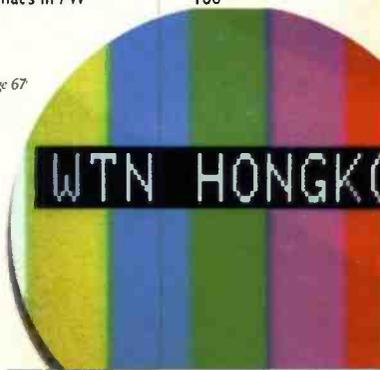
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Communique

New Booklet from BDXC

A new edition of the popular British DX Club publication *Radio Stations in the United Kingdom* has just been published. This 1997-98 (15th) edition - a 48-page A5 booklet - has been completely revised and updated. It includes all UK domestic a.m. and f.m. stations currently on the air - both BBC and independent stations. It is supplied with a free supplement covering radio stations in the Republic of Ireland.

Included in this new edition are:

- Many new stations on the air since the last edition was published 18 months ago.
- Stations listed by frequency and by name.
- Frequencies cross-referenced to show parallel channels.
- Transmitter powers and sites shown for each frequency.
- Includes postal and E-mail addresses, telephone and FAX numbers.
- Brief background to the various radio services.
- Advice on reception reports and verification signers.
- Details of low-power stations at football grounds/race circuits, etc.

The post inclusive prices for *Radio Stations in the United Kingdom* (airmail postage within Europe, surface mail elsewhere) are:

UK: £2.50 pounds sterling - Rest of the World: £3.00, \$5 US or DM10 - \$ and DM payments in cash only, or seven IRCs.

Radio Station In The United Kingdom - 15th edition is available from BDXC's London address: **British DX Club, 126 Bargery Road, Catford, London SE6 2LR.** E-mail enquiries to: bdxc@bigfoot.com

NRD-345 Winner

Drawn out of the Editorial Hat this month, is the winner of the July/August competition for the Japan Radio Company NRD-345 h.f. receiver. The lucky winner of this fine receiver which has been donated by Lowe Electronics, is David G. Wells of Crowborough. Well done David and happy listening with your new radio.

Oops

We have spotted some errors in the component overlay for the CW Filter project published last month. For your convenience we will be publishing a replacement to Figs. 2.8 and 2.9 next month. If you can't wait, please send an s.a.e. to the Editorial Offices marked CW Filter Project.

Hoka Sales UK

All change, for UK distribution of the Hoka suite of data decoders and analysers. Back on the

scene, is Neil Thompson, formerly of NTEch Communications. Neil and Christine look forward to providing their usual high level of expert service to both new and existing customers.

If you need price or technical information on any of the Hoka range, then call: **(01232) 487919**, for both 'phone and FAX. E-mail: hokasales@pavilion.co.uk. By mail contact: **Hoka Sales UK, PO Box 2630, Eastbourne, East Sussex BN20 9RU.**

SARCON 97 Unclaimed Lucky Programme Prizes

Two Lucky Programme Numbers drawn at this year's Scottish Amateur Radio Convention at Edinburgh remain unclaimed. If you have kept your programme and it has either 1650 or 2006 printed on it in the correct place you may still claim your prize by contacting Tommy GM1GEQ who is QTHR.

Relocated Web Pages

The WSHB and KHBI web pages have been relocated on to The Mother Church's web site.

The URL for their home page is now <http://www.tfccs.com>

If you want to go directly to the short wave pages, the URL to try is

http://www.tfccs.com/GV/shortwave/shortwave_schedule.html

Also planned are additions to the short wave listening pages to reflect the programme type and language for each slew each day. This should be up and running by the time you read this.

C. Ed Evans, Senior Station Manager, The Herald Broadcasting Syndicate, RR2, Box 107A, Pineland, SC 29934, USA. Tel: + 1 803 625 5555.
E-mail: cee@wshb.csms.com

The Antique Wireless Newsheet

Tudor Gwilliam-Rees has just sent us a copy of the *The Antique Wireless Newsheet* No. 160. This is an 8-page, A5 newsletter containing some useful tips, free readers' advertisements and, of course, bits and pieces available from **Savoy Hill Publications, 50 Meddon Street, Bideford, North Devon EX39 2EQ, Tel: (01237) 424280** or E-mail: tudor.gwilliam-rees@virgin.net

You could also try their web site at: <http://freespace.virgin.net/tudor.gwilliam-rees>

Rechargeable Alkaline Batteries

The conventional NiCad rechargeable cells have been around for a long time now. They do, however, have several drawbacks - they have a 'memory' effect, they have a cell voltage of only 1.2V and they self-discharge over a fairly short time scale.

The ordinary alkaline cell has none of these disadvantages - they just have to be disposed of when they are 'empty' - so a rechargeable version should be a best seller!

Rechargeable up to 250 times using the special charger, no memory effect, cell voltage of 1.5V, high initial capacity, long shelf life of up to 5 years. Alkaline rechargeable cells with these advantages have just been introduced by **Waters & Stanton Electronics, Spa House, 22 Main Street, Hockley, Essex SS5 4QS. Tel: (01702) 206835.** Prices are £4.99 for a pack of four cells or £17.99 for the special charger with four cells.

Elegant Switch Mode Power Supplies

The 'Mainy' plug-top power supply is stated to be the smallest of its type available in the world. The elegant design, by Professor Beranek of the Technical University, Vienna, makes bulkier and less efficient competitors now appear obsolete. The Mainy is short circuit proof and maintains a stable output voltage under all load conditions.

At present, three models are available with tolerances of 1 to 10% and a power rating of 6W. A 12W rating will be introduced in the not-too-distant future. The Mainy is available with UK plug, IEC 83 European plug, Japanese plug and US plug. As well as this, a plug-in cable facility is also available to cater for different connectors. Thus it can be supplied with or without a cable. The 1% Mainys are designed for medical applications to EN 60 601 and instrumentation where professional accurate measurement is critical, while the other tolerances Mainys are ideal for use with lap-tops, modems, telecoms and industrial electrical/electronic designs.

Relec Electronics Ltd. can be contacted on (01962) 863141, FAX on **(01962) 855987** or E-mail at: sales@relec.co.uk

Lynch's New Number

From October 1st, callers to the **Martin Lynch & Son** store in London will have a new telephone number to dial for sales enquiries. The '07000' prefix series are becoming very popular with companies wishing to make it easier for their customers to remember the telephone number.

Martin chose '73 73 73' as an obvious choice for his business. Even someone starting afresh in amateur radio will know the meaning of '73' and Martin chose that over any other combination.

Martin and his team can still be contacted on the old number (0181-566 1120) and this too will be kept in addition to **07000 73 73 73**. Customer services remain on their 0181 566 0566 number (for the time being!).

Interference Filter

Up until recent times, broadcasters had to take a number of measures to combat interference arriving at a site on the same channel. These included antenna phasing to null interference, terrain shielding and anti-phased antennas. Some problems could not be solved.

Tennatron Industries (N.Z.) Ltd. have produced a co-channel offset interference filter (N.Z. patent application No. 314762) that very significantly reduces the effects of this type of interference electronically. The device can be connected directly between the antenna and transposer or receive input for Band I and Band

FEBA's Rapid Link Technology

New, but not yet fully proven, Rapid International Links (RIL) technology under development at Feba in Worthing was used to transfer a completed *Network* programme tape, specially recorded to respond to the recent death of Diana Princes of Wales, to the transmitters in the Seychelles.

Just four days later the *Network* team were back in action following the death of Mother Teresa of Calcutta. Again, RIL technology was used to transfer the programme to the Seychelles.

The new RIL technology, developed by Feba's technical staff, is a cost-effective means of moving radio programmes from the studios of origin to the transmitters in the Seychelles. As soon as production is completed, the programmes are converted into a digital format and transferred over the Internet to the Seychelles. It is hoped that the system will be operating regularly, so that *Network's* programmes can be produced the day before a broadcast is scheduled.

As this technology can be used in all countries that have Internet connection, staff will be working to make this technology available to all of Feba's overseas bases.



Philip Athyal producing Feba's *Network*

II reception, or at i.f. for use with a transposer on any Band I, II, III, IV and V Channel. The i.f. filter can operate on any interfering line offset as close as 1/2 line offset. Also available is a baseband (Video) version.

There is significant advantage using the filter where the co-channel interference arrives from

the same direction and polarisation as the wanted signal and is almost impossible to null with older methods.

If you would like to find out more, contact **Steve Fogerty, Tennatron Industries (N.Z.) Ltd., 283 High Street, PO Box 218, Motueka, New Zealand.**

OBITUARY

Arthur Cushen MBE 1920-1997

Arthur Cushen MBE, one of the world's leading a.m. and short wave DXers, based in Invercargill, New Zealand and a major contributor to DX radio programmes world-wide and a contributor to many DX club magazines around the world, died on Saturday 20 September 1997. The following tribute was written by G.Victor A. Goonetilike 457VK.

"The passing away of one of Radio's best known personalities comes with sadness for many of us who knew Arthur very closely. For some time Arthur had been ill and his advanced age drew him closer to his last days on this earth. Inevitable as it had to be, for those of us with a passionate love for our hobby, Arthur in many ways was the embodiment of what a very personal hobby meant, and his leaving removes a link with the pioneering days of s.w. radio listening. As long as Arthur was in the hobby we felt that continuity even though those early days of radio were romantic tales from a bygone era.

I remember my early days as a teenage DXer in the sixties when the name Arthur Cushen inspired awe in us. He was famous, and no DXer or s.w.l. who called himself such failed to respect that name. The articles about Arthur were many, and his DX-tips floated through the ether to our small domestic radio sets through many DX-programmes. Radio Netherlands and *DX Juke Box* with Arthur's *Pacific DX Report* along with *Sweden Calling DXers* were the most valuable sources of DX information for us in Asia. His voice giving those DX-tips, both hard to hear and new frequencies for better known stations, always helped us. Those were the days when *World Radio TV Handbooks* were rare and being members of foreign DX-clubs was unthinkable due to their high cost.

Arthur showed us that, even though he lost his sight in the prime of his youth, life could be lived happily and meaningfully and with it came more and more dedication to his work on radio. His work during the second world war, picking up messages of prisoners of war and

passing the information to the authorities to be passed on to their families will stand as a memorial to him.

And his work for the blind, for which he received the order as a Member of the British Empire, shows how he took his hobby beyond personal enjoyment to mean much to his community and it also brought joy to many others.

He was a good man and in many ways showed that the respect we showed him, or the fame he enjoyed didn't distance him from us s.w.l.s. My first letter to him as a relatively unknown DXer brought an immediate response and in the last 25 years he never failed to send us a Christmas greeting. Ralda and Arthur were special people and close friends of many all over the world. Last year when I asked Arthur to mail me a copy of his book *Radio Listeners Guide* he sent it to me personally autographed as a gift with a beautiful letter and a photograph with Ralda taken on their Golden Wedding Anniversary. When ever I wrote to Arthur and Ralda I felt that here was history of radio. A man who was there at the start, experienced those early days and I felt we too belonged to that era which hadn't ended because Arthur was still there.

With him an era has suddenly ended. His life as a DXer Broadcaster and an s.w.l. should inspire any one who has a love for radio.

He was fortunate to experience and enjoy those fine times and even more to have a constant companion in his wife Ralda. We are sad for Ralda for whom it must be very difficult times. While extending our deepest sympathies to Ralda we also thank her for the fine example of love and togetherness that she displayed and the great support she herself gave for us to receive the gift of Arthur in his fullness. Even as you grieve may you be surrounded with fond memories of a man who was respected and loved by friends all over the world. Arthur gave much to the world of radio, brought so much joy to us DXers. May his soul be raised in to the heavens that was so much a part of his daily life. Goodbye friend. May your soul rest in peace."

Send your news to Zoë Crabb at the Editorial Offices

Communiqué

Activity Weekend

The next activity weekend for The World Association of Christian Radio Amateurs and Listeners (WACRAL) is scheduled for Friday 28th and Saturday 29th November on h.f. and 2m s.s.b. and c.w., commencing at 1900UTC on 3747kHz. A full schedule of operating frequencies and times for both EU and DX bands is published in the October edition of WACRAL News, available from G3XNX.

The Association's own callsign G3NJB, will be QRV on all bands from the QTH of G4UJW. Listen for the call 'CQ WACRAL and their distinctive sign-off blessing code of '501'. Look out also for a brand new 80m Christian Net, which has been introduced on Wednesday evenings at 2130 local time on 3.747kHz, to which all readers are invited to call in or to listen.

More information on WACRAL frequencies and an illustrated brochure are both freely available from WACRAL's Membership Secretary: **G3XNX, 51 Alma Road, Brixham, S. Devon TQ5 8QR, Tel: (01803) 853504**. For their latest updates, check the Web at <http://www.g0ppq.demon.co.uk>

Mini Plug-In Coil Formers

Isoplethics I20, 20mm diameter, B9A coil base formers have been developed to combine small size with ease of winding without sacrificing performance. With a winding space of 20mm diameter by 37mm high, I20 coil formers are about the same size as a B9A valves. Vertical slots allow simple termination of coils. A hexagonal flange at the top of the former makes for good grip for ease of changing.

Ideal for both compact valve and semiconductor short wave radio receivers, v.f.o.s and low power a.t.u.s, I20 formers are available moulded in black or brown. Use of a carefully selected, low loss polyester resin allows Q-values in excess of 200 to be achieved at 30MHz - Q reduction due to former loss is less than 4%.

Hard copper pins combine maximum grip with good self cleaning action and minimise resistive loss, thus largely compensating for the smaller pin area of B9A. Side access and hot tinning of the tops of the pins make for easy and reliable soldering of connections.

I20 formers, together with a comprehensive data sheet, are available ex-stock direct from: **Isoplethics, 20 Greenway Close, North Walsham, Norfolk NR28 0DE** at £3.25 each or four of either colour, or mixed, for £9.95, inclusive of VAT and P&P within the EU.



BARTG 1997 AGM

BARTG AGMs are always seen as friendly affairs with the absolute minimum of formality and are usually enjoyed by all who attend (perhaps because of the biscuits and coffee supplied!). They certainly provide an excellent opportunity to meet the BARTG committee and discuss all matter of topics related to data comms within amateur radio.

In the past, the AGMs have been held in many venues, including London, Sutton Coldfield, Luton and Worcester; to try and provide AGMs local to many of BARTG's members. However, the details for this year's AGM are as follows: **The Strathmore Thistle Hotel, Arndale Centre, Luton LU1 2TR** on **Saturday 8th November** at **1400**.

Young Amateur Of The Year 1997

The RSGB is pleased to announce the result of the search for the 1997 Young Amateur of the Year. The winner is 15 year old **Emma Constantine 2E1BVJ** from West Yorkshire. The runner-up is 14 year old **Mark Haynes 2E0APH** from Essex.

The two were chosen from the highest number of applications received for many years, all of which were of an extremely high standard. The judging panel was comprised of representatives of the RSGB and the Radiocommunications Agency (RA).

The winner, Emma, is a founder member of the Rishworth School Amateur Radio Club, G0SQA, and has been Secretary of the club since she was 12. She helps to run Novice RAE courses for pupils and friends of all ages and she has recently started lunchtime Morse code sessions at the school. The school's Head of Science, Anthony Vinters G0WFG, described her as 'an excellent ambassador' for amateur radio.

Emma is actively promoting 'post-Novice' activities for the school radio club and is currently planning an IOTA (Island on the Air) expedition and contest activity. She is involved in setting up a packet node at the school and monitoring amateur radio activities from the MIR space station. Emma has established links with a school radio club in Lithuania and at Moi University in Kenya, and has donated text books to Kenya also.

Emma is also participating in the Duke of Edinburgh award scheme and is learning Morse code, which she will offer as a skill for the award. After her GCSEs are completed, she plans to take the full RAE and hopes then to qualify for the Duke of Edinburgh Gold award.

Emma has been appointed communications officer of a school group planning an expedition to Belize next year. She will be responsible for all radio and other communications on the expedition, which is part of the Duke of Edinburgh 'World Challenge'. After A-levels, she plans to go on to become a veterinary surgeon.

This year's runner-up, Mark Haynes 2E0APH also set up a radio club at his school and has gone on to teach Morse code to two school friends. Mark himself can now send and receive at around 16w.p.m.

Mark became the youngest radio amateur in his home town of Harlow, Essex, at the age of 12, when he gained his first Novice licence, 2E1ERN. Since gaining his class A Novice licence less than a year ago, Mark has been very active on 28MHz and worked hundreds of stations all over Europe using 3W, despite the poor propagation on that band in recent months.

Emma and Mark received their prizes back on the 28 September at the RSGB HF IOTA Convention in Windsor.

Emma Constantine 2E1BVJ - Young Amateur of the Year 1997.



This venue is close to car parking and the rail and bus stations. It was used for an AGM, held back in 1995, and its facilities are excellent (which ample tea, coffee and biscuits). The committee has a morning meeting to prepare for the AGM and then takes a lunch break.

Members are, as usual, most welcome to join the committee for lunch and are requested to contact the BARTG Secretary, **Ian Brothwell G4EAN**, for further details. Ian can be contacted by post at: **56 Arnot Hill Road, Arnold, Nottingham NG5 6LQ** or by telephone on **0115-926 2360** or by E-mail at **secretary@bartg.demon.co.uk**

New Name Newsletter

Back in the June 1997 issue of SWM, we mentioned a piece on Airscan, a group formed by some of the former members of the Black Cat Aviation Group. However, we have now been informed by **Dave Mulligan**, Co-ordinating Editor, that the group has a new name. They are now called **The Command Post**, and have a new contact address, this is **17 Eldo Gardens, West Row, Bury St. Edmunds IP28 8PZ**.

Unfortunately, meetings are no longer held, as most Mil enthusiasts prefer the newsletter only! So, if you would like to find out more and keep up-to-date on all the latest military airband news, drop a line to Dave Mulligan at the above address.

National Transmitter News

Liverton: A new television relay station opened back on the 20th June for Liverton, about 7km north-west of Newton Abbott.

Provided jointly by NTL on behalf of the ITC and Castle Transmission International Ltd. on behalf of the BBC, it is located on a mast at Ingsdon Hill and is designed to bring good television and teletext reception to over 1000 people in the villages of Liverton, Blackpool, Halford, Coldeast and Exeter Cross, near Newton Abbot.

Station Details

Channels:	BBC 1 (South West)	55
	BBC 2	68
	ITV (Westcountry)	48
	Channel 4	65

Antenna Group: C/D
Polarisation: Vertical
ERP: 12.5W

Micro Counter

Optoelectronics Inc. are pleased to announce the second product to be released under the new Techtoyz name, the Micro Counter. The Micro Counter, just like the DTMF Decoder that was released back in July of this year, it is housed in a pager style case, making portable operation easy and convenient. Just clip the counter on your belt or put it in your trouser pocket or jacket pocket.

With a frequency range of 10MHz to 1.2GHz, the Micro Counter can lock onto a 5W u.h.f. radio from as far away as 38m using the optional TMC100 rubber duck antenna. With an initial accuracy of 1p.p.m. and a sensitivity level of <5mV, the Micro Counter is ideal for testing radios in the shop or in the field. In addition, there are three selectable gate times for increased resolution of the frequencies captured.

The Micro Counter has four modes of operation, Normal, Filter, Recall and our Patented Digital Audio Capture. Once a frequency has been captured, it will be logged into one of three memories for later recall.

To order your new Techtoyz Micro Counter, contact your local distributor, **Waters & Stanton Electronics** on **(01702) 206835**, **Haydon Communications** on **0181-951 5781** or **Nevada Communications** on **(01705) 662145**.



The new Techtoyz Micro Counter.

Famous White Papers

The SWM Book Store have recently taken into stock the famous RDI White Papers, which are produced by the International Broadcasting Corporation in the USA. They give an in-depth report on the various popular receivers about.

Each report is £6 and is of tremendous value in making that vital decision before spending out on a receiver. Code numbers are as follows for the White Papers:

PW-01	AOR AR3030
PW-02	Drake R8A
PW-03	Drake SW8
PW-04	Icom R71A/D/E
PW-05	Icom R9000
PW-06	JRC NRD-535
PW-07	Kenwood R-5000
PW-08	Lowe HF-150
PW-09	Sony ICF-2010/ICF-2001D
PW-10	Yaesu FRG-100
PW-11	How to interpret receiver specifications and lab tests
PW-12	Popular outdoor antennas

Please note that P&P is included for any quantity!

Order from the Book Store now by contacting **Shelagh** or **Michael** on **(01202) 659930** or FAX your order on **(01202) 659950** or alternatively E-mail at: **bookstore@pwpub.demon.co.uk**

London Christmas Rally

The latest news from RadioSport is that the CB community are taking great interest in the London Amateur Radio & Computer Christmas Rally, held on Saturday 15 and Sunday 16th November 1997. The British Citizens Band Confederation have booked a stand and will be running a station throughout the event, and CB traders will be offering for sale all kinds of equipment, including the latest 80 channel sets.

Now that the event has been expanded to two days, the major Japanese manufacturers of amateur radio equipment will be in attendance, so visitors can look forward to seeing all the latest from Yaesu, Kenwood and Icom. Computer enthusiasts will be well catered for, with systems and upgrades galore!

Short wave listeners should find interest in the stand of Roberts Radio and the Association of International Broadcasters. All in all, around 100 companies and organisations will be exhibiting in two large halls.

On-demand Morse tests will be available and even more convenient now that Lee Valley Leisure Centre is equipped with a photo booth! Candidates will also need to bring the standard test fee and identification.

Talk-in will be provided on 2m and 70cm and on CB. Special Interest Groups will be in attendance and the Southgate Amateur Radio Club will be running a Bring & Buy stand. Also, there will be priority admission for any disabled visitors.

Signposting to the Lee Valley Leisure Centre was upgraded earlier in the year, so getting there should be easy, but if you would like detailed directions and maps these are available on RadioSport's Website at: **www.radiosport.co.uk** The Website also contains an exhibitor list and other useful information.

For further enquiries, telephone RadioSport on **(01923) 893929** or FAX on **(01923) 678770**.

Editorial



By the time you read this the main amateur radio rally season will be almost over, leaving us with the 'Christmas' ones - doubtless I will get someone writing, or E-mailing, to tell me that their club's rally is still to come and is not a 'Christmas' one!

Having taken the *Short Wave Magazine* and *Practical Wireless* stand to around twenty rallies this year, I have noticed that the number of true radio stands seems to have dwindled in favour of stands dealing in computer goods and CD-ROMs in particular. I also get the

impression that the attendance at several of the rallies has been down on previous years and I have often heard the complaint that there is too much computer junk and not enough amateur radio content. Is this true? I must admit that at many of the shows there are no stands selling basic components, let alone the useful 'pre-owned' bits and pieces that come in so useful for those future projects.

Those shows that operate a 'flea market' are, to me, the most interesting and I can return home loaded with useful things - often nothing to do with radio. Even Brown

Owl managed to buy four useful cups for 25p each - with a free saucer per cup thrown in - at last Sunday's rally! Well, she originally only bought two, but I suggested that she went back and got a further two as insurance against breakages.

What do you find lacking in present day rallies? Are they too computer orientated, or is that a sign of the times? Write and let me know.

Dick Ganderton G8V FH

Dear Sir

My wife and I visited the Fairford Air Show last weekend, having won the tickets in your recent competition. We had a superb day, which included a rare sighting of the 'Stealth Bomber', along with plenty of activity on the scanner!

Thank you very much for a memorable day, keep the competitions coming! Best wishes to all at SWM, it's a great read!

Donald Andrews G4NNP
Ifracombe
N. Devon

Thank you for taking the trouble to write and let us know how much you enjoyed your prize. Ed.

Dear Sir

In response to Roger Waldron's enquiry about Soviet signals during the 1970s, I suggest that he contacts the American ARRL for more information. Besides the 'Tuck-Tuck-Tuck' from the 'Woodpecker' (from their over the horizon radar on h.f.) the Soviets experimented with multi-megawatt arrays covering the Russian Steppes to attempt to control global weather patterns.

During the Cold War, the Soviets believed that the country who ruled the weather patterns would be able to manipulate the outcome of future land and sea battles. Thus, by having the ability to whip up weather fronts, typhoons, blizzards, etc. at will, the Soviets could cripple any NATO forces ready to strike, i.e. the aircraft of the West would be grounded and NATO shipping would have to heave-to in heavy seas, land-based troops would be bogged down or certainly encumbered by snow, etc.

During these high powered multi-megawatt (I don't remember the e.r.p. figures) transmissions, the ionosphere's polarity was altered to suit. Remember, all of the power plays havoc with the electromagnetic layers E-F and so on.

Their scientists related electromagnetic flux in the zones (upper) to weather patterns (local). Needless to say, the r.f.i. generated towards these ionosphere layers culminated to bumper crop harvests throughout the USSR

Letters

Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor.

IF YOUR LETTER IS PUBLISHED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY SWM SERVICE.

that year and this was by no fluke.

On the flip side of the globe (SE Asia inclusive Japan/Australia) that year brought absolute disaster in the form of floods and crop failures. Some of the worst natural disasters occurred that year, with the loss of many lives. Never repeated.

The task of monitoring these Soviet transmissions fell on several agencies in the West and somehow ARRL got involved. I trust that the ARRL have kept records of the events. Noteworthy is, that whilst these massive arrays were in use, a dedicated power station was needed to feed them with electricity. All types of transmissions were blotted out in Australia and the Far East and even taxis in New York (6m band) were jammed on occasion, such as the r.f. power radiated from the Russian?

Of course, the Western governments did all they could to prevent these high powered transmissions but as it was at the height of the Cold War, the Kremlin snubbed them and denied all knowledge of these transmissions. For the technically minded, during these transmissions, many countries experienced power surges in their national electricity grids. This caused untold damage to computers and sensitive electronics.

Even light bulbs in Russian cities lit up from the r.f. generated, like r.f. wands. I may add that millions of light bulbs that were switched on at the time of transmissions, simply exploded from the surge. Eventually, the Soviet military co-ordinated with Russian engineers to shut down electricity grids/networks before transmitting got underway, with lower e.r.p.

The transmissions disappeared as

mysteriously as they had begun but the idea of controlling weather pattern remains. Another side to Soviet transmissions was to attempt 'mass mind-control' through the use of subtle radio emissions beamed at Western Germany of old. We are not quite sure how this was supposed to work and the KGB dismantled the systems about the time of dismantling the Berlin wall. (No evidence of such a project exists today).

If Mr Waldron has a contact in the USA he may ask them to look through scientific archives for evidence of my claims. At the time of said transmissions, the Science and Technology journals in America ran very well informed articles on these matters and so did the ARRL magazine called '73, the US equivalent of the RSGB journal *RadCom*, as you know.

Perhaps this is old news to you in 1997, but I would very much appreciate it if you could somehow get the contents of this letter to Mr Waldron for his research. Thank you for your patience and I trust that Mr Waldron will benefit from his research.

PS: He may want to investigate the 'numbers' stations one day. This will lead him down blind alleys and a red-herring chase will no doubt follow.

Andy

Dear Sir,

With reference to the letter from Bob G8KNZ (*SWM* October 1997), I think he is confusing two quite different over-the-horizon radar experiments.

Bob is quite correct in asserting that the Americans experimented with a spread spectrum OTH system, and that Orfordness was involved. However, this was not the 'Woodpecker'. The American system could sometimes be heard on the short wave bands in the form of brief bursts of sound, but these lasted only a few seconds on any given frequency.

The 'Woodpecker' was indeed a scourge. It didn't only affect the amateur radio bands. I can recall one occasion when I worked at BBC Monitoring in the mid-70s. The monitor complained that the 'Woodpecker' was

drowning out reception of Radio Moscow - and in those days that took some doing!
Andy Sennitt
Editor-in-Chief World Radio TV Handbook.

Dear Dick,

Bob G8JNZ intimates that the 'Russian Woodpecker' was in fact a facility in Suffolk. The facility to which he refers was built at RAF Orfordness, Suffolk in 1969 after a design layed down in 1967 by RCA.

This facility, system 441A, and referred to as AN/FPS-95 or *Cobra Mist*, started high power testing on 17th July 1971 but the full testing was delayed due to the failure of Transmit/Receive switching and one of the processing computers. Further testing eventually started with the facility accepted for use on 9th February 1972. Design Verification System Tests (DVST) were started on 1st March 1972 and on 30th June 1972 unwanted noise with centre values to -65dB (Noise Modulation sidebands 10 to 30Hz from the carrier with median values up to -60dB) were encountered. The reason for the noise was discovered but never released.

This OTHR facility was designed to observe a 91° azimuth section, 19.5 to 110.5°E from true North, i.e. Western Russia, with the intention of surveillance of the air and missile activity in that area. A range of 2000 nautical miles was expected. The frequency range was 6 to 40MHz with pulses having a pulse repetition frequency (p.r.f.) of 40 to 160Hz. The designed peak output power was 10MW, with an average of 600kW. The substantially lower lower peak of 3.5MW was reached. The antenna had a gain of 25dBi.

The facility was beset with problems. Antenna failure, arcing and corona problems as well as unwanted noise led to the final, permanent, shutdown of the facility at 1730z on 29th June 1973. It was dismantled almost straight away, the site totally cleared by 1975. The directional antenna array of *Cobra Mist* pointed in an eastern direction towards Russia.

On 4th July 1976 the rapid pulse signal of the 'Russian Woodpecker' was first noted. Frequency coverage was from 3.26 to 17.540MHz with a p.r.f. of 7Hz. The estimated peak output power of the facility, located near Kiev, was 20MW. The antenna array was pointed towards the USA and believed to be several miles long. Because of the sheer impulse power from this facility, blocking of receivers several thousand miles away was not uncommon. Any station that used frequencies swept by the 'Woodpecker' was blotted out.

Note the start and finish dates of the Orfordness facility and also the start date of the Russian Woodpecker. In addition to the difference of around three years, the technical evidence is also there. The frequency coverage is different and the pulse trains transmitted are also very different.

It is worth noting that a section of the population of Oregon USA claimed strange medical symptoms, including anxiety, pain and pressure in the head and in some cases, noise. It is not uncommon for patients undergoing ultrasound investigations, (frequency around 1215kHz) in the cranial cavity, to be aware of a pulsing sound and to suffer headaches as a

result. *Cobra Mist* antennas were pointing in the wrong direction. The power was also insufficient.

Whilst Bob is correct in the fact that the facility was operated by the Americans he is totally wrong in his assumption that the interference termed the 'Russian Woodpecker' was from *Cobra Mist*.

The only interference that I am aware of from the Suffolk facility was to trawlermen who fished off the Suffolk coastline, and had arcing and corona in the rigging used with their nets!

Best wishes.

Paul Beaumont G7VAK

Dear Dick

Look for HR2369 newflash at <http://www.popcomm.com/> This is an interesting piece concerning the serious reduction and limitation of frequencies (and possible banning of scanners) available to scanning enthusiasts in America. The article suggests that this move is to protect users of the business channels.

I can see that attitude taking off over here!
73

Paul Beaumont G7VAK

Dear Sir

For polar orbiting satellite monitoring I am currently using a frame store made up of five 131072 word x 8-bit SRAMs to provide a 1200 pixel per line, 540 line display on a monochrome monitor, i.e. hardware only, no software. This set up provides a 4.5 minute slice visual or IR selectable from a tape recording of a complete pass. Because of the SRAM access time of 85ns the line frequency is limited to about 10kHz resulting in a field frequency of about 18Hz. Screen persistence makes flicker quite tolerable, indeed, excellent pictures are routinely obtained (Timestep PROscan 4.1 receiver).

Now, short of screen photography, no hard copy is available. Toying with the idea of purchasing a FAX machine for domestic use, it occurred to me that it might be possible to construct an interface which would permit the contents of my frame store/D to A convertor to be delivered to the FAX machine to be recognised and printed in the normal manner.

At the Patent Office Library I found *CCITT Data Standard v. 29 for FAX Machines (Group III, Class 1)*. This refers to 9.6Kbit/sec; combined amplitude and phase modulation; synchronous mode of operation; carrier frequency 1700±1Hz; scrambled data stream divided into groups of four consecutive bits, etc.

Help! Are there are readers who are knowledgeable in this field who could suggest viable solutions or know of any publications which give detailed descriptions of the workings of office FAX machines.

Thank you for an excellent magazine.

B. W. Smithers
Harrow
Middlesex

I don't doubt that Lawrence Harris, our 'Info In Orbit' expert will be able to answer your questions, or know a man who can. Ed.

SWM Services

Subscriptions

Subscriptions are available at £30 per annum to UK addresses, £35 in Europe and £38 (Airsaver), £45 (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 £50 (UK) £59 (Europe) and £63 (rest of world), £74 (airmail).

Components for SWM Projects

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

The printed circuit boards for SWM projects are available from the SWM PCB Service, Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: (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 £2.85 each, photocopies are also £2.85 per article, plus £1.00 for subsequent parts of serial articles.

Binders, each taking one volume are available for £6.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

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

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

Technical Help

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

America

Bandscan America
Gerry L. Dexter,
SWM Editorial Offices,
Broadstone,
Dorset BH 8 8PW.

Bandscan

Some very good news: The Canadian government is going to give Radio Canada International 'full funding' for 1998 and 1999, to the tune of just over \$15.5 million (Canadian) each year.

The proposed sale of Herald Broadcasting's (Christian Science Monitor) Monitor Radio news service to World Time, Inc. did not go through. Thus, as planned, Monitor Radio closed down at the end of June and the only programming now heard on the Herald Broadcasting's two short wave stations is religious and the languages used vary from day-to-day. The two stations are still for sale.

Prophecy Countdown, the religious organisation which bought Herald Broadcasting's WCSN in Maine a couple of years ago has been forced to close down due to lack of funds. It was unable to pay the local electric company and a finance company soon took over the entire property.

All WVHA employees contracts were terminated and the facility is empty and silent. The new short wave station in Georgia mentioned last time has not yet come on the air, although it is expected to be operational soon. The expected call is to be WWBS, with initial operations on 11.910MHz.

Meantime, there's word that still another new short wave station will come on the air, near Lake City, Florida. Much of its air time would be used to carry Chuck Harder's *For the People* programme now aired on US stations WHRI and WWCR.

The station WRMI, Miami, on 9.955 is now operating on a 24 hour per day schedule, although there are a few breaks from time to time. The programmes are in English and Spanish and include everything from station-produced shows to commercial religious broadcasters to programmes with various political agendas to rebroadcasts of foreign pirate programmes.

In Peru, Radio Chaski has come on the air from Cusco with 1kW on 6.087 (assigned 6.090) with broadcasts in Spanish and Quechua. It is operated by Baptist Mid Missions. The address is: **Apartado 368**,

Cusco, Peru. The initial schedule doesn't involve a lot of hours. UK listeners should check between 0000 to 0200.

Another new Peruvian is due on the air soon, owned by Adventist World Radio. It will broadcast from Juliaca with a 5kW transmitter broadcasting programmes in local languages Quechua and Aymara, as well as Spanish.

Recent receptions of other Peruvian short wave stations include:

MHz	Radio	MHz	Radio
3.230	El Sol de los Andes	5.677	Frecuencia San Ignacio
4.039	Marginal	5.730	Santiago
4.410	Lider Bambamarca	5.767	Master
4.461	Nor Andina	5.728	Naylamp
4.567	Gotas de Oro	5.993	Melodia
4.750	San Francisco Solano	6.018	Victoria
4.757	Huanta 2000	6.045	Santa Rosa
4.790	Atlantida	6.140	Huallay
4.822	Atahualpa	6.188	Oriente
4.840	Andahuaylas	6.250	La Voz
4.855	La Hora	6.261	JVL
4.887	Villa Rica	6.536	Huancabamba
4.890	Chota	6.676	Huamachuco
4.914	Cora del Peru	6.726	Satelite
4.969	Imagen	6.798	Ondas del Rio Mayo
4.991	Ancash	6.895	San Miguel
4.996	Andina	7.401	San Ignacio
5.025	Quillabamba	7.142	Ayabaca
5.047	Integracion	9.505	Tacna
5.522	Sudamerica	9.675	del Pacifico
5.630	Illucan	9.722	Victoria

(Frequencies have been rounded off to the nearest kHz. Almost every one of these stations operates a few hertz high or low.

Station Activity

In Mexico, XEQM in Merida, has been reactivated on 6.105. Mexican stations, unfortunately, have a history of returning to short wave for only brief periods before going silent for long stretches, so it's impossible to say how long this particular showing will be.

This station has long used the slogan 'Su Pantera' (Panther). While the comings and goings of mostly inactive Mexican stations is something we've more or less come to expect, the appearance of a brand new Mexican station is a rare event.

Indeed, the average serious DXer (including yours truly) probably wouldn't even want to hazard a guess as to when such a thing

last happened. But now it has!

XERTA, Radio Transcontinental de America, is now active on 4.800 (or a fraction higher) and also using the slogan 'RTA - la voz comercial de Mexico' and apparently beamed to the US and Canada and even airing some English. The address is: **Radio Transcontinental de America, PO Box 375, Tijuana, BC, Mexico.**

There's some doubt on the actual location of the transmitters, although the main office of the organisation is in Mexico City. They announce a power of 50kW. European DXers should be able to bag this one in the post 0000 hours, although there can be a lot of interference from other stations on or near 4.800.

The government's Radio Mexico International continues to operate on a regular basis. The current schedule is 1200-1600 and 1800 to 2300 on 5.985 and 9.705. Then, 2300 to 0500 on 9.705 (this runs to just 0400 on Saturdays and Sundays). There are half hour programmes in English at 1400, 1500, 1900, 2000 and 0300 daily except Sundays. Also at 0400 Monday through Friday.

Check 6.075 for Radio 88 Estereo, which is supposed to be active from San Jose, relaying a local f.m. stereo station on 88.5. Normal sign off is at 0500, though the closing time may be different on the weekends. La Voz de Guatemala, long absent from short wave, has resumed broadcasts on its old frequency of 6.180. This was always a great source of marimba music.

Another station long gone from short wave is SODRE in Montevideo, Uruguay. But that one, too, has now returned to the higher frequencies, operating on 9.621 (nominal 9.620), running to 0300 with relays of the local 1050 medium wave station. This is, apparently, using rather low power and, it seems, is having a bit of a struggle to keep all the parts working properly.

Recent Brazilian short wave loggings include (top of the next column):

Despite many technical problems and spare parts difficulties, Radio Havana Cuba continues to hang in there. It is currently on the air with

Rallies

October 25: The G-QRP Club Mini Convention is being held at St. Aidan's Hall, Sudden, Rochdale, Lancashire. Admission is £1 and doors open at 1000. Talk-in on S22. There is a large social area, lectures on QRP subjects, Bring & Buy, surplus, junk, components, kit traders, food and drink all day. **Rev. George Dobbs G3RJV** on Tel/FAX: (01706) 631812.

November 8: AMS '97, Computer & Electronics Show, will take place at Bingley Hall, Stafford County Showground, Weston Road, Stafford. Admission is £3 for adults, children under 14 - 50p, concessions, OAPs, RSGB Members, Student Card, UB40 £2. Contact the organisers **Sharward**

Promotions, Knightsdale Business Centre, 30 Knightsdale Road, Ipswich IP1 4JJ, Tel: (01473) 741533, FAX: (01473) 741361.

***November 8/9:** The North Wales Radio & Electronics Show is being held at the Aberconwy Conference & The Bew Theatre, Llandudno. The show opens at 10am both days. **B. Mee GW7EXH** on (01745) 591704.

November 9: The Midland Amateur Radio Society Birmingham 9th Radio & Computer Rally is being held at Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Doors open 1000 to 1600 and admission is £1. There is a large free car park, free hamper draw, trade stands, local clubs, special interest exhibits. Trader details from **Norman G8BHE** on 0121-422 9787 or general information from **Peter Haylor** on 0121-443 1189.

November 9: The 7th Great Northern Hamfest (formerly the Barnsley Amateur Radio Rally) will take place at the Metrodome Leisure Complex in Barnsley Town Centre, less than two miles from junction 37 M1, five minutes walk for the

train and bus station. Doors open at 1000. The venue is all on one level with two large halls, with disabled facilities. The event will feature all the usual trade stands, covering amateur radio, computers (hardware and software), electronics components and kits and much, much more. This year, there will be Morse tests on demand from 1200 to 1500hrs (candidates must bring the appropriate documentation). Talk-in on S22, disabled car parking in leisure complex, all other parking in surrounding car parks, admission to Hamfest is £1.50. **Ernie G4LUE** on (01226) 716339 or mobile on (0836) 748958.

November 15: The London Amateur Radio & Computer Christmas Rally is to be held at the Lee Valley Leisure Centre, Picketts Lock Lane, Edmonton, London. Doors open at 10am to 5pm each day. Admission is £2.50 for adults, £1.50 for pensioners and £1.50 for under 14s. With around 100 exhibitors, special interest groups a huge Bring & Buy stand, disabled facilities, bars and restaurants, it's the event with something to interest every radio and computer enthusiast. **RadioSport Ltd., 126 Mount Pleasant Lane, Bricket Wood, Herts AL2 3XD** or telephone on (01923) 893929.

Practical

Wireless

**COMING NEXT MONTH -
DECEMBER**

REVIEWED!

- * Richard Newton GORSN puts the Palstar KH6 hand-held 50MHz transceiver to the test.
- * Rob Mannion G3XFD and Tex Swann G1TEX take a joint look at the new AKD HF3E receiver.

BUILD!

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ICOM

IC-PCR1000

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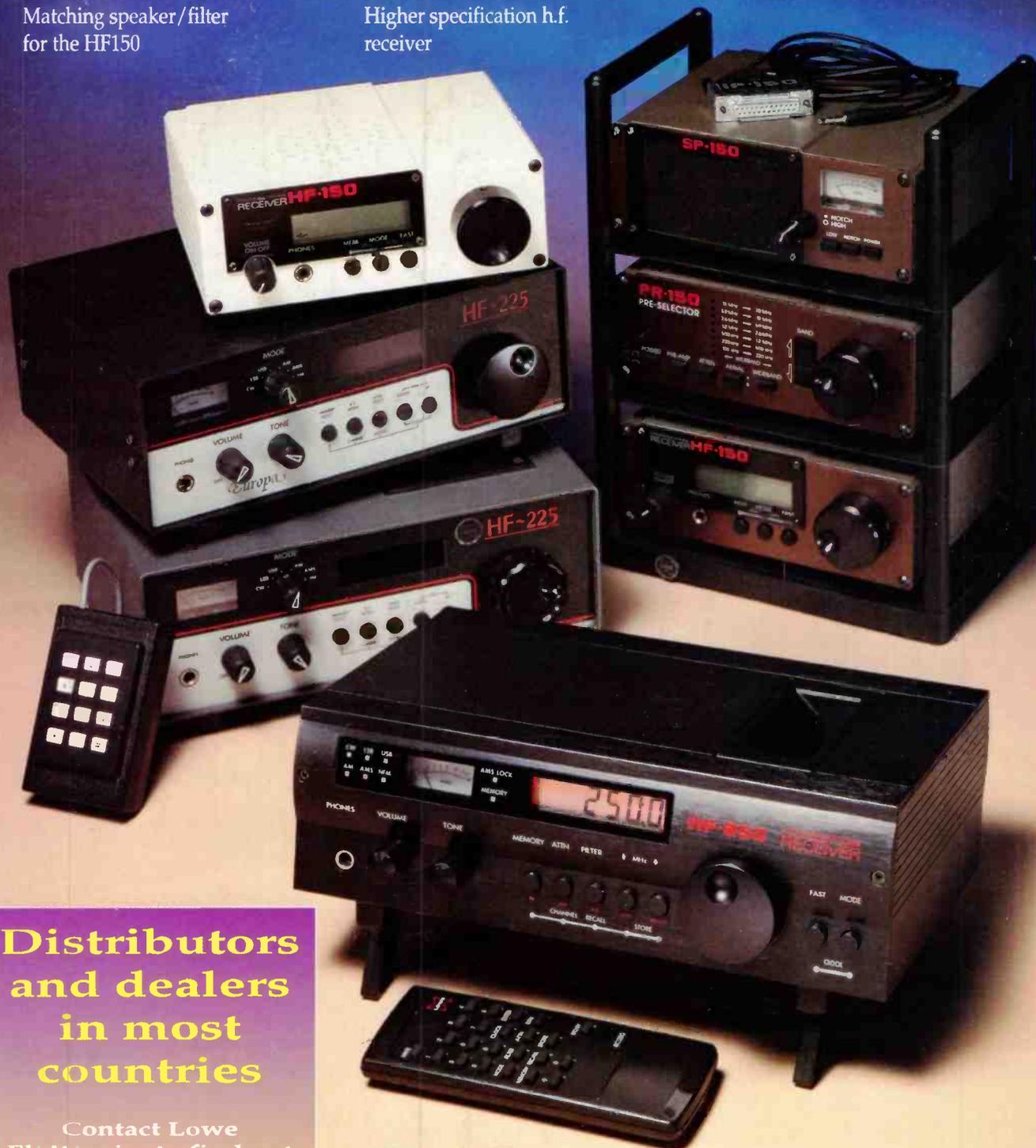
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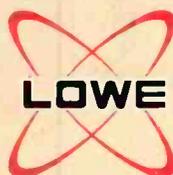
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MHz	Radio	MHz	Radio
2.460	Super Radio Alvorada	6.010	Inconfidencia
3.255	Educadora 6 de Agosto	6.120	Globo
4.755	Educadora Rural	6.135	Aparecida
4.785	Caiari	6.183	Nacional Amazonia (nominal 6.180)
4.815	Radiodifusora Londrina	9.615	Cultura Sao Paulo
4.845	Meterologica Paulista	9.665	Marumby
4.875	Radiodifusora Roraima	11.725	Marumby
4.925	Radiodifusora Taubate	11.783	Nacional Amazonia (nominal 11.780)
4.975	Tupi	11.795	Guaiba
5.035	Aparecida	11.805	Globo
		15.190	Inconfidencia

English to Europe from 2030 to 2130 on 13.715 and 13.725, the latter in upper sideband. The DX programme airs Saturdays at 2015. In Nicaragua the former clandestine station Radio Miskut continues to operate on 5.770.

At one time it was thought this station was going to leave short wave and operate on local f.m. but, in fact, the plans are to put a new 500W transmitter on the air on short wave. As it is, the station is not heard very well in the US much of the year due to its quite low power and early sign off time - normally around 2330.

In Venezuela, the government's station, Radio Nacional de Venezuela, has been reactivated on 9.540 and Radio Amazonas on 4.940 has also returned. Sadly, though, the great majority of the many privately-owned Venezuela broadcasters are now inactive on short wave - many permanently.

Things are a little better in Colombia. Here's what's being heard of late:

MHz	Radio	MHz	Radio
4.915	Armonias del Caqueta	6.015	Radio Mira
4.975	Ondas del Orteguzaza	6.064	Colmundo Bogota
5.019	Ecos del Atrato	6.115	La Voz del Llano
5.077	Caracol Bogota		

The schedule for the Voice of Greece relay over the Voice of America's transmitters in Greenville and Delano: 0600 to 0800 and 0900 to 0950 on 9.775 via Delano, beamed to Australia; 1200 to 1350 via Greenville on 9.550 and 1830 to 2200 on 11.730 via Delano, both to Canada and, at the same hours, on 17.745 via Greenville to Latin America.

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

Grassroots

AVON

Bristol International RC: Tuesdays, 2000. 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. October 28 - AGM, November 25 - Home-brew competition, three categories, Novice - General - Technical, whatever you have built, bring it along. Robin Thompson G3TKF on (01225) 420442.

South Bristol ARC: Wednesdays, 1930. Whitchurch Folkhouse Assoc., Bridge Farm House, East Dundry Rd, Whitchurch. October 29 - Members Suggestions, November 5 - Top Band activity - Committee meeting, 12th - Christmas raffle commences, 19th - AGM, 26th - Show your exciting QSL cards. For more information ring (01275) 834282 on a Wednesday evening.

BUCKINGHAMSHIRE

Aylesbury Vale RS: Wednesday evenings, 2000. Hardwick Village Hall, (Hardwick is situated off the A413 between Aylesbury and Buckingham). November 5 - Quiz night. Gerry Somers G7VJV on (01296) 432234.

CHESHIRE

Mid-Cheshire ARS: Meetings held every Wednesday, 2000, at Cotebrook Village Hall, North of Tarporley, Cheshire. October 29 - VHF on air club station G8ZTT/construction class. Ted Banister G0RBA on (01606) 592207.

DEVON

Appledore & DARC: 3rd Mondays, 1930. Appledore Football Clubroom. November 17 - Quiz night with Mike G3PGA. Den Williams G0UMT on (01237) 471802 for more information.

Exmouth ARC: Alternate Wednesdays at the Scout Hut, Marlpool Hill, Exmouth. November 5 - Aerial evening. D. Fox G0NRR on (01395) 271880.

Torbay ARS: Fridays, 1930. ECC Social Club, Highweek. Newton Abbot. October 24 - Radio controlled models, November 21 - A Kenyan Safari talk. Peter G4UTO, (01803) 864528.

EAST SUSSEX

Hastings Electronics & RC: 3rd Wednesdays, 1930. West Hill Community Centre, Croft Road, Hastings. The club runs courses for the RAE and Novices and is approved as an Examination Centre for City & Guilds exams. Doug Mephem G4ERA, 8 The Close, Fairlight, E. Sussex TN35 4AQ or 'phone on (01424) 812350.

EDINBURGH

Lothians RS: 2nd & 4th Wednesdays, 1930. Orwell Lodge Hotel, Polworth Terrace, Edinburgh. November 12 - Are your keys really necessary? by Geoff Walsh GM4FH, 14th - 50th Anniversary Dinner, 26th - Computer Shareware - FM Deviation Workshop - Bring your rig and manual! Tommy Main GM4DCL, QTHR on 0131-663 8501 day and evening.

GREATER LONDON

Southgate RC: 2nd & 4th Thursdays. Winchmore Hill Cricket Club, The Paulin Ground, Firs Lane, Winchmore Hill, London N21 3ER. October 23 - Radio on the air, November 13 - G6QM judging, 27th - Demo night. Dave Michael G0ASA on 0181-482 6795, FAX: 0181-807 5366.

Surrey Radio Contact Club: Terra Nova, The Waldrons, Waddon, Croydon, Surrey. November 3 - Merchant Navy Radio by Tony Trent G0VGT, 17th - Natter night. Berni G8TB on 0181-660 7517.

HAMPSHIRE

Hordean & DARC: 1st & 4th Tuesdays, 1930. Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. October 28 - AGM and presentation of awards. S. Swain (01705) 472846.

Southampton ARC: Mondays, 1900. This club is now up-and-running after some years of inactivity. New members welcome. Harold McIntyre on (01703) 737715.

HEREFORD & WORCESTER

Malvern Hills RAC: 2nd Tuesdays. Red Lion, St. Annes Rd. November 11 - Microelectronics. Dave Hobro G4IDF on (01905) 351568 evenings and weekends.

HERTFORDSHIRE

Hoddeson RC: Alternate Thursdays, 2000. Conservative Club, Rye Road, Hoddeson. October 24 - Club dinner,

November 15-16th - We will be at Picketts Lock Rally. Don G3JNJ on 0181-292 3678.

Verulam ARC: 2nd & 4th Tuesdays, 2000. RAFA Club, New Kent Road, St Albans. New members and visitors welcome. October 28 - Repeater management, November 25 - 3rd generation mobile communications. Ian Forsyth G0PAU on (01923) 222284.

KENT

Medway AR & TS: Fridays, 1930. Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, Chatham, Kent. October 24 - Peter G0GIR talks on Satellite DX, 31st - Slow and fast scan exchange with the Southend Club, November 2 - John Gill G0VVAN talks on ancient cables, 14th - Fish and chip supper. G3VUN, 40 Linwood Avenue, Strood, Rochester, Kent ME2 3TR, (01634) 710023.

NORFOLK

Norfolk ARC: Wednesdays, 1930. Formal and informal meetings at The Norman Centre, Bignold Road, Off Drayton Road between 'Asda' and Three Mile Cross Roundabout, Norwich. October 29 - Night on the air, construction QRP and Morse practice, November 5 - Construction contest, 12th - Night on the air, construction QRP and Morse practice, 19th - Science For All by Arnold G3PTB, 26th - Night on the air, construction QRP and Morse practice. Mike G4EOL, (01603) 789792.

West Norfolk Airband Monitoring Group: Regular informal meetings on Thursdays, 1930. Dave on (01485) 578183 for details.

NORTH YORKSHIRE

Hambleton ARS: All meetings held at Allerstonshire School, Northallerton, 1930 to 2130, November 6 - RTTY, 20th - Radio quiz. More details from John G0VXH on (01845) 537547.

WARWICKSHIRE

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 2000. St Johns HQ, Warwick Div, 61 Emscote Road, Warwick. October 28 - The Yorkshire Dales - A Lancashire Lad by G0FBY, G8XDL on (01926) 498115.

Stratford-upon-Avon & DRS: 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Street, Tiddington. Stratford-upon-Avon. November 10 - B.E.R.U. by Dr R.C. Whelan G3PTJ, 24th - History of Morse code and an exhibition of Morse keys by Gerry G3KPT. 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 MIDLANDS

South Birmingham RS: West Heath Community Association, Hamstead House, Fairfax Road, West Heath, Birmingham. November 5 - Club AGM and election of Officers and Committee, year's accounts and programme review, starts 8pm. Don Keeling on 0121-458 1603.

WEST YORKSHIRE

Wakefield & DRS: Tuesdays, 2000. The Ossett Community Centre, Prospect Road, Ossett. October 28 - On the air, November 4 - Pie and peas night, 11th - The great egg race, 18th - Video night, 25th - Circuits I have known. John G7JTH, QTHR on (01924) 251822.

WILTSHIRE

Salisbury ARC: 2nd and 4th Tuesdays, 2000 The Scout Hut, St. Marks Avenue, Salisbury, Wiltshire. Prospective members and visitors are welcome. A club Net held daily at 1830 local time and additionally 2030 Fridays 5.16 (V32) 145,000. RAE tuition available. October 28 - CQ G4ZUP - From South Portland Bill Lighthouse, November 11 - Talk on Comings & Goings of a QSL Bureau by Gordon G4KJV, Jamie G7WAA on (01772) 334935 (business hours).

Trowbridge & DARC: 1st & 3rd Wednesdays, 2000. The Southwick Village Hall, Southwick, Trowbridge. November 5 - Constructors Cup Event, 19th - Natter Night. Ian G0GRI on (01225) 864698.

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



This recent QSL from Radio Mexico International appears to be a newly designed card. Normally, RMI replies with a form letter.



Adventist World Radio has radio stations spotted around the world, plus studios in many more locations. Their newest station will be a Voice of Hope outlet in Juliaca, Peru.

The Quad Loop

Joe Carr
K4IPV,
takes us on
yet another
antenna
journey.
This time
we loop the
loop and
discover a
thrilling
ride.

Obtaining directivity and gain in an antenna can be quite a task. It can also be quite expensive. But there is a way to obtain gain and directivity on the cheap, using a very special kind of gain antenna. The various types of quad loop antennas represent a great opportunity to improve your reception in both the h.f. and v.h.f. bands. And what's more, they can be both low cost and are well-behaved...which means that they tend to work well when home-brewed. They can also be used by both licensed amateur operators and s.w.l.s.

What Is A 'Large Loop'?

There are two very broad categories of loop antennas. Small loops are used for radio direction finding (RDF). These loops have an overall wire length that is less than 0.18λ , and may be shaped as a circle, square, triangle, octagon or hexagon. The loop may have only one turn, or many. Although there are examples of small RDF loops used in the upper h.f. and v.h.f. bands, the principal use is in the medium wave bands, a.m. broadcast band and l.f./v.l.f. bands. The directivity of the small loop puts the minima (nulls) broadside to the loop, and the maxima off the ends.

The large loop (Fig. 1), on the other hand, has an overall wire length of at least half wavelength ($\lambda/2$), and may be as much as 2λ . Large loop antennas usually have just one turn of wire, and are usually square, rectangular or triangular ('delta loops'). The most common form of loop is the one wavelength (1λ), single turn square loop, in which the length of each side is $\lambda/4$. This form of antenna has a gain of about 4.1dB above an isotropic radiator and 2dB above a half wavelength dipole.

Figure 1 shows two forms of square 1λ loop. The version in Fig. 1a is fed at the centre point of the bottom wire, and produces horizontal polarisation. Rotating the loop 90° (Fig. 1b), with the feed in the centre of either vertical wire, produces vertical polarisation.

The radiation patterns associated with the square 1λ loop are shown

Fig. 1: a) Horizontally polarised quad loop; b) vertically polarised quad loop. The difference is in the feed point.

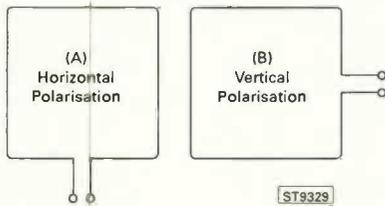


TABLE I

Frequency (MHz)	Overall Length (m)	Each Side (m)
7.2	41.727	10.433
9.75	31.212	7.803
11.75	25.909	6.479
14.2	21.455	5.364
18	16.909	4.227
21.25	14.333	3.585
24	12.667	3.167
27	11.273	2.818
29	10.515	2.630

in Fig. 2. The assumption made here is that the top horizontal wire is $\lambda/4$ above the Earth's surface, which is a reasonable assumption for most h.f. loops. The azimuthal pattern, which is a view from above, is seen in Fig. 2a. The maxima, i.e. directions of maximum radiation or greatest receive sensitivity, are broadside to the loop. The minima are off the ends of the loop, and are quite sharp. These directions, if you will recall from above, are exactly the opposite of what is found on small RDF loops.

The elevation patterns are seen in Figs. 2b (horizontally polarised version) and 2c (vertically polarised version). In both cases, the directivity is as shown in Fig. 2a, and the elevation patterns represent a slice taken from the solid three-dimensional radiation pattern that actually exists. Note that the horizontally polarised version in Fig. 2a has a higher angle of radiation than the vertically polarised version of Fig. 2c.

The overall length of the wire used to make the quad loop is:

$$L = 304.55/F$$

Where L is the overall length in metres, and F is the frequency in megahertz (MHz). The length of each side is one-quarter (1/4) of this length. The appropriate lengths for several different bands are found in Table 1.

These bands represent some of the more popular amateur and international broadcast bands where h.f. loops are most useful. You can build loops for the 160m amateur band, or the 4-5MHz tropical bands, but the sizes are large enough to cause problems at most installation sites.

Building & Installing the Quad Loop Antenna

When you plan the installation of a quad loop antenna you must take into account the exact nature and layout of the site. There are some general guidelines, however,

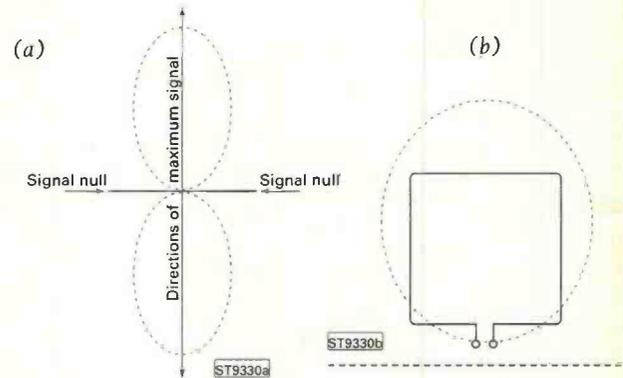


Fig. 2: Antenna patterns: a) azimuthal; b) horizontally polarised feed

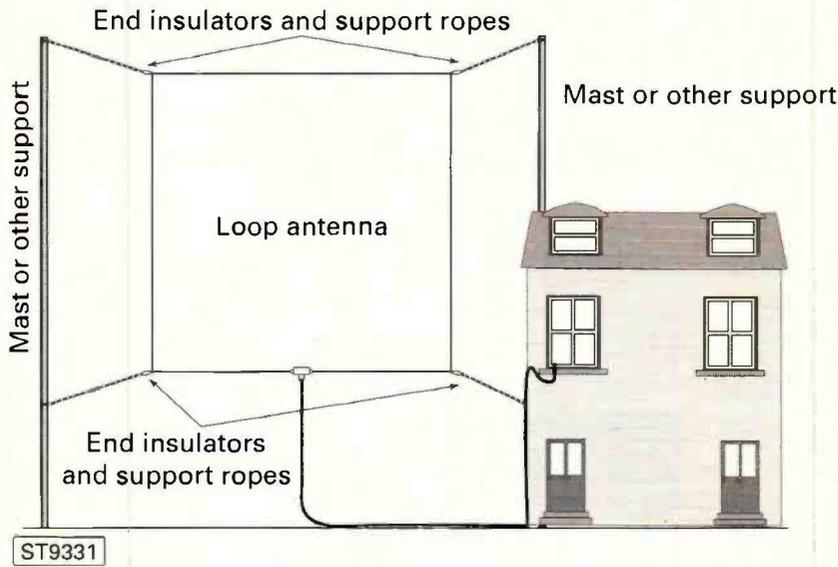


Fig. 3: Rope method of erecting a quad loop.

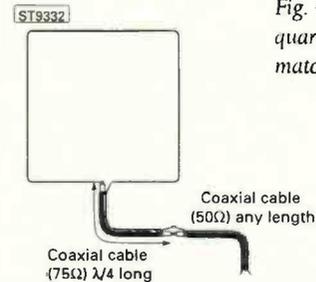


Fig. 4: Use of a quarter wavelength matching section.

and they should be able to prompt your thinking about designing a loop that works at your place. But first, let's talk a bit about safety.

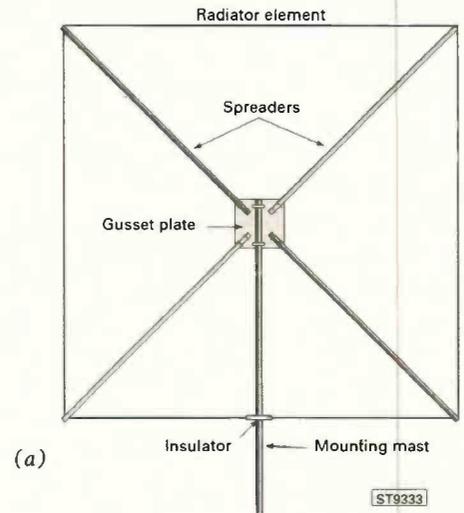
Antennas can be dangerous to install, and they can be dangerous to passers-by if the installation is designed poorly. There are three different issues that must be taken into account: electrical safety, mechanical integrity and the safety of passers-by. The electrical safety issues should be obvious, but there always seems to be a few cases of electrocution or injury from people installing antennas in an unsafe manner. Don't even think about tossing an antenna wire or transmission line across a.c. power lines. Even though both are insulated, it's very likely that the stresses will cut through the wire and make the antenna come into contact with the power line...and **kill anyone who touches the antenna!** It's also necessary to erect the antenna in such a way that it will not fall onto the electrical power lines if it fails or comes apart.

Mechanical integrity means that you build it well, with due regard for the wind situation in your area. There might also be some local planning issues to consider (consult your local government's planning department if in doubt).

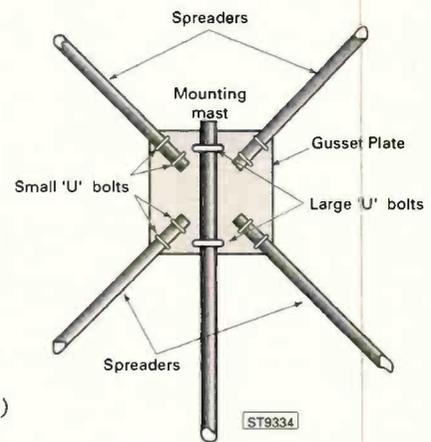
The matter of third party safety is also quite important. You don't want the antenna situated such that someone passing through your garden (even trespassing!) will walk into the wire and experience injury. If the antenna is for transmitting, then you also want to position it to prevent someone from casually touching the wire. If there are small children in the neighbourhood, then put up a fence or other obstacle to keep the little squirt from climbing it or pulling it down. Finally, make sure that if it falls it won't fall on someone walking by, especially outside the boundary to your own property.

Figure 3 shows one method for building a quad. Although it can be used on any frequency, this method is particularly useful for lower frequency quad loops where each side is quite long. In this method of installation, two convenient supports (tree, mast or roof of a building) are selected. They must be a greater distance apart than the lengths of the horizontal sides of the loop. Ordinary end insulators (see Fig. 3) are used to support the corners of the loop, while lengths of rope run from the insulators to the supports.

The feed point of the quad loop has an impedance of around 100Ω , so makes a fairly good match to 75Ω coaxial cable. The coaxial feeder can be connected to the loop via a special dipole centre insulator, or crudely with another end insulator (not recommended because

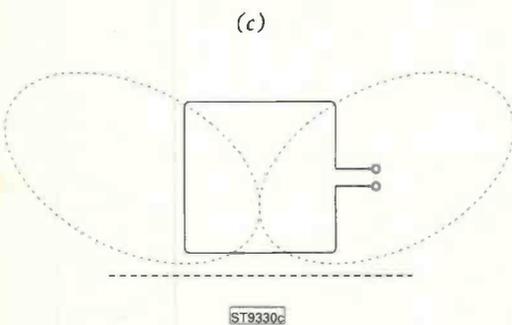


(a)



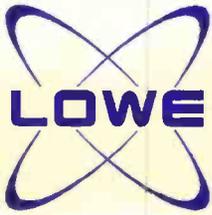
(b)

Fig. 5: a) Quad loop construction; b) detail of gusset plate.



ST9330c

elevation plot; c) vertically polarised feed elevation plot.



Lowe Elec

NEW! FROM ICOM



For the listener who doesn't want to miss a thing!

The IC-PCR1000 lets you listen to the airwaves on your PC!
 No knobs - use your keypad and mouse instead
 Three interface screens to choose from:
 Display screen showing all you need, as on a real receiver
 Component screen for tuning and mode choice etc.
 Radio screen show presets for stations and frequencies
 External connection for your PC or laptop
 Real-time bandscope function
 All-mode receiver - 100kHz - 1300MHz

Low Price £349.95

JRC NRD345G

An all-mode receiver, the NRD345 includes synchronous detection as standard, offering low signal distortion and clear sound. Direct Digital Synthesis is employed in a phase locked loop circuit to enhance the carrier to sideband noise ratio. The RF amplifier and the first mixer in the front end stage incorporate 4 low-noise junction-type FETs with excellent cross modulation characteristics respectively to ensure high sensitivity with wide dynamic range. Other features include a variable level noise blanker, clock and timer functions and a built-in RS232 interface for computer control.

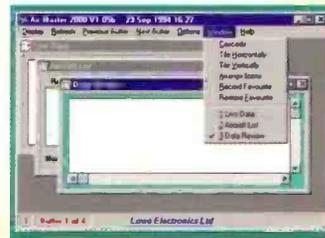


Low Price £749.00

AIRMASTER 2000

Software decoder for ACARS

AIRMASTER 2000 equipped airband enthusiasts have a low-cost way of monitoring ACARS transmissions, adding a whole new world of airband monitoring. Now airband enthusiasts can have accurate data regarding flight numbers, tail numbers, weather conditions, schedules, flight plan and position information together with a host of engineering information including engine performance and fuel status; all in real-time!



To receive and decode ACARS traffic you need three items:

1. A suitable receiver
2. IBM Compatible Personal Computer with MS-Windows 95 or v3.1
3. AIRMASTER 2000

AIRMASTER 2000 is Lowe's ACARS Windows based decoding system. Hardware and software is supplied consisting of a small demodulator built into a 25 way D-type plug and the decoding software. The plug connects and derives its power from a COM port on the PC. The software is installed on the PC hard disk drive. The receiver or scanner is connected to the other demodulator connection.

Low Price £89.95

Upgrade from earlier DOS version £29.95

RCON

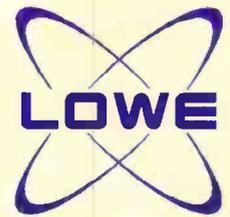
Receiver Control Program for Windows



RCON is a Windows-based software program used to remotely control a suitably equipped communications receiver or scanner via an RS232 link. Integrated with the application are two relational databases of broadcaster/air band information that can be queried to tune the receiver quickly and accurately to active channels. Provision is made to manage the memory stores, timers and clock of the receiver. Additionally the application can be used to provide a means of easily tuning and controlling a receiver for other types of listening required by the operator in a highly "user-friendly" manner. Dozens of new ideas are implemented in this new release, thanks to many suggestions made by satisfied users of V1.0! You can select a Monitor Window, simulating a radio front panel with "virtual controls" or operate from a Database Window allowing rapid selection of frequencies and stations.

Low Price £49.95

tronics Ltd



The trouble with ordinary maps is, they don't know where you are



this is no ordinary map

GPSIII from Garmin

A Global Positioning System receiver with electronic map. It not only shows you the lay of the land, but where you stand, too.

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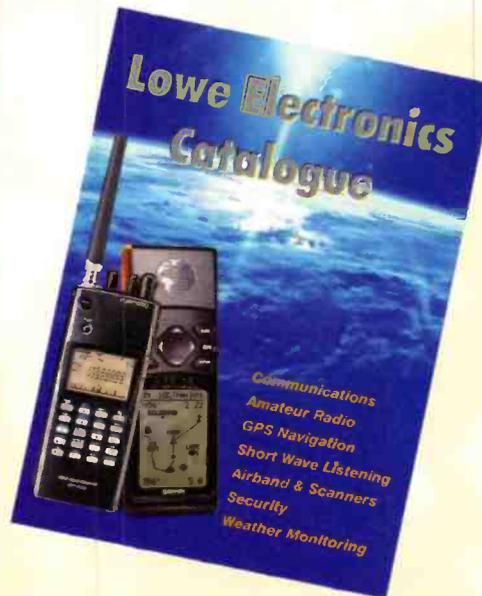
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Fig. 6: Two forms of quad loop beam.

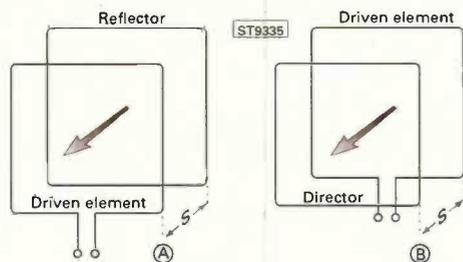


Fig. 7: Four-element quad loop beam.

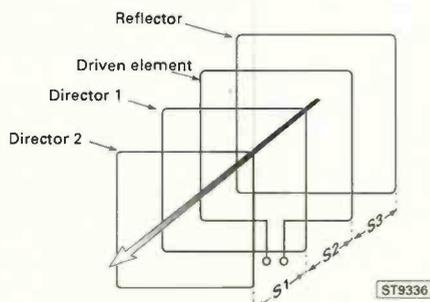
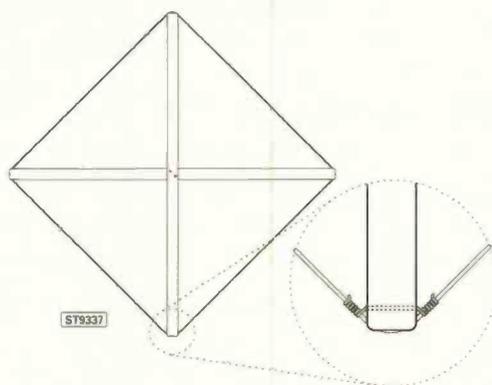


Fig. 8: Detail of each element.



it weathers poorly). A 1:1 Balun transformer can also be used as the centre insulator, and indeed may be the best method of connection.

If you want a better impedance match than is possible with straight connection, then you might want to use a quarter wavelength matching section made of 75Ω coaxial cable, and feed the rig or receiver with 50Ω cable (Fig. 4). The 75Ω matching section matches 100Ω to 50Ω when 75Ω cable is used. Because signals travel in coax slower than in free space, the physical length of the coaxial cable is reduced from quarter wavelength by the velocity factor (V) the cable:

$$L_{\text{Cable}} = 74.55V/F$$

Where L_{Cable} is the cable's physical length in metres, F is the frequency in megahertz (MHz) and V is the velocity factor. The value of V is 0.66 if polyethylene dielectric cable is used, and 0.80 if polyfoam dielectric cable is used. Let's look at an example. Suppose we want to build a quad loop for the 31m international broadcast band, centred on 11.75MHz. From the equation and table given earlier, you know that the overall length of the wire in the loop is 25.901m, with

each side being 6.479m. To provide a quarter wavelength matching section you need 75Ω cable of the following length (if polyethylene dielectric is used):

$$L_{\text{Cable}} = 74.55 \times 0.66 / 11.75 \\ = 49.203 / 11.75 = 4.187\text{m}$$

Once the 4.188m section of 75Ω coaxial cable is cut and in place, cut any convenient length of 50Ω coax to run to the receiver or transceiver.

Figure 5a shows a method for building quad loop antennas in the higher end of the h.f. and low end of the v.h.f. band (e.g. 14MHz and up). The quad is built using a set of four spreaders fanning out from a square plywood gusset plate. The gusset plate is bolted to a mounting mast. The spreaders are made of glass fibre, and are the most expensive portion of this antenna. Suitable spreaders can be bought from antenna dealers, amateur dealers and other radio supplies dealers. At one time, carpet dealers rolled carpet on bamboo stalks that were just about long enough to make a good 14MHz quad. Unfortunately, they no longer use that material...to the detriment of hobbyist antenna constructors.

Figure 5b shows more detail for the gusset plate construction. The plate is made of 18mm plywood. Marine grade plywood, at least 300mm square, and well varnished against weather, is recommended. The spreaders are attached to the gusset plate with two or three small U-bolts and hex nuts. The U-bolt will have a lot of stress on it, so use a good grade of hard brass or stainless steel. The gusset plate is fastened to the mast with larger U-bolts.

Quad Beams

If you put two or more quad loops in an array, parallel to each other (Fig. 6), then you can make a beam antenna. The quad antenna was designed in the late 1930s at missionary radio station HCJB in Quito, Ecuador. The original antennas were half wavelength Yagi-style beams. These antennas have a problem when used at high altitude and at high power. The impedance at the ends is very high, so there is a high voltage at those points. At high altitudes, where the air is thinner, the high voltage at the ends tends to form a corona arc, that costs power and eats up the ends of the antenna. The solution found at HCJB was to feed the antenna in the middle of one leg, which forms a current node. This has the effect of putting the high voltage nodes in the middles of the wire segments adjacent to the feed segment.

The two quad loops are spaced between 0.18λ and 0.25λ , with about 0.2λ being a good compromise.

The two element quad beams shown in Figs. 6a and 6b produce a gain of about 9.1dB above isotropic (dBi) or 7dB above a dipole (dBd). If four elements are used, then up to about 14dBi or 12dBd can be realised.

There are two equivalent forms of quad beam shown in Fig. 6. The version in Fig. 6a uses a reflector element behind the driven element (i.e. the element connected to the transmission line). The size of the reflector is slightly larger than the driven element. The variant in Fig. 6b uses a director element in front of the driven element; the director is smaller than the driven element. The directivity of these antennas is shown by the arrows. While the quad loop is bi-directional, the quad beam is

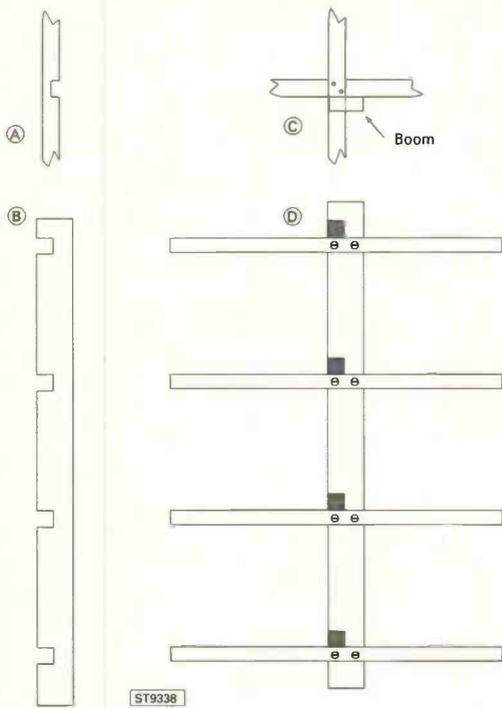


Fig. 9: Construction details.

unidirectional in the direction of the smaller element in the array.

The overall lengths of the wire used in the quad beam elements are found from the equations below, with each side being a quarter of the total length:

$$L_{REFL} = 312/F \text{ (m)}$$

$$L_{DRIVEN} = 304/F \text{ (m)}$$

$$L_{DIR} = 295/F \text{ (m)}$$

$$S = 59.7/F \text{ (m)}$$

Using these figures to make the quad loop beam will result in a workable wire beam that is relatively easy to get working properly.

Build A 4-Element VHF Quad Beam

How would you like to get about 14dBi (12dBd) of unidirectional gain for your scanning receiver? And get it cheap. The quad loop beam shown in Fig. 7 uses one reflector, one driven element and a pair of directors to produce up to 14dBi of gain. At v.h.f. bands the dimensions are small enough to make it possible to build these antennas with ease.

Table 2 gives the dimensions for this antenna when cut for 100MHz (i.e. middle of the f.m. broadcast band).

To make this antenna work on any other frequency, divide all of the dimensions in Table 2 by the desired operating 1/100 the frequency in MHz. This method of design is called frequency scaling. For example, to make an antenna for 450MHz, divide all lengths by 450/100 = 4.5:

$$REFL = 3.121/4.5 = 0.693\text{m}$$

$$D.E. = 3.046/4.5 = 0.677\text{m}$$

$$DIR1 = 2.955/4.5 = 0.657\text{m}$$

$$DIR2 = 2.854/4.5 = 0.634\text{m}$$

$$S1 = 0.537/4.5 = 0.119\text{m}$$

$$S2 = 0.596/4.5 = 0.132\text{m}$$

$$S3 = 0.657/4.5 = 0.146\text{m}$$

Figure 8 shows how this form of v.h.f./u.h.f. quad beam can be built using low-cost materials. The wire is formed on an X-frame made of small wood members. I've used 12 and 18mm square wood for this purpose. You will find this type of material available in hobby stores, as well as do-it-yourself timber and hardware stores. Detail is shown in Fig. 9. Each crossarm is square-notched to a depth of half its thickness. That allows two arms to be fastened together by mating them at the notches. The boom (Fig. 9b) is made of a piece of wood that is at least twice as thick as the crossarm elements. It is notched to a depth equal to the crossarm thickness at all four points (see Table 2 for separations). An end view of the crossarms assembled onto the boom is shown in Fig. 9c, while a top view is shown in Fig. 9d.

When assembling the wooden elements, you will want to use brass machine screws to hold the element together. Some people prefer to use nylon machine screws in order to reduce interaction with the antenna. This effect is quite small, so I don't see it as necessary. It is a very good idea to smear mating surfaces of wood with a thin film of woodwork adhesive (PVA or similar).

A method for feeding this antenna with coaxial cable is shown in Fig. 10. The low impedance feed points for quad loops are found in the middle of the sides, not at the corners. The low impedance point is found at the same point on the segment opposite the feed point; high impedance points are in the middles of the two segments adjacent to the segment where the coaxial feeder is connected.

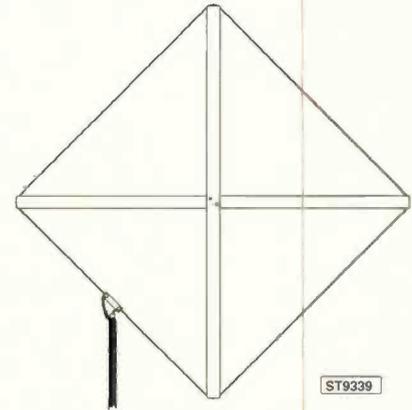


Fig. 10: Feed details for 4-element quad beam.

Conclusion

The quad loop and quad beam works well at h.f. and v.h.f./u.h.f. bands. These antennas are easy to get working, and unless you buy an expensive antenna kit can be dirt cheap. Try it, you'll like it.

TABLE 2

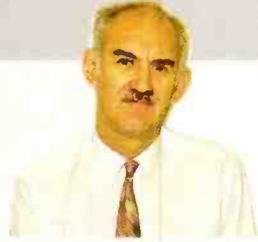
Element	Overall Length (m)
Reflector	3.121
Driven Element	3.046
Director 1	2.955
Director 2	2.854
Spacing S1	0.537
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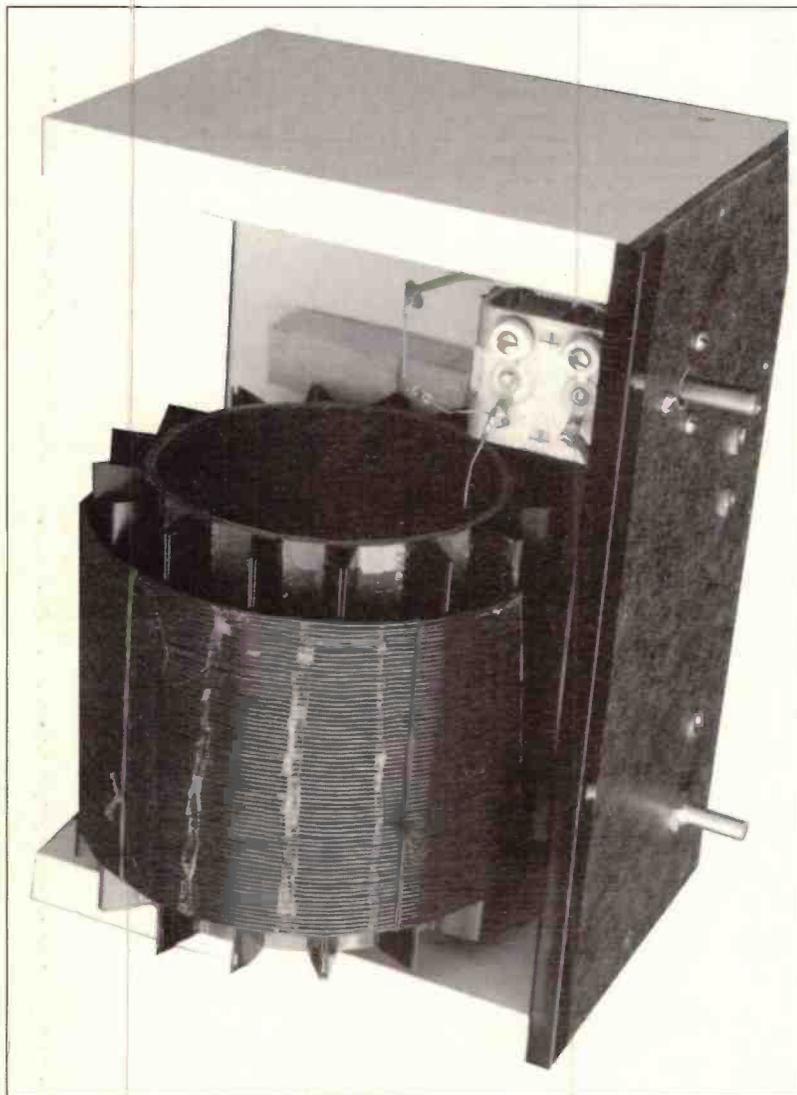
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John Brown G4WBB offers this design of crystal set to try to overcome the problems of poor selectivity.

A view of the crystal set under development. This shows the construction of the coil and how it is mounted in the box.

Selectivity is the ability to differentiate between closely spaced stations and is usually the major problem in crystal sets. Connecting the antenna down the coil improves selectivity at the expense of audio volume. The antenna and earth system collects signal power which is amplitude demodulated by the diode to produce the audio signal. Often the antenna and earth connections so dampen the performance of the coil that selectivity becomes poor.



Design Considerations

To avoid compromising on selectivity, I decided to allow either an antenna or earth connection, but not both. The circuit of the crystal set is shown in Fig. 2. To make up the signal strength the coil is large enough to intercept power directly from the transmitter, but at the same time retain an efficient shape for single layer construction. Its length to diameter ratio is 0.74. Also the coil is air cored to minimise losses and remove the possible varying quality of ferrite rods. Inductance contributes to selectivity and this was made to be around $450\mu\text{H}$, with the self-resonance of the coil around 2.05MHz. Since heavy gauge wire is necessary to give the right number of close wound turns with an efficient coil shape, the wire cross-sectional area is large enough to minimise any degradation of selectivity by the skin effect increasing the apparent impedance of the coil. That is why Litz wire is not used. Using a comparatively high inductance for the coil requires a smaller than usual variable capacitance to tune the medium waveband.

As the parallel tuned circuit works at high impedance, it was found that the best match for audio volume was obtained by using two very high impedance crystal earpieces in series with the diode tapped down the coil. When using an antenna or earth connection, any distortion of the sound on strong signals is avoided by selecting a smaller input coupling capacitance, using the 6-way rotary switch S1. Without an external antenna connected, the volume is a maximum when the coil axis is horizontal and one side of the coil faces towards the transmitter.

The sensitivity of the crystal set was checked using a communications receiver. The receiver was fed by a matching unit and a 4m long wire antenna at ground floor, picture rail level. The input terminal of the crystal set was earthed. Stations with strong signals are clearly heard on the crystal set when they exceed 30dB over S9, but please remember that these signal levels may be unavailable inside steel framed or re-inforced concrete buildings.

Components

The values of the ceramic capacitors C1, 2, 3 & 4 are not critical and may be varied by about 40% in each case. Trimmer C5 can have a maximum value up to 30pF, however, its maximum value should not be less than 22pF. Regarding the variable tuning capacitor, C6, 150pF will cover most of the medium wave. However, I used the 100pF unit because the strong stations in my area all

exceed a frequency of 730kHz and this gives a greater angular swing of the tuning knob between stations. I received five stations. C5 is adjusted to receive your highest frequency station, e.g. Capital Gold, 1548kHz with the vanes of C6 almost fully open. This gives the best swing for the remaining stations. Diodes are cheap and it is worth trying different ones for the best performance. This remark also applies to different crystal earpieces. Where appropriate, Maplin or Cirket part numbers have been quoted in the 'You Will Need' panel.

The Coil

The coil comprises a single layer close wound - i.e. the turns touch each other - and is mounted horizontally on wooden supports. You will need around 250g of enamelled copper wire to complete the winding. Before you start to wind the coil you will probably find it helpful to remove any kinks in the wire by gripping one end in a vice and pulling on the other end until you feel the wire straighten.

Start winding the coil 14mm from the end. This allows wooden support blocks to be used for the coil without touching the actual winding. The three taps on the coil, at turns 33, 38 and 43, are made by scraping the insulation of the wire at the point where the tap is to be made. Neatly twist the bare length of wire into a small loop about 25mm long, using a small pair of pliers, before continuing to wind the coil.

Construction

The crystal set was built in an unscreened Melamine faced box with a hardboard fascia.

All the wiring is kept as short as possible, using insulated tinned copper connecting wire, but do make sure that no component or general wiring comes within about 20mm of the coil. Avoid using steel brackets and minimise the use of screws and nails in the cabinet. All wiring joints are soldered.

You Will Need

Capacitors

Ceramic

30pF	1	C1
40pF	1	C2
60pF	1	C3
120pF	1	C4

Timmer

22pF	1	C5 (Maplin WL70M)
------	---	-------------------

Variable air spaced

100pF	1	C6 (Cirket 06-10009) (see text)
-------	---	---------------------------------

Semiconductors

Diode

OA91	1	D1 (Maplin QH72P)
------	---	-------------------

Miscellaneous

Switch, 6-way rotary type (S1); Sockets 3.5mm mono (3) (SK1,2,3); Very high impedance earpieces, (2); Knobs, 45mm for C6, (Maplin YX04E) (1), 19mm for S1 (Maplin YX01B); Materials for coil former; Enamelled copper wire 1.2mm dia, 250g; Plastics drain pipe 120mm long, 97mm outside diameter, Plastics A4 slidebinders, cut to 120mm long (16); Materials for box (see text).

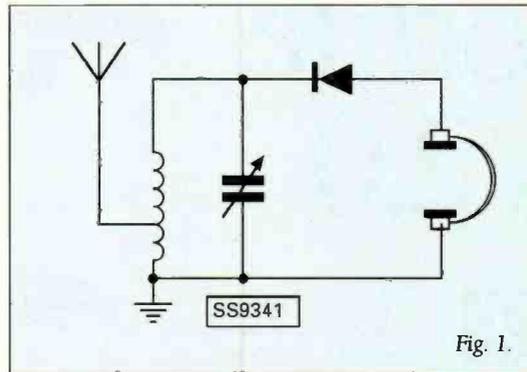


Fig. 1: The traditional circuit of a crystal set.

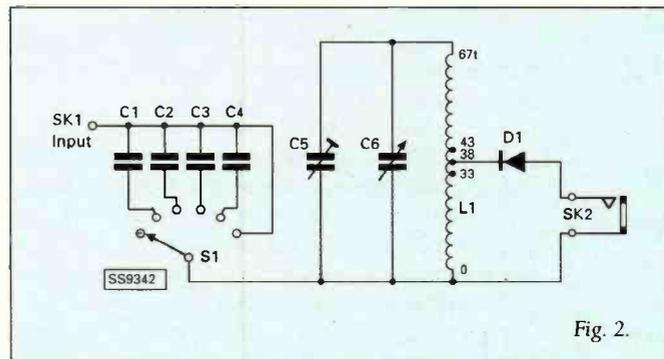


Fig. 2.

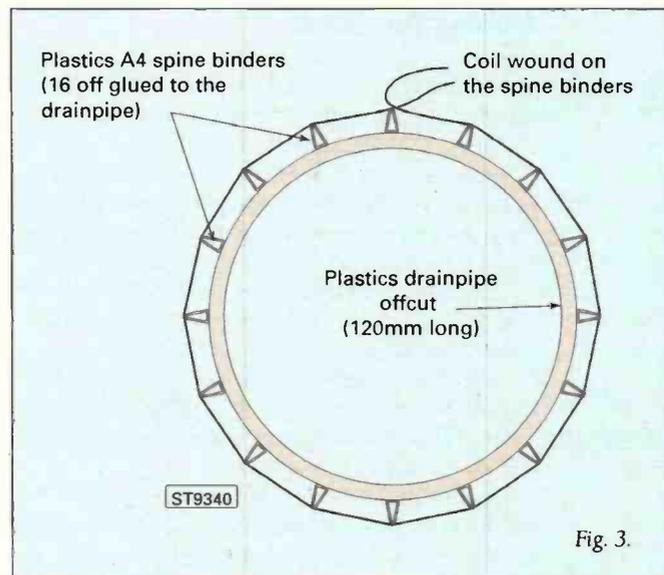


Fig. 3.

Table 1. Coil winding details

Length	82mm
Diameter	125mm
Turns	67
Wire	1.2mm dia. (18 s.w.g.) enamelled copper
Inductance	450µH

Conclusion

This crystal set is fun to build and should give hours of pleasure to build and use. My set cost around £18 to build.

Crocodile Clips 2.0

Dick Ganderton has been trying out an interesting real time circuit simulator aimed at the beginner.

Top Right: Screen grab of the simple 555 oscillator circuit 'built' using Crocodile Clips 2.0 on a Macintosh computer. The oscilloscope screen is at the bottom.

To someone starting out in the fascinating world of electronics, visualising what is going on in a circuit is a big hurdle to jump. Learning about mechanical things is much easier in the early stages. The student can actually see how the various parts of, say, a car engine move to create power. With an electrical circuit, however, the flow of current is invisible.

Crocodile Clips 2.0 is a real time circuit simulator that uses computer animation to show the invisible concepts of electronic circuits. The student can build a circuit using a library of components, switch on and the simulated circuit operates, just like the real circuit would. Component values can be changed and the effect of the changes noted. Get something wrong and the component is destroyed with a suitably graphic explosion!

Building The Circuit

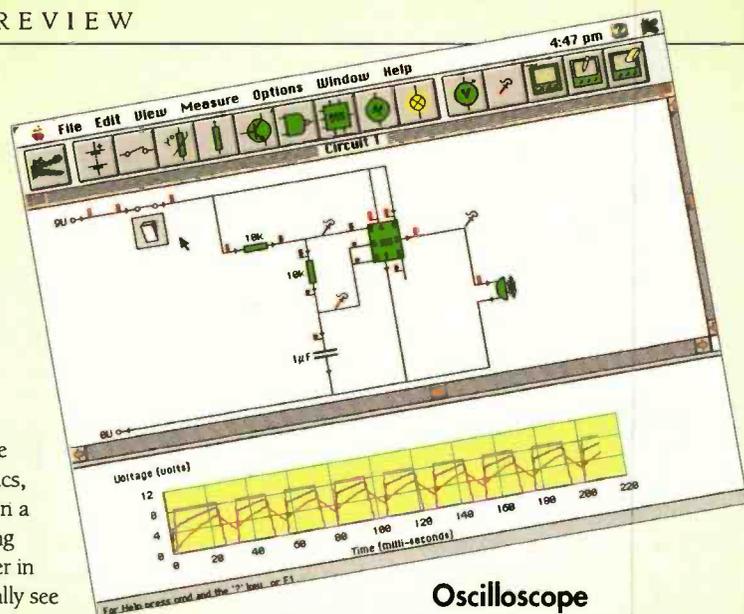
Circuit construction is simple. Selecting the component you want to place from the appropriate library is just a matter of clicking on the right icon in the Library Selection Bar across the top of the 'worksheet'. This then reveals the range of different components available in that section of the library. Moving the mouse arrow to the position you want the component to be placed and then clicking yet again places the component.

Connecting the various components to form the complete circuit is just as simple. Select a node on a component and the arrow changes to a reel of wire connected to the node selected. Moving the reel along the path you want the connection to follow unreels the 'pretend' wire. Click on the destination wire or node and the connection is completed.

Component values are easily changed - just click on the value alongside the component and a menu appears allowing you to change the multiplier and the value number.

If you change your mind or want to delete a component or remove a wire, select the 'Crocodile Jaws' and just 'chomp' away with the crocodile's jaws to remove the offending component. Components can also be deleted in the more conventional way, but using the 'croc' is much more fun! Selecting and moving a component disconnects it from the rest of the circuit - annoying when you need to move a component to make room for the resistor you have forgotten or the extra decoupling capacitor you want to add!

I decided to build a simple 555 oscillator circuit and is shown as an example in the booklet containing Quick Start worksheets and Resource Tasks. The former help you to get started with the software, while the latter are there to teach you some of the basic concepts of electronics. Starting with a blank sheet to 'switching on' the final circuit took me just under three minutes.



Oscilloscope

A multi-beam oscilloscope is provided to enable you to investigate what is happening in various parts of the circuit. This is easy to set up and has up to four traces. Each trace is a different colour and there are four correspondingly coloured probes to 'clip' onto the part of the circuit you want to 'watch'.

Each connection has a small 'voltage bar' attached to it, giving a bargraph indication of the instantaneous voltage level at that point. Also, each capacitor displays its 'charge level', so you can 'see' what is happening at each point around the circuit.

Conclusions

So, what did I think of the package? First, I was pleased to see that there is a Mac version available as well as the usual Windows one. This is obviously because the program is aimed at the educational market and the Mac has a reasonable penetration in that sector.

The version I used was the Mac one and I found it easy to use once I had got used to the fact that it is a Windows program ported for the Mac. The lack of the usual Mac features and keyboard shortcuts I found frustrating. Pressing the 'Apple A' key combination, for instance, should have 'selected all' ready to perform a global 'Apple C' to copy. Instead, it opened the 'About Crocodile Clips' information box! The circuit can, however, be copied and pasted into other programs such as word processors, page layout and drawing packages.

However, I enjoyed using the program and found it to be a useful, if elementary, circuit design tool. Certainly, for the raw beginner, it should prove to be a godsend, enabling them to actually visualise the inner workings of a circuit.

The manuals provided were clear and understandable, even though they were based on the Windows version with a few notes added for the Mac user - what a blessing that the Mac is so much easier to drive than a Wintel machine!

Crocodile Clips is available in both Macintosh and Windows versions from Crocodile Clips Ltd., 11 Randolph Place, Edinburgh EH3 7TA. Tel: 0131-226 1511, to whom I would like to extend my thanks for supplying the package for review. You can download a demonstration version from www.crocodile-clips.com/education/

Just before going to press we checked on the current prices to be told that version 2.0 has just been superseded by version 3.0. Prices are £80 for single user and £175 for a five-user licence.

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C.M.HOWES COMMUNICATIONS

Alinco DJ-X10 Wide Band Communications Receiver

Alan Gardener has been putting the new Alinco DJ-X10 Wide band Communications Receiver through its paces.

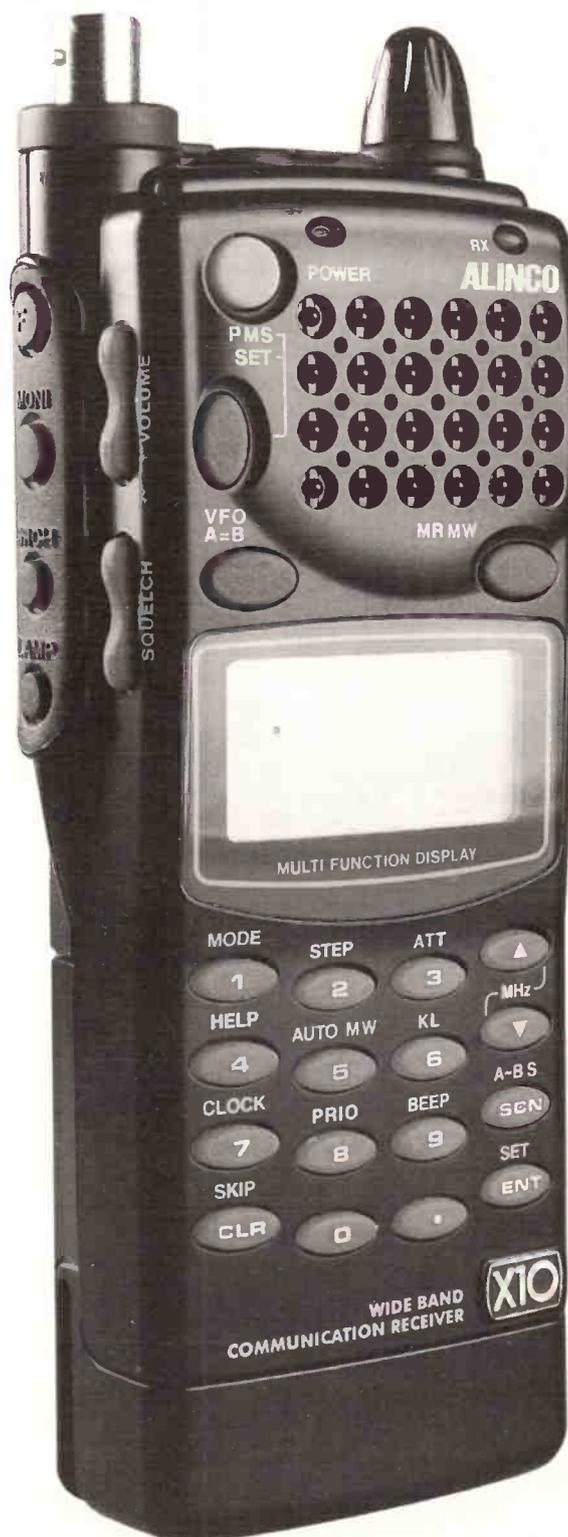
Alinco is not usually one of the first names to spring to mind when enthusiasts discuss scanning receivers, however they have been around for some time now, and although their previous offerings have not sold in particularly large volumes, things may change with the introduction of the DJ-X10.

It's got the looks

The styling of the unit is a little bit different from the usual offerings, with its black, orange and gold colour scheme strongly reminding me of one particular brand of hi-fi manufacturer. The outer case measures approximately 60 x 150 x 30mm with a strip of four rubber function buttons and the volume and squelch controls down the left hand side. The front fascia is split into three main sections with the numerical keypad occupying the bottom third, l.c.d. display the middle and the speaker grill, power and additional function buttons filling the remaining space at the top. The top of the case has a BNC antenna socket, external speaker and 'Clone' sockets and a multi-function rotary control knob. The right hand side of the case has a socket for external power, whilst the rear of the case features a battery pack release catch and belt clip fixings. The supplied NiCad battery pack forms part of the case and is very securely held in place by a latching mechanism. It has external charging connections and fits very neatly into a special desk mounting charger unit, which is supplied with the receiver. I liked this idea, but I would have preferred it if the scanner had been positioned at a slight angle to make the display more readable and the bottom row of keypad buttons more accessible.

Second functions

As with all hand-held scanners most buttons have second or third uses, which are enabled by pressing a separate function button. This is located at the top of the strip of four buttons on the left-hand edge of the receiver, the other three buttons being used to activate the monitor, bandscope and backlight functions. In use I found the size and location of the function button to be a bit fiddly, although I was pleased to find that it had a 'Latching' action which made second function operations that bit easier to perform. Another slight criticism was the liberal distribution of controls around the edge of the loudspeaker grill. These are used to enable the scan programming, v.f.o., and memory modes. I found the location of these buttons a bit confusing and would have preferred the greater level of



prominence to have been reserved for other controls such as the function button. I also found cancelling some of the modes of operation a bit confusing. For example one type of search could be cancelled by pressing the same button, whilst another required the v.f.o. button to be pressed. I guess that, in some respects, this criticism is just down to personal taste. I find that having tried a lot of different hand-helds, most manufacturers tend to adopt the same basic philosophy, so new Alinco users who have not have been quite so pre-conditioned may not find this to be a problem.

Main Features

The DJ-X10 has all the features you would expect from a radio in this price range, including frequency coverage from 100kHz to 2GHz, reception of a.m., n.b.f.m, w.b.f.m, u.s.b, l.s.b. and c.w., Preset tuning step sizes of 50Hz, 100Hz, 1, 2, 5, 6.25, 9, 10, 12.5, 15, 20, 25, 30, 50, 100, 125, 150, 200, 250 & 500kHz, Beginner mode, Help menu, Auto Bandplan mode and step size adjustment, On/Off Auto Timer, Clock, Key Lock, Priority Watch and Attenuator. A couple of points to note are that the 8.33kHz step size recently proposed for aircraft communications is not included and my attempts to offset 25kHz channel spacings by 12.5kHz were strongly resisted. This may be a problem if you wish to rapidly search through ranges of frequencies that have unusual channel spacing, such as c.b, cordless 'phone or certain p.m.r. allocations.

A nice touch is the inclusion of a 'help' menu. This is intended to give a useful reminder of how to enable certain functions, which should be of particular interest to new owners. However I couldn't make any sense of it! Selecting an option produced a screen display which would state something along the lines of PMS! > EDIT PMS COPY #27, which I think is meant to refer to a table at the rear of the user manual, which in turn is supposed to refer to the relevant page - except in my copy it didn't. I think I would have preferred this button to have been put to better use. *(Nevada have informed us that this table in the manual has been amended to include the relevant information. Ed.)*

Memories

The DJ-X10 has 200 memory channels arranged in three sets of ten banks with 40 channels in each bank - additionally each memory is capable of being alphanumerically tagged with a description of up to eight characters. Scanning modes include: 'Memory Scan', 'Programmed Memory Scan', 'Selected Mode Scan' and 'VFO Scan' as well as the more usual search facility for locating new frequencies complete with auto-memory write function. The auto-memory write function worked well with lots of local signals being automatically stored in one of the memory banks. All the usual memory functions are present, with the ability to 'link' or 'lock-out' various permutations. A number of special 'set' menus are used to enter, edit and copy memory contents. I found it took a bit of time to initially get used to some of these menus. However after a while it became almost second nature and I soon found that I could quickly manipulate memory contents. The number of memory locations available to the user can make the maintenance of contents difficult, especially if you need to reload all of them from scratch,

perhaps after pressing the reset button. This is where a computer interface can come in handy, and although the user guide makes reference to a 'clone' function, I was not able to obtain any further information about its facilities or any ability to interface the radio to a PC. *(Nevada have informed us that Alinco are currently working on a PC program for this scanner and expect to have it ready in the near future. Ed.)*

Display

The liquid crystal display shows a lot of information, including frequency, channel number, mode, volume and squelch levels as well as providing a bandscope facility which allows you to 'see' activity upto 40 channels away from the received frequency. Unfortunately the amount of space available to each of these functions is a little bit limited and when added to the rather restricted viewing angle of the display it does make reading some of the information difficult. This is made worse by the fact that Alinco have only chosen to make the display contrast adjustment operate only in the 'Demo Mode'. This can be very frustrating. *(Nevada have pointed out that the contrast can be set and stored to the operator's personal preference. Although the display is typical of an l.c.d., they have noticed that artificial lighting can cause glare due to reflection from the display front. Rotating the set slightly so that the light doesn't hit the display at right angles can help. Ed.)*

Unlike some other hand-helds the bandscope cannot operate continuously whilst you are listening to a signal. The best compromise I found was to use the interval mode where the bandscope is updated about once every 10 seconds during which time the receive audio is muted. By fiddling with the bandscope set-up it is also possible to improve the horizontal scale resolution, which can make a big improvement to the usefulness of the display. The range of the bandscope can be toggled between a narrow range of seven channels or a wider range of 40 channels. This is achieved by pressing the side mounted function button before enabling the bandscope. Pressing the bandscope button for a second time restores normal operation. Watching signals appear and scroll across the screen when the bandscope was used in conjunction with the search function was very entertaining, and by using the combinations of functions it was possible to jump quickly to active frequencies on channels adjacent to the current receive frequency.

The search functions available were well thought out and I particularly like the ability to quickly set-up a search within a pre-set range by setting the upper and lower limits on the twin v.f.o. One unusual point when using the search mode is that the squelch setting is fixed in a separate setup menu. So if you try to exclude weaker signals from stopping a search by adjusting the squelch setting with the front panel controls whilst a search is running, you will find that it has little effect. This is rather a peculiar way of doing things, and I'm not too sure if it offers any advantages, but it didn't present any major problems when operating the unit.

Where are the knobs?

One of the features I liked the most was the lack of the rotary volume and squelch controls. Most



manufacturers tend to place these on the top panel next to the tuning knob, but I always find that makes adjustment of any of the rotary controls more than a bit fiddly. Alinco have chosen to replace these with two electronic 'Rocker' switches located on, but inset from, the left hand side panel. The volume and squelch settings are changed by pressing the appropriate edge of the 'Rocker' switches which vary the levels as indicated on the l.c.d. display.

The volume control worked very well but I would personally have preferred to have been able to make a slightly finer adjustment to the squelch settings. This was not quite as big a problem as it could have been due to another nice feature added by Alinco. As is the case with most hand-held scanning receivers the DJ-X10 has a monitor button. When this is pressed the squelch is disabled so that weak signals can be monitored a little bit more easily. Now anyone who has used a scanner for short wave reception will know that you have to disable the squelch when listening to weak s.s.b. transmissions, and this is normally achieved by turning the squelch control fully off. With the DJ-X10 you can press the function key and then the monitor button to disable the squelch. Pressing the monitor button again restores normal operation. This is a great time saver and I just wish that my current hand-held had this facility.

Measured performance

The performance was typical of that for a modern hand-held scanner. The receive sensitivity at 150MHz was measured as being for n.b.f.m. (2.5kHz deviation) -118dBm, w.b.f.m. (50kHz deviation) -108dBm, a.m. (60% modulation) -111dBm, s.s.b. -117dBm all for 12dB SINAD. The performance varied slightly across the main frequency range with rather a curious 5dB dip in performance at 400MHz. However, the main worsening was at the extremes of the frequency range with a rapid falloff below 1MHz and a gradual falloff above 1.000GHz for example I measured an n.b.f.m. sensitivity of -116dBm at 900MHz, -86dBm at 1.500GHz and -80dBm at 1.700GHz so don't expect to hear much activity in this band. The intermodulation performance was acceptable for a hand-held design with measurements at 100kHz spacing, giving a calculated third order intercept point of approximately -30dBm. This is adequate for use with small external antennas, but as soon as a large antenna was connected, the familiar sound of paging systems could be heard in the v.h.f. aircraft and Amateur Bands.

How well does it work?

In practice the receive sensitivity with the supplied antenna was adequate, with all the usual airband and amateur signals being audible. I did notice a slight problem with the coarseness of the squelch setting but this could be improved by using the monitor function when listening to weak signals, which would otherwise have caused the squelch to chop. Performance on the short wave bands was good with several broadcast stations being clearly audible using just the supplied antenna. Connecting a few metres of wire to the antenna socket made a big improvement, with many amateur s.s.b. stations being received. The 50Hz tuning step size made the fine resolution of speech reasonably

easy, but it may still be a bit too coarse if you are interested in the reception of certain types of data signal.

Summary

I must admit that I was not particularly looking forwards to reviewing this scanning receiver as previous models have only produced a lukewarm response from enthusiasts.

However I was presently surprised by the DJ-X10. Its styling is good, it feels nice to handle and the performance is comparable to that of similar models in the price range. I felt that the only real problem was associated with the small size of l.c.d. display and its limited viewing angle. This factor aside the DJ-X10 is worth taking a look at if you are considering buying a new hand-held scanner.

My thanks to Nevada Communications, 189 London Road, North End, Portsmouth PO2 9AE. Tel: (01705) 662145. FAX: (01705) 690626 for the loan of the review model.



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What You Can Learn From Grandpa's Radio Listening Post

How did the radios of yesteryear manage to produce such astonishing results? Gerhard Eberlein DF2NR explains all.

Once upon a time, radio was a sensation, even when the era of the glowing bottles was not on the horizon. On the scale of the radios were exotic names, like Lahti and Tour-Eiffel (Eiffel Tower) and everybody was building radios on their own kitchen table.

Compared with today's standards, the sensitivity and selectivity were very poor, but astonishing results were achieved. On the Continent, steady reception of British stations (playing mostly dance music) was common place. The interception point of a receiver hadn't been invented yet and the crystal set did a marvellous job.

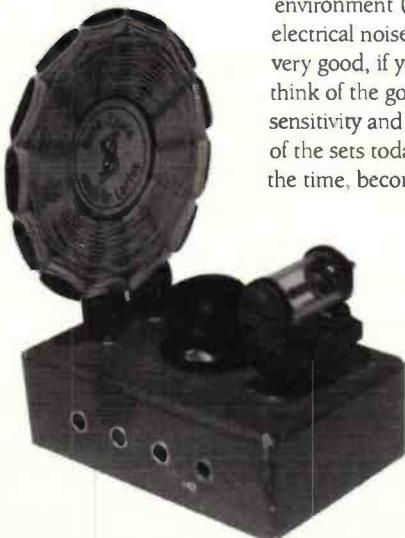
How come these results were possible, with the poor equipment of those days in comparison to today? The answer was just patience. The people had a lot of time (television was not on the scene yet) and there were not as many stations on the dial.

The reception, even if it was only over a distance of a few miles, was the goal. Therefore the best weapon against the poor technical circumstances, was the exceptionally good ears of the listener to the programme.

Crowded Bands

On the crowded bands of today, patience makes all the difference. Even if you have a poor receiver, just switching it on at the right time and right frequency, can make all the difference.

Reception at night and in an interference free environment (without electrical noise) can be very good, if you just think of the good sensitivity and selectivity of the sets today. Just take the time, become an



A crystal set from the 1920s

expert on the stations you want to listen to and listen to them at unusual times.

Change your location and note the reception differences. That is the reason why one identical station set up can give poor results at one location and excellent results at another.

You will see that you can receive stations in the countryside (without much interference), which you were unable to copy in cities and towns. Try to make the best out of your listening post.

Often, just a little trick like earthing the receiver (which can be a cheap portable) can give very good results. Also, try out different antennas. They can be simple or more complicated like a rotatable Yagi antenna.

Flexibility is the name of the game. Start simple and improve your station with time.

Important Factor

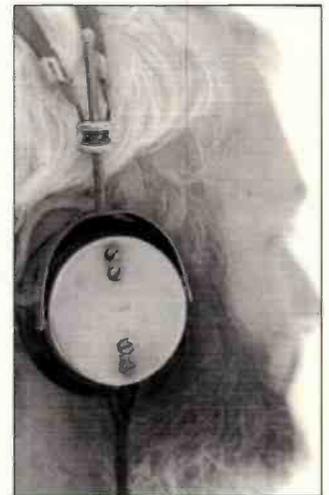
Another important factor is to share your experiences with others. Everybody has a trick in store, which the other person is glad to have. If you read old radio books from the 1920s and 1930s you can see that everybody was listening to the radio.

Read as much as you can about technical aspects of the hobby. Old books about radio offer good solutions, even if they are out of the spark era.

Another good source is going to fleamarkets and radio rallies. You can see there are good solutions to equipment and antenna problems. This is especially true if you look at old military equipment. They had the same problems as you have, some 60 years ago!

They had limited space to erect an antenna, they had little money and they had to fight with radio techniques. So, share grandpa's experiences and use it today.

See you some time at a radio fleamarket!



The receiver is as good as the listener's ears.



Beautiful radio sets from the 1930s.



Golden Oldies

Pete Roberts has the answer for all those destitute, would be s.w.l.s.

When I first got interested in short wave radio during the early Sixties, there was plenty of cheap World War II surplus radio gear around, much of which had creditable short wave receiver coverage. In fact, I used to use a '19 set' tank radio for listening around the 49m commercial bands. A friend and I also converted the transmitter section of another, very tatty '19 set' to operate on medium wave - we didn't exactly outdo Radio Caroline, and the less said about that probably the better! Unfortunately, war surplus has all but completely dried up, with surviving equipment now enjoying 'collectable' status and commensurate price tags! So what's the alternative to shelling out tens, or perhaps several hundred quid for even a second-hand 'proper' radio?



A Fifties 4-valve Philips BF101. Courtesy Green Wood Publishing.

Built My Own

You could, of course, build your own. I built several sets as a youngster using parts salvaged from - yes, you've guessed - war surplus radio gear. Also, in 1964, when BBC2 started transmission on u.h.f. with 625 lines, many 405-line only tellys were thrown out in favour of new dual-standard jobs; we usually beat the bin men to it and grabbed discarded sets to cannibalise for parts. Old TV sets could also be turned into crude but useful oscilloscopes, as could war surplus radar tube units.

Most stuff on the surplus market nowadays seems to be of computer or industrial origin, yielding few components suitable for radio use, and contemporary domestic equipment is next to useless for salvage. Printed circuits are difficult to strip, and even assuming that you can remove components intact and without heat damage, their short leads make re-use almost impossible.

So home constructors nowadays have little alternative to buying new parts, some of which (like decent air spaced tuning capacitors) can cost an arm and a leg. And to cap it all, some malignant electronic deity has inflicted upon us that quintessential epitome of technical nastiness - surface mounted technology. The main philosophy behind SMT was to facilitate cheap, automated assembly, saving manufacturers the cost of assembly workers' wages. Despite claims to the contrary, boards assembled using SMT are fragile - even slight bending can fracture tiny chip resistors and capacitors. SMT is the Devil's own job to repair, and a major contributor to today's stratospheric service charges. How do you troubleshoot a board where many of the components have no indication of even what they are, let alone of their value? The idea, of course, is to make the cost of repair uneconomic compared to that of buying new - an appalling waste of increasingly scarce

resources. No, I particularly don't like SMT!

Golden Years

During radio's golden years - from, say, the pre-war 1930s to the end of the Swinging Sixties - a thriving British industry turned out well designed and built domestic radios. Valved and early transistorised designs used high quality signal frequency tuning components and double tuned i.f. transformers which ensured decent selectivity. Automatic gain control (a.g.c.) circuits that actually worked helped reduce overloading and Intermodulation - always a problem when trying to hear a weak DX station in the crowded commercial short- or medium wavebands. Of course, craftsmanship never comes cheap, and a new radio cost considerably more than a week's wages. However, those sets were built to last and designed to be repairable, unlike much of the disposable, mass produced, hideously styled, all-plastics consumer electronics sold today. Likewise, most of the knowledgeable, independent local radio dealers have been ousted by the totally impersonal, hideously styled, all-plastics chain store in some ridiculously styled, all-plastics shopping mall. And does anyone really know why the plastics facias of today's audio-visual gear are designed to look as though they've been half melted with a blowtorch?

It's still possible to get hold of really good radios from that pre-70s era for a few pounds at second-hand shops, auctions and car boot sales. They can make good 'starter' sets for newcomers to the hobby, and perhaps valuable collectors' pieces when lovingly restored! Radio repair and restoration is also a great practical introduction to the art of fault finding and fixing. Sets bought at auctions usually come from house clearances and may well work perfectly, as may those found in jumble sales, or second-hand and charity shops. However, new legislation requires that all used mains powered equipment sold by way of trade, must undergo electrical safety testing before being offered for sale - the so-called portable appliance test or PAT. At present, private sales are exempt. Charity shops in particular may not be able to undertake these tests themselves (PAT testers aren't cheap) or afford to have them done by a contractor. In fact, I know of one local charity which no longer accepts portable electrical gear. Obviously, PATs aren't needed for sets powered solely by batteries, so these should still be readily available from second-hand or charity shops.

Buyer Beware

When buying second-hand, it's a case of buyer beware. Obviously, watch out for stolen goods, although this doesn't seem to be much of a problem with old radio gear. Also, bear in mind that transactions at jumble- or car boot sales are private sales not covered by the Sale of

Goods Act. However, as prices are usually very low, you've not got much to lose. In my home county of Cheshire, the going rate seems to be 50p for pocket 'trannies', anything from one to five quid for a table transistorised set - including good makes like Roberts Radio and Hacker - while valved radios usually go for about a tenner. I wouldn't be too bothered if the set rattles a bit, as broken internal mountings can be fixed relatively easily, and damaged or missing knobs repaired or replaced.

So what type of set do you go for? Well, for serious medium wave DX work, one of the larger domestic valved jobs are quite good, and as a bonus this type of set usually has one or more short wave bands. If you're lucky you may even find one with a 'magic eye' tuning indicator. Valve radios from the late Fifties onwards used frame type or ferrite rod antennas: a frame antenna basically comprising a tuned loop wound round the inside of the cabinet. However, almost all specimens I've come across also have sockets for external antenna and earth. A longwire antenna can give excellent results - especially if used with an a.t.u. or preselector. The impedance of a random length wire antenna varies with frequency but is almost always on the high side, and valved r.f. stages, with their high input impedances, are a good match. A good earth also helps but if, like me, you live at the top of a three storey building, an earth connection may be impracticable, although you may be able to rig a counterpoise set-up. Incidentally, the mains socket earth pin is **not** suitable for an r.f. earth. Mains earth wiring runs between the live and neutral conductors, picking up all manner of electrical noise!

Radiated Hash

Unfortunately, a home based set may only be ideal in a rural idyll. If, again like me, you live in the middle of a housing estate, the hash radiated from scores of television line scanning circuits can wreck reception on long and medium waves as well as the lower end of the short wave bands. For estate dwellers, a portable set small enough to carry in a pocket or rucksack may be a much better bet, together with one of the new extendible wire antennas now available - especially now that we are cursed with 24-hour TV. A wild, windy, high location, well away from civilisation, is ideal for DXing. All short wave transistor radios that I've come across have had telescopic antennas, to which the fully unwound wire antenna can be clipped. Most portables made during the Fifties and Sixties were fitted with a socket for a car antenna. This socket can be used to connect a long wire antenna - the antenna being connected to the inner of the plug, and for best results, the outer should be connected to an earth spike driven into the ground - I use a 300mm meat skewer. Needless to say, never use any kind of antenna in thundery weather, and take all precautions to avoid becoming a target for a lightning strike. It's also advisable to disconnect and ground home based antennas when thunderstorms are grumbling in the vicinity. I must admit that I've always wondered why the full force of the law is brought to bear on any amateur or CB operator causing TVI, while nothing is done to reduce TV interference to broadcast radio services - there's not even minimal screening around modern TV line-output stages. Could anyone please enlighten me?

Portable valve sets do occasionally turn up, and are

highly collectable. They do have the disadvantage of requiring a 90V h.t. battery in addition to 1.5V or 7.5V for the valve filaments. Some valve portables have built-in mains power supplies but servicing of this type is a bit of a tricky job that I'll describe anon. I've got a couple of these sets, and there is a way round the battery problem which I'll also describe another time. So, for portable use, a decent transistor radio with long, medium and short waves would be a good buy. Don't worry about external condition. If a set has been discarded because it looks tatty, there's probably very little wrong with it that a bit of spit, polish and switch cleaner won't fix. It's the smart looking set that's probably got something significantly wrong internally. For example, I got a somewhat tatty Fidelity Rad 18 from a car boot sale for £2.50, in perfect working order. This particular set not only has full l.w., m.w. and f.m. coverage, but also boasts s.w. (6-15.5MHz) and Marine h.f. Band (1.7-4.5MHz). The reason for sale? It uses eight D-cells which its previous owner considered expensive to replace - I use NiCads.

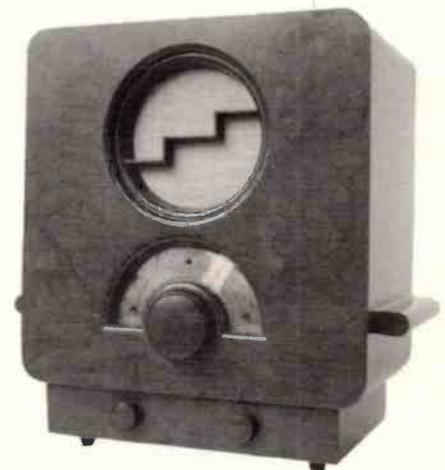
Doornail Dead

I also found a pristine 3-band Russian Astrad receiver of late 60s vintage, complete with leather case, going for £3. It was as dead as a doornail. The reason? The speaker magnet was missing! A replacement speaker from Maplin costing about a quid did the trick, and like all Russian sets of that era, medium and long wave reception is excellent. In my experience, makes to particularly look out for are Hacker, Roberts and Grundig (especially Satellit and Yacht Boy models) together with top of the range sets from the mainstream manufacturers like Ferguson, Philips and Fidelity or the well known Japanese makes such as Sony, Sanyo, National and Matsushita, to name a few. As a bonus, Japanese makers tended to incorporate short wave coverage in their small portables. Bear in mind, though, that most Far Eastern sets don't cover long wave. I stand to be corrected, but long wave only appears to be used for broadcasting in Europe.

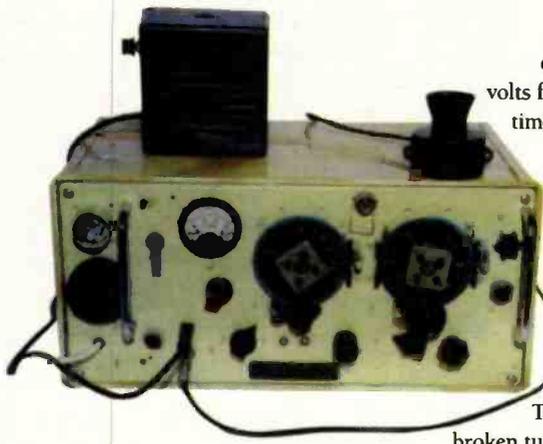
Most sets that I've bought actually worked, but had been discarded because of noisy controls and switches or even failure due to corroded battery terminals. So, after getting your prize home, take the back off and have a look inside. A word of warning: valved radios can present a fire and/or shock hazard under certain fault conditions, so beginners should leave initial inspection and testing of such sets to an older hand familiar with valve circuitry, or wait until our future article covering the subject. And most importantly, never forget that the reservoir capacitors in



1946 RAP Courtesy Green Wood Publishing



1934 Ecko AC157. Courtesy Green Wood Publishing



The 19 Set Tank Radio.

all kinds of valved equipment can hold a charge of a few hundred volts for a surprisingly long time!

The first job is to shake any loose bits out and put to one side. Be careful not to lose any screws, nuts, or any special fasteners as replacements may no longer be available.

Try not to disturb any broken tuning drive cord, as you'll have to make a sketch of its routing before fitting a new one - a job to look forward to - not! Take great care not to lose the tensioning spring(s). You can't use any old twine or string: only proper drive cord, which is available from Electromail or Maplin. Should any screws or nuts be missing, British radios usually used BA sizes, American ones UNC, while Continental and Far Eastern sets used metric sizes. British set makers started to introduce metric sizes from the early '70s onwards. The commonest sizes appear to be 4BA and 6BA Imperial - I've never come across odd BA sizes in electronic gear - (I remember 5BA on rotary switch kits - Ed.) and 3mm Metric. If you intend to make a hobby of radio renovation, the cheapest source of assorted fasteners would be a mixed nut, bolt and hardware pack from one of the surplus dealers such as Greenweld, Bull Electrical or J&N Factors. Take care not to lose any broken plastic bits: when you find where they came from they can be glued back in place. Incidentally, neither cyanoacrylate (*Superglue*) nor epoxy adhesives seem to work too well on plastics. I find the structural acrylic types such as *Permabond Flexon* to be most effective, and although frowned upon in some circles, it wouldn't be the first time that I've welded a broken part in place with the soldering iron! Loose speaker fabrics can be stuck back in place with *Bostick*, *Evostik* or similar contact adhesive, while *Evostik Resin 'W'* and hot-melt glue work well on damaged wooden cabinets. With a transistor set, the next task is to power it up. Most British sets used the 'Power Pack' type of battery, of which all but the cylindrical PP4 are readily available. Should any indication of the correct battery be missing, as a rough guide it can be assumed that if a pair of large press-stud connectors are fitted, the battery will almost certainly be a 9V PP7 or PP9. Likewise, a plastics or card mounted pair of small press-studs are designed to fit the familiar PP3 or the larger PP6. Some of the posher sets used two batteries, usually PP7s or PP9s. Just to catch you out, sometimes two 6-volt PP1s were used, and these use the same large press studs as the PP9. Whenever two batteries are fitted, they are usually arranged as a split rail supply. Never try to run such a set on a single battery, and always replace the batteries as a pair. A few British sets, and most imported ones, used conventional cylindrical cells, all of which are readily available today. One or two very early British makes used the old No.8 torch battery, which may be still be found in older cycle or radio shops as well as being stocked by Maplin. Whichever batteries are used, take great care to connect them correctly.

Hear Anything?

Upon switching on, you may be rewarded with reception of some sort. The volume and wavechange switches will almost definitely need cleaning, and a shot of switch cleaner will do the trick. Take care, because some of the plastics in older sets can be damaged by the solvents in modern switch cleaners. If in doubt, use an Electrolube contact treatment oil pen. Loud crackling when operating the tuning control points to the tuning capacitor's plates touching. This can be cured by very careful bending of the offending plate(s). Weak medium wave reception is often down to a broken ferrite rod - a common fault usually resulting from an argument with the floor.

When testing valved sets the warning given earlier must be heeded. Don't take the back off unless you're experienced with high voltages: I plan go into greater detail in a further article. Firstly, check the mains lead. If it's old and perished it must be replaced before connecting to the mains - with one significant exception! AC/DC radios use a largish wire-wound resistor called a mains dropper, to ballast the series connected valve heaters used in this type of set. Some midge American radios of this type had no room for a dropper resistor. Instead, the dropper resistance was incorporated in the mains lead. This type of mains lead must not be replaced with standard mains flex. Make sure the plug fuse is no more than 3A; fit a 1A one if possible. While on the subject of a.c./d.c. receivers, bear in mind that the chassis is connected to one side of the mains supply. Make sure that no part of the internal metalwork is exposed, including control knob grub screws. After doing these basic safety checks, plug in, switch on, and check that the valve heaters glow after a little while. It will usually take anything up to a minute for the set to 'warm up' and start operating, and you may need to connect a yard (sorry, metre!) or so of wire to the antenna socket. While the valve heaters may rattle faintly while warming up, any smoke or fizzling noises, or excessive hum from the speaker are very bad news. Switch off and unplug immediately. When first switching on an a.c./d.c. set that's been disused for a while, the dropper resistor can produce a bit of a pong as it heats up and drives any dampness out. However, a burning smell from the mains transformer of an a.c. only receiver is serious, and the set must not be plugged in again until the cause has been found. The cost of a new mains transformer will usually require the negotiation of a second mortgage! I must admit that all the valved sets I've acquired from car boot sales have actually worked, with only minor fettling needed. So keep your eyes open and see if you can pick up a bargain!





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Code30 Data Analysis

Kevin Nice, datamode enthusiast and Hoka Code30 user, scratches the surface of this amazing tools capabilities and looks at serious tools for serious analysis.

If you have more than a passing interest in datamode reception, for that matter even if you've only a passing interest in this particular branch of the hobby of short wave listening, then you'll probably read Mike's 'Decode' column. All of you who do read 'Decode' on a regular basis will be all too aware of some interesting developments in the area of shareware decoders. Of particular interest will be the like of *RadioRaft* from F6FLT Whilst it is true to say that this wonderful software is indeed an excellent tool for the beginner, it falls a long way short of providing the tools essential for the real datamode detective.

I have been using a very sophisticated decoder come analyser for some time now. The Code30 from Hoka Electronics the Netherlands based radio data specialists.

What's It Do

In addition to being a comprehensive decoder shipping with numerous modes, the Code30 offers a powerful set of analysis tools. It offers the ability to very accurately measure frequency, shift and baud rate of a data signal under analysis.

Once the Code30 is calibrated by adjusting the internal clock division ratio to obtain a straight edge

on a FAX screen whilst monitoring a known accurate station like say, Rugby, the Code30 become a highly accurate piece of measuring equipment. Mind you, to achieve good results you'll have to have a high quality, professional grade receiver to match for very serious work. However, the Code30, due to its use of d.s.p., can compensate for some receiver inadequacies. For instance, you can actually resolve and tune in 0.1Hz steps!

Extensive use of processor time does require a near dedicated machine, my 486DX2-66 only seldom performs any other task, the Code30 once located certainly demands attention. The base requirements for the host PC for the revision I've been using (V1.1) are a meagre 386DX25, with at least 640Kb of RAM. The latest, V2 demands a minimum of a fast 486 based machine, with the more RAM the better as V2 allow the 'bit buffer' to use Extended Memory.

It is this 'bit buffer' that is at the heart of the Code30's operation, allowing the capture and subsequent storage of a monitored signal. By using oodles of memory it is possible to monitor, capture and analyse a complete on-air traffic session from a station under investigation. For instance 32Mb of RAM yield about 20mins of recording time.

The Code30 allows the user to save these 'bit buffer' sessions to disk for later work. This is an essential feature that allows the collection and cataloguing of both known and unknown signals for

subsequent re-investigation. It is possible, for instance, to have collected an on-air recording of an unknown mode months or even years earlier, work out the signals characteristics by using the various modules that comprise the Code30, build a custom demodulator - yes, you can do that! - and then apply this demodulator to the previously captured signal and decode the traffic. You will however have to invest a serious



Fig. 1: The first step with any signal is to select the 'Shift - Speed' module from either the menu or press the 'F1' key. This screen allows determination of vital information to allow further analysis to proceed. You will notice that this is a two tone system with a shift of about 800Hz, which I've tune almost centrally - 8Hz offset! The standard speed measurement shows that the baud rate is either 149.9 if we are looking at a synchronous signal or 75 for an asynchronous type. I've invoke the 'Precision Measurement' feature which provides a speed to four decimal places - a very useful facility for characterising signals.

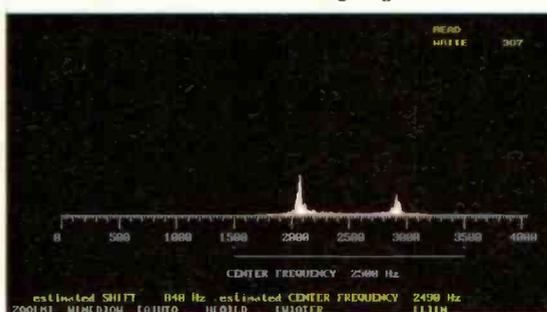


Fig. 2: This shot show the 'Audio Spectrum Analyser' module. Although similar to Fig. 1, this module allows visibility of more of your receiver's pass band. A vital tool for determining the number of tones that make up a system under investigation. You will note the horizontal line under the graticule scale, this is a visual indicator of the 'Roofing Filter' that is currently being used. At 2kHz it is set a little too high, I would normally reduce this to a more appropriate width. You can see that the Code30 is set to a centre frequency of 2500Hz, to correspond with my receiver's carrier reinsertion oscillator's (b.f.o.) position in the data filter.

amount of time to achieve this kind of activity. Be assured it is a very rewarding activity which develops your knowledge of data transmission techniques tremendously.

No Choice

The Code30 is pretty much alone in the market place. There is, theoretically, competition from Wavecom in Switzerland in the form of the W41PC. This like the Code30 comprises a plug-in card for a PC (8-bit) slot and accompanying software. The only problem that I have personally found with the Wavecom product is getting hold of one. Maybe it is due to media shyness on the manufacturers part - but after many FAXes and E-mails to their headquarters over the past year, so far I've only managed to obtain ever retreating delivery promises - never a decoder!

There is, of course, the Wavecom flagship product, the W4100, this stand alone unit weighs in at more than twice the price, though. Its comprehensive specification actually falls short of that of the Code30. I can reliably inform you that Code30s are in residence at various UK official monitoring sites, go on ask yourself why.

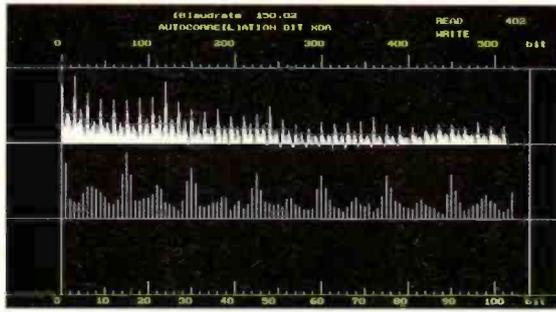


Fig. 3: The next vital piece of information required is the ACF - auto correlation frequency. This allows us to identify data block timing information. The 'Autocorrelation' module displays two traces, the upper has a horizontal scale of 500 bits the lower is a zoom section of the upper to show more detail, it has a resolution of 2 bits. Note the repeat pattern of 15 bits.

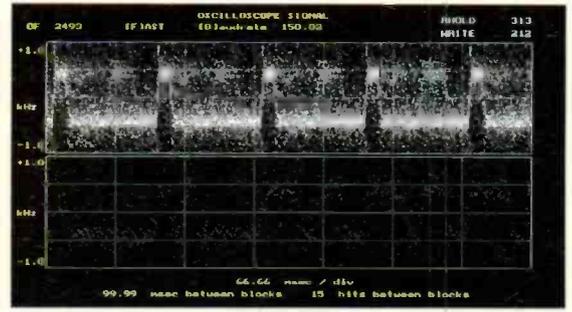


Fig. 4: Setting this module with the information obtained so far, i.e. shift, speed and ACF, allows a sensible synchronised display on the 'Oscilloscope' module. The upper trace is a memory trace and is therefore a cumulative display of the received data. The lower trace is continually updated in real time.



Fig. 5: The 'Speed-Bit Analysis' module allows the use of movable on screen cursors (not shown) to make timing measurements. Here the signal can be seen to have a consistent pattern with the same bit occurring in the right hand side of the display.

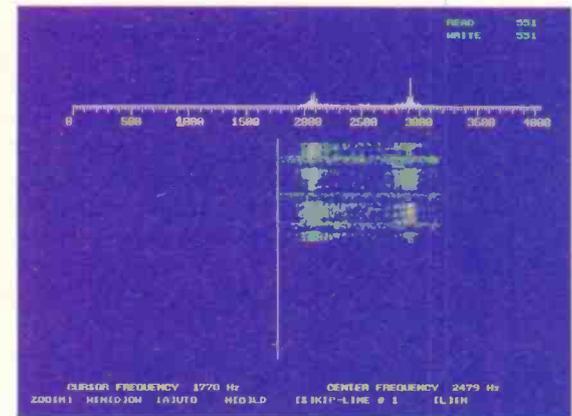


Fig. 6: This is one of the two 'Waterfall' displays provided by the Code30. This type of display allows a time plot of a signal (pass band) under investigation.



Fig. 7: One of the other unique features on a measuring tool of this cost is the 'Phase plane' module. Here is the plot of a p.s.k. (phase shift keyed) system. Note the activation of the 'Auto-Tune' facility, which is keeping the signal locked to counteract both transmitter and receiver drift. There isn't too much drift occurring in either here though as the Code30 is only having to correct by 0.11Hz.



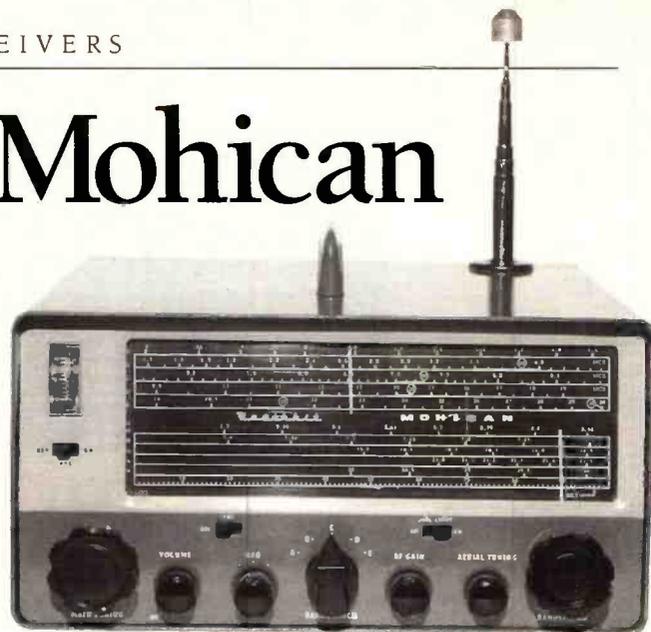
Fig. 8: Same signal as Fig. 7. This time angular modulation (phase angle) is displayed against time with the 'Phase Scope' module.

You can get your Code30 or just more information on this Analysis tool and Decoder from:
 Hoka Sales UK, PO Box 2630,
 Eastbourne, East Sussex BN20 9RU.
 Tel/FAX: (01323) 487919.
 E-mail: hokasales@pavilion.co.uk

The latest version, V2 costs £1885.

The Heathkit Mohican Receiver

Ben Nock G4BXD, enlists the help of the cavalry and discovers a lone Indian.



Head on to a Mohican, note the large whip antenna which extends to over 1.5m.

The Heathkit *Mohican* receiver, or GC-1U as it was otherwise known, is a very stylish, portable transistorised receiver of the early period, tuning 500kHz to 30MHz in five bands and providing a good band spread function for amateur band coverage.

A child of the 60s, the *Mohican* was a radical change to the previous valved RA-1 type receiver. Presented in a neat, Heath green case, carry handle on top, self-contained battery, loudspeaker and whip antenna, the GC-1U is ideal for portable and holiday use. The sensitivity and selectivity, although being reasonable for a set of its time, is nothing much to shout about but it is, never the less, a portable set, and it does have the amateur bands clearly marked on it and catered for.

What Makes It Tick?

The ten-transistor set was futuristic enough to even employ crystal resonators in the i.f. strip to give the required selectivity. The circuit follows fairly standard design lines, single conversion superhet, separate local oscillator, 455kHz i.f. stages and a simple diode detector. The full circuit description starts with a common base r.f. amplifier, using an AF115 p.n.p. bipolar transistor, feeding the mixer, another AF115, which is also being fed with the signal from the separate oscillator stage, again the AF115 device being used.

Tuned circuits are used in the r.f. amplifier input and output circuits, the three ganged tuning capacitor being used for the two r.f. circuits and the local oscillator.

Three OC45 transistors, strange black glass objects, are used in the i.f. strip, which operates at 455kHz, a further OC45 transistor being employed as the beat frequency oscillator. An OC81 a.f. driver stage feeds two OC81 output transistors via a matching transformer. The output stage drives the internal 25Ω loudspeaker, with a headphone jack being provided which disconnects the speaker when headphone listening is being enjoyed.

The b.f.o. circuit is in fact tuned using a Varicap diode. The front panel b.f.o. tuning knob, which has a pull on/push off switch combined, varies the volts on a Varicap diode which forms part of the b.f.o. tuned circuit.

The internal, or external 12V supply if used, is regulated with a 6.4V Zener diode to feed the b.f.o., local oscillator, mixer and r.f. stages. The audio output stage gets the full 12V, a small filter/dropper circuit lowers the supply to 10.6V for the a.f. driver stage and again to 9.3V for the rest of the set. The i.f. stage has a switched 'S'

meter, which is ganged with the a.g.c. switch, so that the 'S' meter only operates when a.g.c. is being activated. A simple diode noise limiter is also provided and this can be switched in or out, reducing any 'peak noise' type pulses.

A separate r.f. gain control is located on the front panel, along with an antenna peaking trimmer. The set has a built-in whip which extends to some 1.52m.

Alternatively an external antenna, longwire, etc., can be connected to a high impedance terminal on the rear of the chassis, a 75Ω Belling Lee coaxial socket being provided for connection of low impedance antennas, dipoles etc. The rear chassis also accommodates a pair of terminals for muting the set when used with a transmitter, these simply invoke disconnection of all power to the set.

The dial illumination, provided by a bulb either side of the tuning scale, can also be switched on or off, a useful feature when running on internal batteries so as to conserve power. It should be noted though, that the GC-1U is a positive earth set. That is, the case and ground of the set are connected to the positive terminal of the power supply, thus making it unsuitable to be connected to a modern car supply by way of the cigar lighter. There is the considerable danger of case of the set, touching the chassis of the vehicle, and shorting out the car supply - beware!

Listening With An Indian

In use, the *Mohican* is very easy to get on with. The portability of the set and large tuning dial, especially with the amateur band spread scales, makes it ideal for those sunny days in the garden.

I used the set with a longwire antenna - some 41m total - this did overload the set. The r.f. stage and a.g.c. being unable to deal with the strong signals, especially on 80 and 40m.

Listening on the internal whip alone, provided a surprising number of resolvable signals. A short spell on 20m produced many European countries, African call signs and the usual array of American calls.

Sitting in the deck chair, with the set on the pool table, sun beating down and a drink in hand, made listening to the bands very pleasant.

Considering the low cost of these sets today, and the high price of a modern equivalent, it would seem that despite its age, the Heathkit *Mohican* can still give great enjoyment for s.w.l. and amateur alike. Do look out for one at your next rally, and put a little Indian into your listening.



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SPECIFICATIONS

Frequency 100kHz - 2000MHz
Memories 1200
Scan speed 25 ch/sec
Scan steps Selectable (50Hz - 500kHz) in 20 fixed steps
Receiver Triple Superheterodyne
Dimensions 57(H) x 150(W) x 25.5(D)
Weight 320g (with EBP-37N battery pack)

OPTIONAL EXTRAS

EBP-33N Small size 650mAH NiCad £39.95
EBP-34N Long life 1200mAH NiCad £49.95
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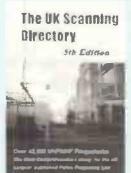
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Scanners - What's Hottest?



AOR AR8000 MCO Enhanced

The AR8000 is leading the way in the scanner field at present by offering the benefits of a short wave AND professional wide band VHF/UHF receiver in a neat hand held package! Perhaps one of the AR8000's strongest points is the EXTREMELY comprehensive user manual which offers lots of useful tips about starting out in the hobby.

The numerous features include:

500kHz - 1900MHz continuous coverage * Built-in Medium Wave antenna * AM/NFM/WFM and yes... USB/LSB & CW! * Password protected memory (to stop those 'prying eyes'!!) * 1,000 alphanumeric nameable memories * three way power operation - internal Nicads, 12V DC and 240AC mains

(PSU included)* Optional PC interface.

Available exclusively from SMC the AR8000 MCO Enhanced is supplied ready to use with the Optoelectronics Scout and the Siskin Multicat.

Plus lots more, phone or write for a glossy, or better still call in and try one out, it's fun!

AR8000MCO Enhanced - £324.95

Data Decoding - the easy way

We have recently launched the Siskin Multidata PC add-on for decoding High resolution fax, Slow Scan TV, RTTY, AmTOR and Morse code. This little unit simply plugs into your PC serial port and receiver's tape/extension speaker socket. Just £29.95 with FREE software!!!

Unlike other similar units on the market the Multidata IS CE approved to cut down on harmful radiation, beware of imitations!



Short wave Under £100?

Sangean ATS-818 Worldband Radio

Yes that's right, our buying power has enabled us to offer the fabulous Sangean ATS-818 receiver at just £99.00 rather than its usual list price of £119.00. The 818 is a high quality feature packed portable Short wave receiver tuning 1.7MHz to 29.999MHz plus MW, LW and FM S-T-E-R-E-O! All this plus 45 preset channels, built-in sleep function and AC supply, we must be crazy!

The Super Snooper Sniffer...

Have you ever wondered how books like the UK Scanning Directory are compiled? How do they find out who uses what frequency? One possible explanation could be the Opto Scout, an ingenious little device that slips in your top pocket whilst sampling two-way radio users nearby logging their frequencies into its memory. Up to 400 frequencies may be stored for later retrieval from the Scout's built-in LCD screen or by dumping the information out to a PC (using an optional RS-232 interface such as the Siskin Multicat) for in depth analysis with programs such as Microsoft Access etc.



Optoelectronics Scout

Supplied by SMC complete with built-in Nicad, fast charger, wide band telescopic whip and companion PC software diskette at just £349.

Receiver C.A.T. control

What is all this C.A.T. stuff everybody is on about these days? Well, many modern receivers (most Icom, Yaesu FRG100, Kenwood R5000, AOR AR8000 etc.) have an extra computer control socket



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allowing a PC to control mode, frequency and memory functions. Whilst you could buy an RS-232 interface from the various manufacturers invariably they are specific to just that one radio.

A couple of years ago we launched the Siskin Multicat which revolutionised C.A.T. control. At last, one interface that works with ALL Icom, Kenwood and Yaesu



C.A.T. radios and Scanners such as the AR8000MCO Enhanced and the Optoelectronics Scout..

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ICOM's new Baby...

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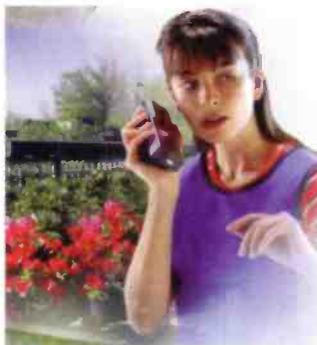
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Yaesu FRG-100



As a result of an oversight by John Wilson in one of his recent reviews, he decided to make amends by revisiting some of the older receivers that are still in production. This time it's the turn of the Yaesu FRG-100 receiver.

I felt very embarrassed when I forgot to mention the Yaesu FRG-100 receiver in a recent article about receivers in the £400 to £500 price range, and suggested to the editor of *Short Wave Magazine* that I would like to take a second look at one or two receivers which had been around a few years, including the FRG-100, to see how well they compared with more recent offerings. I have to say in my defence that I recall the FRG-100 being introduced shortly after I had brought the HF-150 to the market, and at that time it didn't compare because the HF-150 was priced close to £300 and the FRG-100 at £599. However, the FRG-100 list price has dropped to £489 and is actually being sold at under £450 whilst the HF-150 has escalated to £419 so they are now almost head to head and people are asking "Which one shall I buy?" Well, thanks to the generosity of SMC, I have had the opportunity to try out the FRG-100 and have to say that it has been a revealing experience.

When Lowe were the UK distributors for Yaesu Musen back in the 1970s it was a pleasure to unpack any of their products because they were always complete with plugs and sockets, well wrapped up against transit damage and had the best handbook of any of the foreign manufacturers. It was therefore doubly pleasing to unpack the FRG-100 and find that Yaesu have kept to their original principles and provided everything you need to switch on and go, and the

handbook was just like the old times, with a perfectly judged mix of operational and technical information - and the large, clear circuits printed on heavy paper are a delight to see and handle. I never could persuade Kenwood to follow the Yaesu example in handbook production, more's the pity.

Classic Mould

The FRG-100 is a real receiver in the classic mould, with good physical proportions and simple controls carefully arranged on the panel. However, there are powerful operating facilities available to the user and it's possible to do a good deal of 'tailoring' to suit your own requirements as you get to know the receiver. The main front panel display gives frequency readout to 10Hz, with decimal points after the MHz and kHz digits so you always know where you are, and the figures of the display stand out in black against an orange/yellow background, making them very easy to read even in bright light. A 'Dim' button is provided which reduces the level of back lighting if you wish. The display also carries the various legends reminding you what you are doing (some of us forget), including mode, memory channel, wide/narrow filter, 'busy' which shows when the squelch has opened, 'fast' when you use the fast tune function, and all the legends for setting the clock and timer functions. Everything displayed is clear and legible at a glance. If you find seven digits of frequency

display too much to take, you can disable the 10Hz digit, but I found it reassuring to know exactly what frequency I was on - aided by the excellent stability of the FRG-100. It's worth reminding yourself that users of receivers like this enjoy a level of frequency stability that only professional crystal controlled equipment could provide not that many years ago. I still have the original reviews of the Sommerkamp (Yaesu by another name) FR-100B carried out by Brian Armstrong, G3EDD and Peter Simpson, G3GGK, with whom and for whom I had the pleasure of working in the heady days of Pye Telecommunications in Newmarket Road, Cambridge. Where are you now, O members of the Special Engineering Department?

Oh Lord, he's off down memory lane again. But - to the point; the FR-100B was rated as pretty good with an overall drift of nearly 2kHz which was achieved after a 45 minute warm up. Can you imagine waiting for 45 minutes for any receiver to settle down?? - but it was, after all, 1967.



Tuning

The main tuning knob sits at a nice height above the table and is smooth and easy to use although having that slightly dead feel which is common to most receivers these days. As you tune, it is easy to be misled by the rapid shuttling of the display digits into thinking that the tuning rate is too fast; in fact at 5kHz per revolution it's absolutely perfect in all modes - about two QSOs per turn on 80 metres and two stations per turn on the broadcast bands. Alongside the knob are two up/down buttons which change frequency in 100kHz steps when in normal tuning mode, and just below these is the 'Fast' button which changes the main tuning knob rate to 100kHz per revolution and the up/down increments to 1MHz which makes getting around quickly a very easy task even when jumping from medium wave to ten metres. The tuning range of the receiver is from 130kHz to 30MHz, and when using the tuning knob there is no 'rollover' at the band limits. However, if you are sitting at 130kHz and want to roll over to 30MHz, a quick prod at the 'Down' button will get you there, and you can use the same technique to get from 30MHz directly to 130kHz.

The receiver tuning rate changes to suit the mode selected, and the normal settings are 10Hz steps for s.s.b. and c.w., with 100Hz steps for a.m. and f.m. These increase to 100Hz and 1kHz respectively when

the 'Fast' button is pressed, but one of the more impressive features of the FRG-100 is the way in which several operating functions can be changed to suit your own preferences, and the 'Fast' tune system is one of these. By a few simple key strokes you can programme the fast tuning rate in each mode independently, so as to give you what you prefer. For example, you could set it to 9kHz in a.m. for medium wave channel hopping, whilst having 1.5kHz steps for s.s.b. - or whatever you want. It's extremely flexible, and above all easy to change to suit your current needs. If you don't want the receiver to go anywhere at all a 'Lock' button is provided which locks out all the tuning functions. However, it is still possible to change mode and use the memory channel selector and I found this to be more useful than the lock keys which totally disable all functions because it allowed me to sit on frequency and try different reception modes to find which gave the best results. Very good feature for listening to weak broadcast signals where propagation conditions and interference dictate the use of alternative modes at different times of the day.

Mode selection is by a row of buttons at the lower edge of the panel, and modes provided are u.s.b., l.s.b. c.w., c.w. (narrow), a.m., a.m. (narrow), and f.m. (with an optional f.m. detector board). There is no synchronous a.m. detector, but the receiver is so stable that the e.c.s.s. technique can be used in s.s.b. mode without any difficulty whatsoever, helped by the fact that the receiver stays on the correct frequency when switching sidebands (some other makes don't). Received audio is excellent in each mode, and another of those user programmable features comes into play when you have the experience to know how s.s.b. reception should sound, because you can adjust the carrier offset independently for each sideband to get that perfect balance of audio which makes all the difference to easy s.s.b. or e.c.s.s. listening. This particular feature really impressed me, as did the ability to adjust the b.f.o. offset in c.w. mode using the same technique, and a choice of normal and reverse b.f.o. offsets - but I may be the only reader of *Short Wave Magazine* who listens to c.w., so please excuse my enthusiasm. Just remember that when the chips (and the satellites) are down I will still be able to communicate by banging my head on the wall in Morse code, even though my message may only be "Get me out of here". Come to think of it, if I'm in the padded cell, even Morse won't help - but I can always whistle it.

IF Filters

The i.f. filters provided represent a good choice, with a 2.4kHz bandwidth for s.s.b. and c.w., and 4kHz and 6kHz for a.m. narrow and a.m. wide. Here comes another clever 'tailoring' feature, which allows you to change the settings for s.s.b. and a.m. so that 'Wide' and 'Narrow' can select filters other than the normal default choice. The f.m. bandwidth (when the f.m. option is fitted) is set at 15kHz, and c.w. uses 2.4kHz for wide, the narrow filter being an option, with a choice of 500Hz and 250Hz. Incidentally, fitting instructions for the various options are given in the handbook which accompanies the receiver, and the illustrations are unmistakably clear. The c.w. filter options are mounted

on plug-in boards so no soldering is necessary.

Final receiver functions are switchable 'AGC Slow/Fast', a noise blanker and r.f. attenuators which have the best selection of values I have come across. Rather than the usual 10dB or 20dB steps, Yaesu have chosen 6dB and 12dB which can be selected together to give 18dB. This may not seem dramatically important to you, but when checking the r.f. performance of a receiver, as well as using it in anger with an antenna connected, the 6dB and 12dB settings are absolutely perfect for optimising r.f. sensitivity and intermodulation performance. This is a really intelligent choice by the FRG-100 designer, and is to be applauded.

One area where receiver facilities have improved over the last couple of years is in the provision of memory channels, and the FRG-100 slightly betrays its age by having only fifty two available, each storing frequency, mode and filter selection. Swapping memory to v.f.o. and v.f.o. to memory couldn't be easier, and reviewing the memories is extremely easy because Yaesu have provided a separate front panel rotary control which steps through them and displays the contents on the main display but without stopping the receiver listening to the current frequency. If you don't want any of the memory contents you simply stop twiddling the knob and the display returns to showing the frequency. The 'knob twiddling' is also perfect for finding a blank memory channel should you want to store the current frequency.

All the memory channels are tuneable, so you have in effect fifty two receivers under your control, and since frequency and mode are stored, it's ever so easy to have a series of bands already programmed to suit your listening habits. I would choose to have the bottom frequency of each amateur band and its correct sideband stored in memory so that I have a dedicated amateur band receiver at my fingertips. You may prefer to have a selection of h.f. aircraft bands set up or the bottom end of the Citizens' Band, but if it's broadcast bands you need Yaesu have already provided that facility in the FRG-100. By pressing a couple of buttons the receiver will step through all sixteen broadcast bands including long wave and medium wave, and if that wasn't enough you can store any mode and filter setting on any band and it will be called up automatically when that band is selected. These sixteen stores are in addition to the fifty two other memory channels so the receiver really has sixty eight stores available. Nice feature, as is the list in the handbook giving suggested frequency bands for aeronautical and maritime communications.

Scanning

Can I scan? Scan I can! Not quite palindromic but it says what I need to say. Any receiver having memory channels usually has a means of automatically scanning them and the FRG-100 is no exception. Yaesu have covered most scanning options, and you can have the receiver stop on signal and wait until it vanishes, stop and step on after a 5 second delay, or stop and remain on frequency until the 'Scan' button is prodded. Memory channels can be grouped in lots of ten to allow 'Group Scan' so you don't have to blunder through all fifty two every time, and any memory channel can be designated as 'Priority' which gets looked at every few

seconds to check for activity. The maritime distress frequency is the one I always pop in priority and it's surprising how much activity there is, particularly here in North Devon where the air/sea rescue chopper is out regularly through the summer picking up chumps who ignore warning signs and get cut off by the tide.

The receiver can also scan in frequency, and you can set upper and lower frequency limits and let it gallop off at whatever tuning steps you want - even down to 10Hz. The 'Scan and stop' facility was useful in checking the receiver for internally generated spurious signals because I just set the receiver scanning away at one end of its frequency range and let it find its own sproggies. Yaesu adopt a very honest approach by telling you in the handbook of the spurious signals the receiver generates, and I didn't find any others worth mentioning.

The final items on the front panel are a very nice 'proper' signal strength meter, the usual headphone jack



and controls for setting the clock and timer functions. Two clocks are included so that you can have one set to GMT/UTC and the other to local time or some other time zone, and both can be set to 12 hour or 24 hour format. The clock displays can be enabled at any time during reception by simply pressing the 'Clock' button and/or the 'Sel' button to toggle between the two clocks. The timer function can be used as a timed switch on or switch off, and has a 'Sleep' timer should you be in the habit of nodding off whilst listening. Yes, I've listened to some of those 80 metre nets as well. A fixed level audio output is provided on the rear panel for connection to a tape recorder, and a control line for actually switching the external recorder is also on the rear panel. A quick look at the (excellent) circuit diagram showed that the switched output comes from a properly isolated relay contact which is a plus point for the designer and a good safety point for the user. Now that I'm on the back panel, I've started so I'll finish - as the Bishop said to the Actress - or was it someone else?

Two antenna inputs are provided, one 50Ω into an SO-239 connector and the other high impedance into spring loaded terminals; a 'mute' jack allows external muting of the receiver from a simple contact closure; a jack for external loudspeaker connection; a switch for

the internal lithium backup battery and a socket for the CAT external computer control. The CAT system was designed by Yaesu and has been in use for quite some time. As far as I know it has been successful and trouble free, and since it uses a relatively slow serial data transfer rate there have been no complaints about computer noise getting into the receiver by that door. I didn't have the opportunity to check any commercial software, but provision of the CAT facility is a jolly nice feature and makes the FRG-100 tie in with all the other Yaesu radio products.

Measurements

Time to get it on the operating table and do some measurements.

Looking again at the circuit reveals a well chosen selection of input filters which should mean decent second order intermod performance and a push pull f.e.t. mixer with high level oscillator drive, two sections of first i.f. filtering and a push-pull f.e.t. second mixer which would suggest good third order performance as well. I was not disappointed.

The basic sensitivity of the FRG-100 is -124dBm for 12dB SINAD on s.s.b. and c.w., which is equivalent to $0.125\mu\text{V}$ p.d. and therefore much too sensitive for use on the h.f. frequencies up to about 20MHz. However, the provision of the 6dB attenuator sets the FRG-100 in the right league for good h.f. receivers and I would always use it with the attenuator in circuit unless I was going up to 10m and listening down in the noise for very weak signals. Sensitivity on a.m. with 60% modulation for 12dB SINAD is -114dBm, equivalent to $0.35\mu\text{V}$ p.d.

In order to keep measured figures for third order intercept point equivalent across other receivers, I tested the FRG-100 with the 6dB attenuator in circuit, and obtained a highly respectable +21.5dBm and a dynamic range of 101dB. This is really very good indeed, and the FRG-100 is up among the leading performers, even with receivers in higher price ranges. I do wonder, however, just how many readers of the *Short Wave Magazine* really understand, or indeed care about the arcane world of third order intercept points, and does this have any real bearing on the choice of a receiver. A standard house brick has a superb third order intercept point, but it doesn't make it a good receiver, in much the same way that a Santa Pod dragster may well have a nought to sixty acceleration time of 2s, but it doesn't make it suitable for towing a horse box, or capable of taking the children to school. It also occurred to me that one performance figure that few people take a look at is not the third order, but the second order intercept point, because this can be important in the real world. Put simply, a second order intermodulation product is the result of two strong signals mixing together and producing sum and difference signals. When I lived in Huddersfield and tried to operate on Top Band, I found that the band was full of spurious signals emanating from the BBC Moorside Edge medium wave transmitters; a typical product being a mixture of 1215kHz and 693kHz making big noises on 1.908MHz, just where I wanted to operate - second order products which I suspect were actually being generated on the transmitter site.

I thought about how to test a typical short wave

receiver and decided that since there were usually strong signals around 6.5 to 7MHz I would use those frequencies and look for the second order sum at 13.5MHz. Obviously, if a receiver has reasonable front-end selectivity which prevents the original 7MHz signals getting in, the second order performance should be good, and it's a sobering thought that all the golden oldies of the receiver world - the receivers, not me - had good front-end selectivity as a matter of course, whereas modern receivers sometimes have none at all, or as in the case of the FRG-100, a selection of carefully chosen band pass input filters. So - I measured the FRG-100 at 13.5MHz with input signals at 6.5 and 7.0MHz and obtained a very respectable second order intercept point of +91dB. Now that is an excellent result, and shows how well the input filtering is working, despite the fact that my classic Collins 51-S1 turns in a figure of +107dBm just to show that new is not necessarily better! In future I shall carry out the second order measurements on all receivers and see how they turn out.

Reciprocal mixing performance, which is a measure of the cleanliness of the synthesiser used in the receiver, also turned in respectable figures as shown in Table 1.

Table 1.

Spacing from wanted signal (kHz)	Reciprocal mixing ratio (dB)	dBc/Hz
10	-82	-116
20	-91	-125
50	-101	-135
100	-107	-144

As one might expect from a long established communications company such as Yaesu Musen the 'S' meter reading was a spot-on $50\mu\text{V}$ p.d for S9, and followed the 6dB per 'S' point down to S4 where it became a bit non-linear and optimistic. All in all a satisfactory measuring session.

Conclusions

The FRG-100 shook me up a bit, because I don't remember it being so good when I tested an early sample just after its introduction. In both form and function it is an excellent receiver, and is bang up to date in its performance. The memory capacity is perhaps a little light by current standards, but use of the CAT facility in conjunction with appropriate software would give almost unlimited memory functions. It is hard to imagine why it is not more prominently advertised by dealers, except for the fact that it is easy to fall into the trap of thinking that the latest models are always better - in the case of the FRG-100 this just isn't so, and if you are in the market for a first class receiver with hard to beat r.f. performance, you ought to take a good hard look at the FRG-100. At its current discounted prices it's an outstanding bargain.

I would like to thank SMC Ltd., SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hants SO53 4BY, Tel: (01703) 255111 for having the courage to lend me a sample of the FRG-100 from their stock room.

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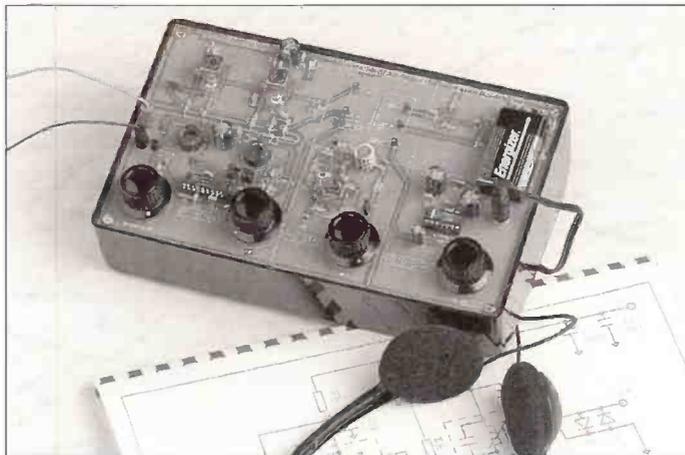
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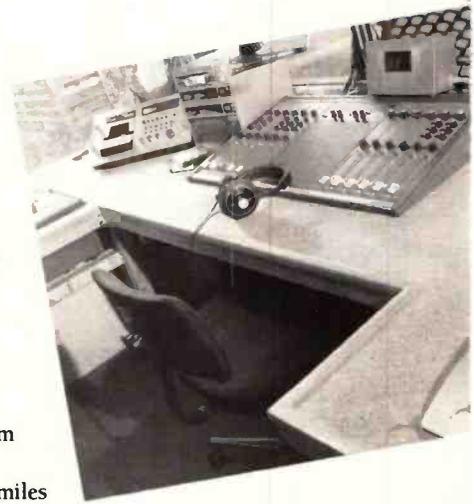
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The Return Of *Wonderful Radio London*

The story of the 30th anniversary commemoration the summer of love 1967 told by Jeff Harris.

Another Summer of Love

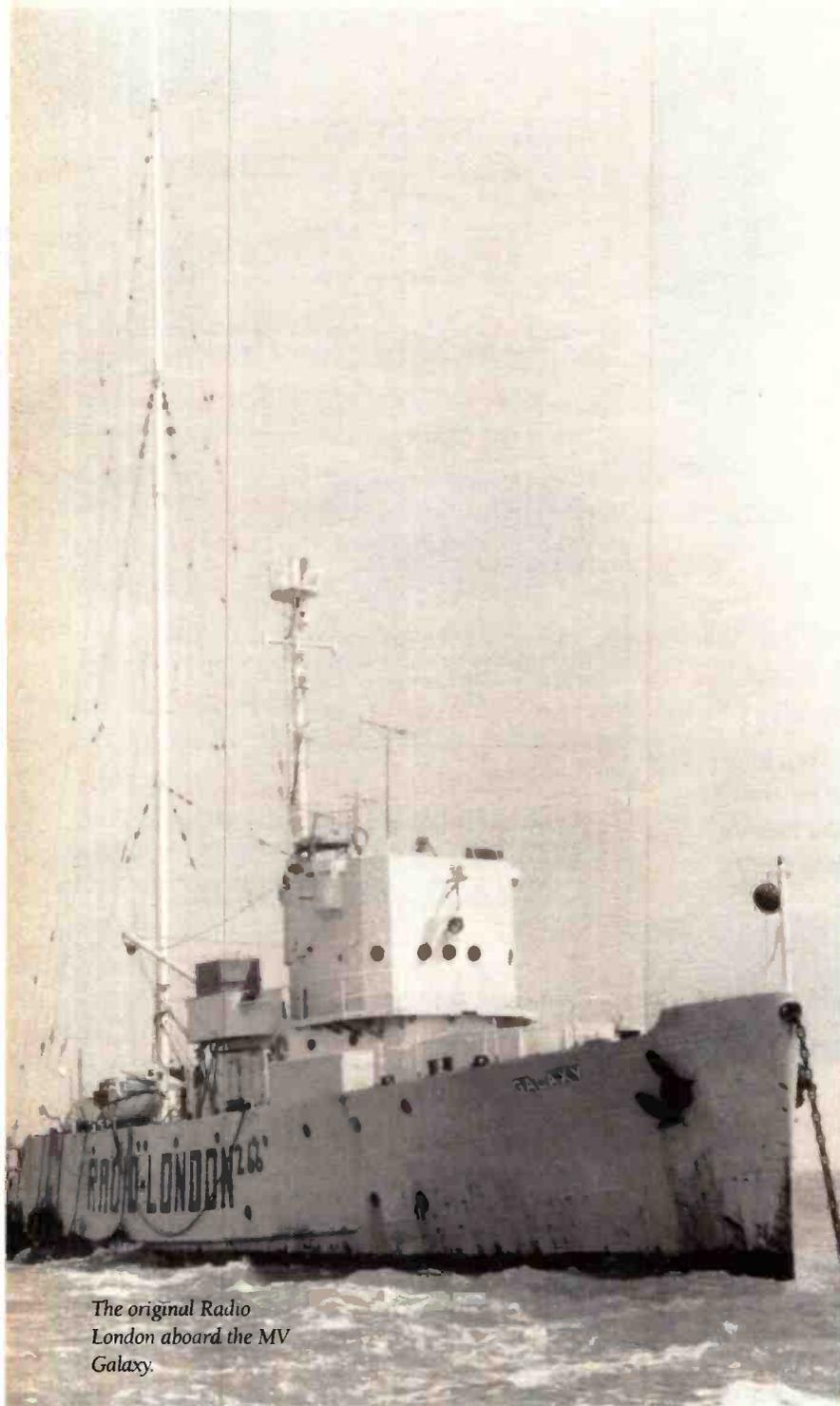
A Mini cost £508 15s 0d and hem lines were 6 inches above the knee! Can you remember the sunny days of 1967? Radio London was transmitting from the *MV Galaxy* anchored three miles off Frinton-on-Sea in



Essex. The *Galaxy* was originally built as the *USS Density* and saw war service during WW2 in the Pacific war zone. With 50kW and a vertical radiator 64.6m high, the massive signal was received all over the UK and most of Europe on 266m during the day and night. But there were clouds on the horizon. The then Labour Government introduced legislation to outlaw all offshore pirate stations with draconian penalties. The *Marine, etc. Broadcasting (Offences) Act 1967* came into force at midnight on August 14th 1967. Some of the pirates did continue for a short time after that but Radio London closed down on Monday afternoon of 14 August 1967. Like it or not, the pirate radio stations of the 60s changed the face of broadcasting in the UK forever.

East Anglia Productions obtained a Restricted Service Licence for 28 days to allow them to recreate, in a small way, the sound of 'Wonderful Radio London'. In this case small refers to the transmitter power! In the halcyon days of Radio London the transmitter ran a power of about 50kW, the Radio Authority regulations covering the use of RSLs allow a maximum power of 1W e.m.r.p (Effective Monopole Radiated Power).

Ray Anderson, the boss of East Anglia productions, had chartered the *MV Yeoman Rose*, a 973-tonne cargo vessel that will be moored off Frinton-on-Sea, close to the original anchorage of Radio London. A studio was built on-board and a transmitter and all the associated equipment installed. Programmes recreated the original Radio London jingles and promotions. Original commercials for products were broadcast and music from the Top Forty of the 60s were played. These



The original Radio London aboard the *MV Galaxy*.

Wonderful Radio London

A typical mobile studio used for RSL applications. Courtesy of Eastern Electronics.

included The Beatles, The Beach Boys, Dusty Springfield, the Supremes and many others.

The original Radio London attracted twelve million listeners in the UK and a further four million on the continent. Radio London will be remembered for the many DJs such as Tony Blackburn, Ed Stewart and Keith Skues to name but a few. It also gave Kenny Everett his start in radio.

The RSL project was underwritten by East Anglian productions. They hoped to sell radio commercials to local business and also offered a range of promotional merchandise.

GUTZ

The MV *Yeoman Rose* is a well-found vessel and was built in 1974. Like many British merchant vessels she is now registered in Belize and has the callsign V3VM. Her original callsign, which might be considered appropriate, was GUTZ! Unlike other vessels of this type she has no conventional wheel, control being effected by the port and starboard 'joy-stick' controls. Her normal task is carrying cement from Purfleet to Belgium and returning with scrap railway lines. Her skipper, J.J. Burford was somewhat amused at her more glamorous task but happy to remain anchored in shallow waters for a month.

A winch-up tower had been added just forward of the bridge to enable the vertical antenna to be supported as she only has one mast located at the bows. The electric power derived from the main engines is 24V d.c. and a Lister diesel generator had been installed so that the transmitter and associated equipment could be operated from a 230V a.c. supply. Two PortaCabins were lowered into the hold to give accommodation to the additional crew, DJs and technicians.

Radio Equipment

In order to comply with the strict conditions of the Restricted Service Licence the transmitter and associated equipment were under the watchful eye of David Trainer G3UPJ. Constant monitoring of the transmitted quality and other parameters were necessary. The equipment functioned without any faults over the whole period, although there were some 'exciting' moments. In spite of the low power the signal was received well in the designated service area on both car and domestic radios. Reports have also been received from many s.w.l.s throughout the

Short-Term Restricted Service Licences - The Low-down

The Radio Authority is responsible for issuing these special licences that can be made available for a wide variety of events. They cover two basic areas, coverage of special events and trial services. Special events can be anything from a large football match to a religious festival; educational aspects are also encouraged. Trial services would include new programming ideas or investigations into the viability of a local broadcasting service on a regular basis.

Technical Requirements

The setting up of a broadcast station, even on low power and with a restricted coverage requires to be controlled and the following are the basic requirements with which holders of RSLs have to comply.

Frequency: The frequencies used shall be assigned within the 531-1602kHz Medium Wave for a.m. and 87.7-108MHz for f.m.. A sub-band of 87.7-87.9MHz has been set-aside for use by RSLs.

Power Output: The permissible radiated power shall not exceed the following: For a.m., 1W effective monopole radiated power (e.m.r.p). For f.m., 25W effective radiated power (e.r.p.).

Interference: The station shall not cause any interference with any wireless telegraphy or other services.

Accessibility of Controls: Controls which may effect the technical characteristics of the transmitting equipment shall not be accessible from the exterior of the equipment.

Frequency Tolerance: a.m. ± 10 Hz, f.m. ± 2 kHz.

Modulation: a.m. - modulation index shall not exceed 100%, f.m. deviation shall not exceed ± 75 kHz after pre-emphasis.

Audio Frequency Bandwidth: Amplitude modulation. A Low-pass filter to be installed to limit the audio frequency bandwidth to 6.5kHz. The filter characteristics are as follows (levels quoted relative to 1kHz):

6.5kHz:	< -3dB
7.6kHz:	< -20dB
9.0kHz:	< -40dB

For frequency modulated signals a pre-emphasis filter with time constant of 50 μ s combined with a low-pass filter shall be installed to limit the bandwidth to 15kHz.

Harmonic and spurious emissions: Radiation for a.m., at any frequency removed from the assigned frequency to more than 9kHz shall be not greater than -40dB relative to the carrier level. Radiation for f.m. at any frequency removed from the assigned frequency by more than 100kHz shall be less than -40dB relative to the carrier.

Antenna: The maximum permissible antenna height for a.m. shall not exceed 10m above ground level. For f.m. this shall be 20m maximum. Polarisation shall be vertical for both a.m. and f.m.

Inspection

The station shall at all reasonable times be open for inspection by any authorised officer of the Radio Authority or the Radiocommunications Agency of the DTI.

These terms and conditions are quite reasonable but the Radiocommunications Agency point out that equipment placed on the market after 1 January 1996 will have to comply with new EMC standards. These will specify tighter limits for harmonic and spurious emissions.

Table 1

Usage Per Day (h)	Cost (£/day)		
	m.w. 50mW	m.w. >50mW	v.h.f.
<4	10.00	12.50	15.00
4-9	15.00	17.50	20.00
9-12	20.00	22.50	25.00
>12	25.00	27.50	30.00
Provided the Minimum total fee shall be	50.00	75.00	100.00

Essex. Within weeks the station had attracted a considerable audience and remained very popular until forced to close down in August 1967.

Local Success

The event proved very successful, with many radios remaining tuned to Radio London for the whole period of the event. Local firms have reported a good response to their adverts. In addition Ray Anderson supported a number of charities with free commercials including the RLNI, SANE, International League against Epilepsy and others.

Station Costs

Running an RSL is not a cheap exercise, there are many cost to consider.

The application and licensing costs are as follows:
a.m.: less than 50mW £435. 50mW to 1W £770.
f.m.: up to 1W £1180. Above 1W and up to 25W £2310.

There are also Performing Rights fees to be added if recorded music is to be played. These charges range from £10.00 + VAT per day to £30.00 +VAT per day depending on the usage per day and waveband utilised see Table 1.

Then there are the costs of the Antenna, Transmitting and Audio equipment.

Radio Amateurs should note that 'talk-in' stations for rallies represent very good value for money! Bessemer Broadcasting offer the following for a 28 day Hire Period:

- BB Am32W Transmitter. BB AMCL Compressor/Limiter/Line Send Amplifier and up to 100m balanced line.
 - 10m Capacitive Hat Monopole antenna with Tuning Unit and Earthing Network. The two cost for hire only £450.00.
 - Provisional Technical Support including installation £205.00.
 - Transport to and from site (Provisional) £145.00.
- All the above total some £800.00.

It is interesting to note that Bessemer Broadcasting supply valved transmitters for use on Medium Wave - 807s live on!

Follow-up Material

A fascinating book *From International Waters* by Mike Leonard (ISBN 0-9527684-0-2) gives a full history of off-shore broadcasting.

country. If you had your Top Band rig at sea and a good vertical antenna, then 5+9 reports would be expected, even on a.m.

The Studio

The studio was in a small cabin just to the rear of the bridge. There is just enough room for the announcer come DJ and one visitor. Audio equipment to provide the necessary tailoring of the signal prior to transmission was, of course, included, as were all the mixers and other bits of audio equipment. In addition, all programme output and advertisements have to be recorded and retained for a period of six weeks.

Disc Jockeys

Many of the original DJs visited the ship during the event making the broadcasts even more realistic. These included Ray Anderson, Chris Baird, Dave Christian, Tom Collins, Mark Roman, Keith Skues and many others. Tom Collins is VP8ASD, well known for his association with the Forces Broadcasting Service.

Original Radio London

Radio London was set up by a consortium of Texan businessmen, who, because of the initial success of Radio Caroline, felt that they could do better. They purchased an ex-World War II Mine Sweeper, renamed it *MV Galaxy*. She was fitted out in Miami with a 50kW transmitter and an antenna mast some 64.25m high. By Christmas 1964 Radio London was on the air and moored 3 miles off Frinton-on-Sea in



The Radio London 30th Anniversary Commemorative Catalogue.



Tony Currie.



The Bridge on the MV Yeoman Rose.

Dave G3UPJ - posing not 'driving'!





The temporary mast on the MV Yeoman Rose.



Ray Anderson in the studio.

Northern Ireland Scene

In Northern Ireland the RSLs are not normally run for commercial purposes. The main purposes have been for community programming, coverage of festival or sports events, Irish language broadcasts and social action programming.

Ian Sinclair who operates from Belfast notes that the Irish Republic authorities make no charges for RSL licences. Although they are only valid for a 14-day period these days need not, necessarily, be consecutive.

Ian reports that the UK Radio Authority will be introducing a new fee structure that will be based on a daily rate, which will assist the operators requiring a RSL for a few days rather than the full 28 days. Operating as I.S. Systems Ian is developing a complete f.m. radio station built into a 5m long exhibition trailer. Source: I.S. Systems, Belfast.

Acknowledgements

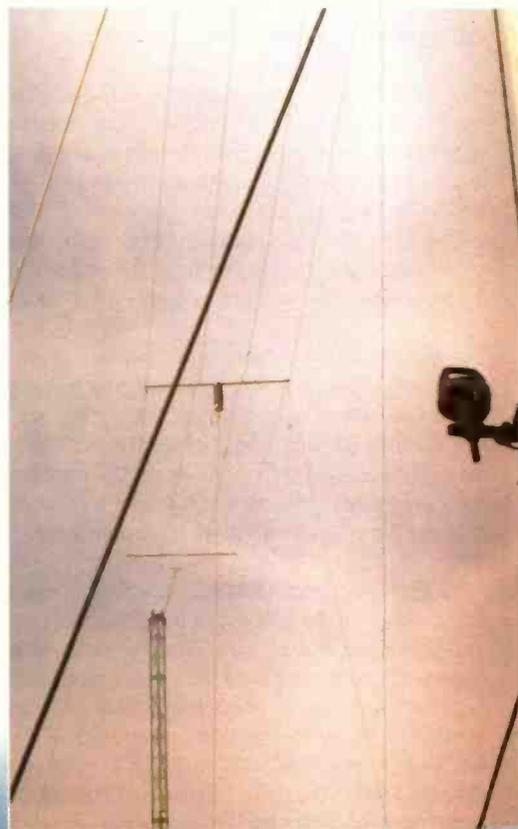
- The Radio Authority.
- East Anglian Productions.
- Bessemer Broadcasting.
- Eastern Electronics.
- Alice Soundtech plc.
- I.S. Systems.

A number of books and CDs are available covering the history of Radio London and these can be obtained from East Anglian Productions at 21-23 Walton Road, Frinton-on-Sea, Essex CO13 0AA. E-mail: eap@compuserve.com or FAX: (01255) 850528.

Below left: Ian Sinclair at the controls. Ian operates from Belfast and handles the unique requirements of RSLs for Northern Ireland.

The suspended monopole antenna.

Below: MV Yeoman Rose, home of 'Big' L.



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AR5000

Cyber Scan®



AR5000 £1495 AR5000+3 £1749

Why a base station receiver??

The expertise AOR has demonstrated over the years in producing high quality wide band receivers is undisputed. It all started in 1983 with the AR2001 which represented the world's first "no-gaps" high performance wide range receiver. In 1985 the AR2002 became the worthy successor extending the frequency coverage into the UHF band. In 1989 AOR released the revolutionary AR3000 providing all mode receive and unbroken coverage from 100 kHz - 2036 MHz... Building on this success AOR continued the EVOLUTION to bring the AR3000A to the market in 1992, smooth tuning, faster scan / search rates & more.

The AR5000 is the pedigree offspring bringing together high performance and unprecedented microprocessor control.

True base receivers are few and far between, some have simply evolved from the hand held equivalents with little tangible improvement in performance or facilities over their smaller counterparts. The AR5000 is not like this! Drawing from its earlier success, AOR has designed the AR5000 to be a true base station receiver - from the drawing board, this is very apparent when plugging in an external aerial, the result is unsurpassed performance instead of a clutter of music and pager breakthrough over many of the desired frequency bands.

The AR5000 strong signal handling is very good, over the range of 500 kHz to 999 MHz this is further assisted by an automatic preselector which peaks the receiver's front end circuits for the best "on channel" sensitivity and ultimate rejection of out of band interference. Even better, you can manually over-ride the automatic preselection to peak the receiver away from the source of interference, this setting can then be stored in memory for smooth interference free scanning.

Alan Gardner, Short Wave Magazine, June 1996 "I found the r.f. performance of the receiver to be very good, making it suitable for professional as well as top of the range hobbyist use... unlike most other wide band receivers it uses separate Vericap tuned r.f. stages to provide important front end pre-selection for a large proportion of its range. This is particularly important in conjunction with a good dynamic range and a low noise synthesised local oscillator in order to minimise unwanted intermodulation products... Receive sensitivity was very good and tended to remain fairly constant throughout the range of the receiver..."

Chris Lorek, Ham Radio Today Vol. 15 No. 6 "...Not once did I find any problems on VHF or UHF due to strong signal overload from other bands - I was extremely impressed! ...Throughout the wide frequency range, the receiver was adequately sensitive, especially so at the upper end, with good overall strong signal handling characteristics... I must admit that I'm a fan of AOR's receivers, and having tested the AR5000, even more so."

Add to this the most comprehensive set of scanning facilities in this sector of the market, wide unbroken all mode coverage of 10 kHz - 2600 MHz in 1 Hz steps, high stability NCO (Numerically Controlled Oscillator) for drift free listening and **the AR5000 proves to be quite a receiver.**

These qualities have been recognised by government departments on both sides of the Atlantic who have carried out extensive trials against rival units and we are pleased to find they are placing orders for the AR5000, good sensitivity at frequency extremes, excellent range of facilities, compactness & light weight.

PLUS Capabilities have been further increased with the launch of the **AR5000+3** providing three enhanced facilities: **A.F.C.** switchable automatic frequency control for accurate tracking of unusual bandplans, **noise blanker**, switchable to help reduce the effects of ignition noise especially while mobile, **synchronous AM**, featuring double and selectable sideband with an easy to use wide lock range.

- Very wide frequency coverage 10kHz - 2600MHz
- All mode reception: AM, FM, USB, LSB & CW
- Automatic electronic preselection of the front end
- Excellent strong signal handling
- NCO (Numeric Controlled Oscillator) with tuning steps down to 1Hz
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- Two aerial inputs with programmable switching from the front panel
- Built-in squelch tone eliminator
- Audio and discriminator out plus tape recorder control

SDU5000 Spectrum Display Unit £799

The AR5000 may be directly connected to the optional SDU5000 without modification. The SDU5000 connects to the AR5000 i.f. output and RS232 port to provide a spectrum display of up to 10 MHz with the capability to zoom in to a single transmission. Additional facilities include peak hold and average reading. An essential tool for the professional monitor. The SDU5000 may also be used with: AR3000, AR3000A, ICOM R7000, R7100, R9000 & R8500 with varying degrees of compatibility, call for details.



★★★★★ Table top receiver of the year 1996/7 - World Radio TV Handbook

★★★★★ Awarded Five Stars - Passport to World Band Radio 1997

AR7030



AR7030 - High dynamic range short wave receiver £799

The AR7030 has established itself at the top end of the high performance short wave receiver league as "the" set to have and operate. UK designed & built to high standards, 0 - 32 MHz, all mode, built-in RS232 port and more. Innovative features include auto-tune synchronous detector and automatic filter alignment.

The standard unit is supplied with everything you need to get going either for casual short wave listening or for serious DXing:- mains power supply, infrared control (with batteries for the remote), operating manual... just plug in an aerial! I.F. bandwidths are typically 2.2 kHz, 5.5 kHz, 6.5 kHz and 9.5 kHz and all mode receive.

PLUS
PERFORMANCE

For the ultimate in performance for the extremes of listening, the 'AR7030 PLUS' is now available (£949) offering the following enhancements:

- ✓ Increased balance of the mixer for greatest IP2 & IP3
- ✓ High tolerance 0.1% components in DDS ladder for low noise
- ✓ Enhanced RF attenuator operation for minimal intermod
- ✓ Higher spec wire aerial input transformer for minimal mixing products
- ✓ Ceramic metal cased 4 kHz (displayed) AM filter fitted as standard
- ✓ Bourns optical encoder for the smoothest DX tuning
- ✓ Features CPU fitted, 400 memories, multi timers & alpha tag

It is still possible to fit other options to the **AR7030 PLUS**, if fitting the multi option NB7030, only the hardware is needed as the features CPU is already fitted, so quote *UPNB7030* at £163.00 if required.

If you already have an AR7030 receiver, our UK workshop can 'PLUS' upgrade your existing unit for £170 (carriage extra) so that you are not left behind in the race for the ultimate DX performer. AOR is quite unique in offering this PLUS upgrade service to existing AR7030 owners, please contact us for details and prices.

ACARS / NAVTEX

Good news for airband ACARS and marine NAVTEX enthusiasts, these data reception modes may now be decoded in a single compact portable (hand-held) unit, the **AOR ARD-2**. Features include built-in LCD readout, operation from internal batteries or external 12V d.c., internal speaker with separate volume & level controls, RS232 socket. A computer is not required for stand-alone operation, just connect audio from a suitable receiver.

Full details next month... watch this space !!

Short Wave Column: Get Them While They Are Hot!

The good news is that the world's radio media are agreed that Sunspot Cycle 23 has officially started. This means the higher frequencies, those above 12MHz say, will again come to life. We have great listening in store as we head for the millennium.

The bad news is that the lower frequencies lose their DX edge. I put my 7030 to the test down on 90 Metres where faint DX competes with our Coastal Operations. Late evening seemed the best time to listen, also sadly the best time for the interference - both co-channel and TV.

AOR's front end took the signal levels, both wanted and unwanted, while the tenacious sync detector recovered Africa's Greatest Hits. See if the band is open by trying for Ghana on 3366. If that is "fair readable", listen around. As I write this, I can hear the BBC from Mayerton on 3255. Good audio too, and I'm having to sync on one sideband as John Peel gets clobbered by RTTY.

3290 and 3270 seem to be coming out of Namibia, perhaps. If they aren't, let me know at bob@aor.co.uk Much higher up on 15575, I can hear Korea as I reach for the bedtime coffee at 2150GMT. A sign of sunspot recovery to hear 19 Metres open for DX at this time? I would like to think so, but I reckon they have just hired airtime at the BBC site just up the road...

Don't you hate it when that happens!

©Bob Ellis 1997

AR8000UK wide band hand held receiver

The **AR8000UK** provides a frequency coverage from **500 kHz to 1900 MHz** without gaps in the range (actual acceptable frequency input from 100 kHz). The AR8000 combines full computer compatibility with advanced wide-band radio receiver technology. The all-mode reception provides AM, USB, LSB, CW, NFM and WFM.

An independent ± 2.0 kHz SSB filter is fitted as standard and the USB/LSB modes use true carrier re-insertion with correctly calibrated frequency read-out (not offset by 1.5 kHz). Step size is programmable in multiples of 50Hz for smooth tuning. A custom manufactured ferrite bar aerial is neatly internally installed at the top of the receiver's cabinet to enhance receive performance when listening in population centres to Medium Wave services. The high visibility dot matrix LCD provides great detail including a signal strength bar meter, band-scope, twin VFO frequencies displayed simultaneously, ALPHANUMERIC comments stored along with frequency, mode & attenuator status simplifying the job of recalling and identifying memory channels, password protection etc. **Computer control** and clone of data between two AR8000UK receivers (optional interface required).

£349



AR3000A Evolution at its very best

It all started in 1983 with the AR2001 which represented the world's first "no-gaps" high performance wide range receiver... the rest is history! AR3000A all mode receive AM, NFM, WFM, USB, LSB & CW with smooth tuning in 50 Hz steps and unbroken coverage from 100 kHz - 2036 MHz. Even the world's armed forces including the largest Airforce and Navy has employed the AR3000A in its up-to-date high-tech hardware for backup purposes, performance, quality, reliability and performance-cost-factor being excellent... £799



To order any of the titles mentioned on these two pages please use the Or

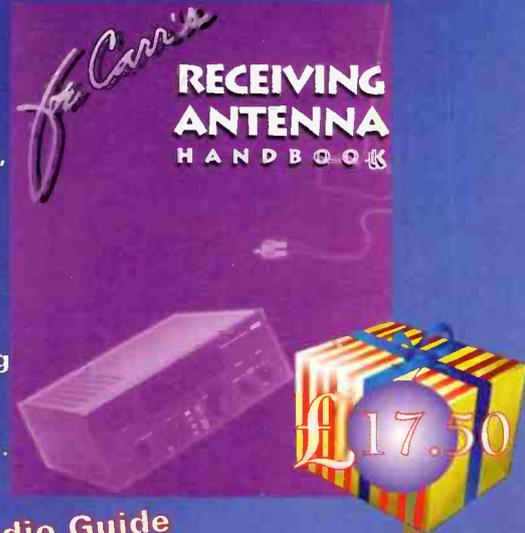
CHRISTMAS

NO P&P, as long as you order prior to the

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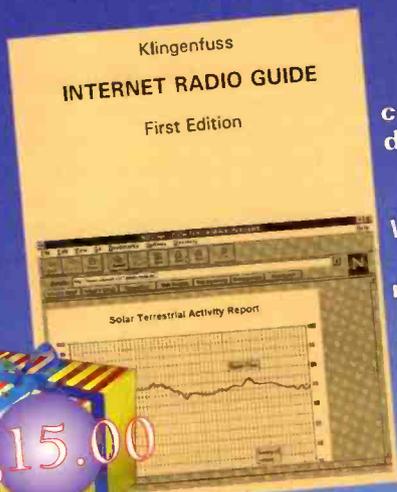
Joe Carr's Receiving Antenna Handbook

This handbook is a complete guide to high performance receiving antenna for longwave, all the way to the upper end of the short wave spectrum. It is a comprehensive examination of antennas intended specifically for receiving purposes. Among the many topics discussed are the basic theory behind all receiving antennas, loop antennas for the a.m. broadcast band, getting a good ground connection at radio frequencies, special designs for indoor and limited space applications and so much more. Well worth £17.50.



Internet Radio Guide

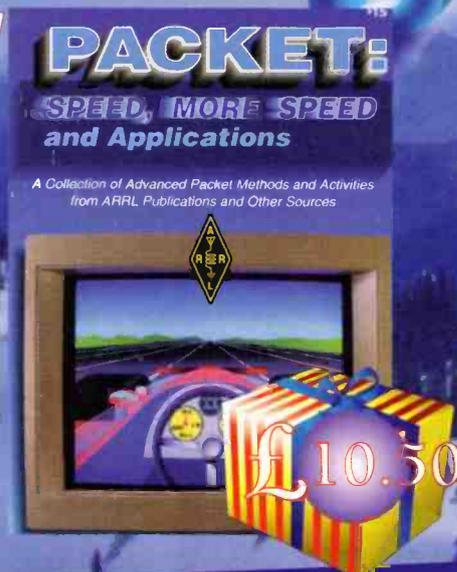
This book is the most comprehensive, reliable and up-to-date manual in existence. In it you will find the latest Internet locations and hundreds of World Wide Web pages on amateur radio, aviation, geography, satellites, radio clubs, intelligence and secret services, radio monitoring, DX clubs and newsgroups, marine and navigation and lots, lots more. A definite must for your bookshelf. Was £21, order yours now for only £15.



BOOKS

ARRL Packet: Speed, More Speed

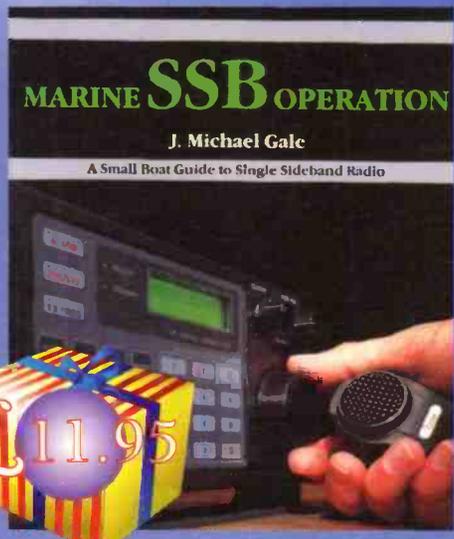
This collection of articles and updates from ARRL promises any exciting ride for both packeteers and future packeteers. Among the topics covered include how to track the flow of messages through the packet network with Packet Tracker, track persons, balloons, ships, how packet works on the digital satellites, and what special modems are needed, how to set up remote packet weather stations to tell you when the floods are coming, and so much more. Best order yours now for only £10.50 - hang onto your seat and start your modem!



To order any of the titles mentioned on these two pages please use the Or

Order Form in this issue or telephone Michael or Shelagh on (01202) 659930.

IS COMING!

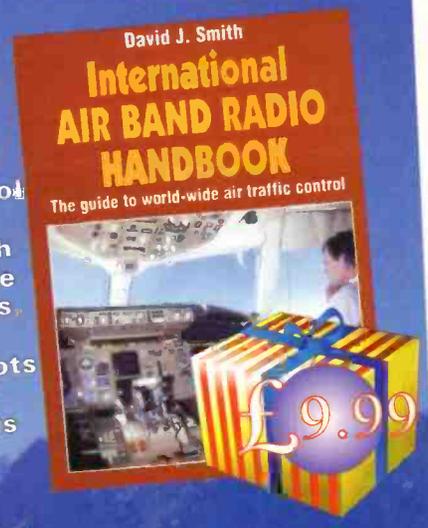


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International Air Band Radio Handbook

The *International Air Band Radio Handbook* presents a world overview of the subject. This entirely new book explains how air traffic control is regulated internationally and includes brief details on each country's system, together with the radio frequencies for all major airports. The many related subjects include navigational aids, flight plans, interception and emergency procedures, as well as weather reporting and lots more. Anyone wishing to take up the hobby surely can't do without this book. Order yours now for only £9.99.



Passport To Web Radio

Here, in this book, you'll find the ultimate in sports coverage along with every kind of music, news and entertainment from hundreds of f.m. and a.m. stations throughout the United States and beyond. And while you're listening, your computer is still free to be used for other things, so you can listen to the world while you work or play. You can listen first hand to the world's major centres, New York, Rome, Taipei, Texas, etc., etc. *Passport To Web Radio* tells you everything you need to know. A definite must at only £14.99. Order your copy now!



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DC2000 built in HA22R hardware option

HOWES DC2000 SSB/CW Receiver Kit - £22.90

This great little receiver makes an excellent project for the novice constructor! The plug-in band module system gives a wide frequency coverage combined with simple construction. Choose from 160, 80, 40, 30, 20, 15 & 10M amateur bands. Also suitable for BM11 and BM54 HF air-band modules. One band kit supplied with DC2000, extra band kits £7.90 each. Expands into an amateur transceiver with add-on kits! A great way to start building your station! DC2000 Electronic kit: £22.90 (inc. one band module). HA22R Hardware: £18.90.

Accessory Kits

ASU8	Antenna Selector & 5dB step attenuator (includes hardware)	£27.90
CSL4	SSB & CW Audio Filter for internal fitment in a receiver	£10.50
DCS2	"S Meter" for signal indication on direct conversion receivers	£10.90
RA30	HF RX Rotary Attenuator 0/15/30dB for internal fitment	£3.90
SPA4	Scanner Preamp. 4 to 1300MHz wideband for discons etc.	£15.90

Frequency Measurement/ Display

CBA2	Counter Buffer (fits in DXR20 or DC2000 to feed DFD5)	£5.90
DFD4	Add-on Digital Readout for superhet receivers / transceivers	£49.90
PMB4	Adds 5 extra frequency offsets to DFD4	£9.90
DFD5	Digital Frequency Counter / Readout with 5 digits	£54.90
XM1	Crystal Frequency Marker - provides accurate calibration signals	£16.90

Enjoy your radio more with great projects from HOWES!



Multiband SSB/CW Receiver

The DXR20 covers 20, 40 & 80M bands as standard. You can add any other SW band with optional plug-in band modules (same type as DC2000). Versatile and popular!

DXR20 Kit: £39.90. DCS2 "S meter" Kit: £10.90. HA20R hardware pack: £28.90

The famous HOWES Active Antenna Kits

AA2. Covers 150kHz to 30MHz. The neat compact answer for those with limited space. Kit: £8.90 Assembled PCB module: £14.90

AA4. Covers 25 to 1300MHz. Broad-band performance in a neat, compact package. Kit: £19.90 Assembled PCB modules: £28.90

AB118. Optimised for long distance reception on 118 to 137MHz air-band. Kit: £18.80 Assembled PCB modules: £27.90

MB156. 156 to 162MHz marine band active antenna system (the brother of AB118!) Kit: £18.50 Assembled PCB modules: £27.60



Antenna Tuning Units for use with HF receivers

CTU8. Covers 500kHz to 30MHz. Matches antenna impedance and helps reduce spurious signals and interference with extra front-end filtering for the receiver. SO239 sockets. Factory Built: £49.90. Kit (including case and all hardware): £29.90.

CTU9. As CTU8 plus balun, bypass switch and terminal posts. The fully featured Rx ATU! Factory Built: £69.90. CTU9 Kit (including case and all hardware): £39.90.

Please add £4.00 P&P. or £1.50 P&P for electronics kits without hardware.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our free catalogue and specific product data sheets. Delivery is normally within seven days.

73 from Dave G4KQH, Technical Manager.

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Welz WS2000EX Wide Band Receiver



The amazing miniature hand-held scanner from Welz was first reviewed in the July '96 SWM. Now it has been upgraded to include more memories and better r.f. performance - and is now the WS2000EX!

The WS2000EX is identical in physical shape, size and appearance to its predecessor, the WS1000. The basic operation of the new receiver is so similar to the earlier model that the review by Alan Gardener in the July '96 issue is still applicable, so there is no point in repeating it here. (Copies of the issue containing the review are still available, price £2.85 inc. P&P. Please use the order form on page 99.)

The main differences between the two models are the number of memories, audio power output and receiver r.f. performance. The number of memories has been doubled to 800 channels whilst the search band and search pass memories have been increased to 20 and 90 channels respectively. The audio output power, which Alan felt was not really sufficient in the WS1000 at only 60mW, has been increased to 90mW. The r.f. sensitivity has also been improved along with the ability to handle signals from an external antenna.

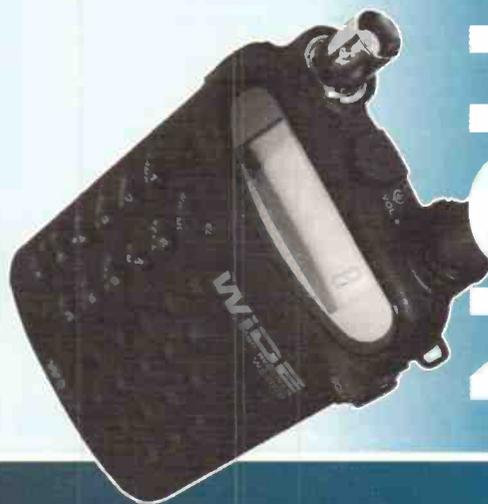
Some useful accessories have also been introduced for the WS2000. There is a NiCad battery pack costing £11.95 with the charger priced at £35.00. To keep the scanner in pristine condition, a carry case is available at £14.95.

A further 'improvement' is in the price. The WS1000 started out priced at £349 - the WS2000 carries a price tag of £269.

**Waters & Stanton Electronics,
22 Main Road, Hockley,
Essex SS5 4QS.
Tel: (01702) 206835.
FAX: (01702) 205843.**

Waters & Stanton Electronics have very kindly donated a Welz WS2000EX scanner as the prize in a competition open to SWM readers. All you have to do is correctly answer the simple question below, and the final question to be asked in the December '97 issue. You will need to save the corner flash from this page to use with the entry form in the next issue. Full details of how to enter will be given next month.

Question 1.
How many memory channels has the WS2000EX scanner?



COMPETITION

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Super Syncro 1100 – 1100mAH Nickel Metal Hydride (NiMH) AA size rechargeable cells. No memory effect. Twice the capacity of NiCds. **£3.00** inc P&P.



Skyscan DX-V1300 base disconn – Most disconnes only have horizontal elements and this is the reason that they are not ideal for use with a scanner. Most of the transmissions that you are likely to receive on your scanner are transmitted from vertically mounted antennas. The DX-V1300 has both vertical and horizontal elements for maximum reception. Constructed from best quality stainless steel and aluminium and comes complete with mounting pole. **£49.95** + £3 P&P.



Skyscan Desktop Antenna Model Desk 1300 disconn – Built and designed for use with scanners. Coverage: 25 to 1300MHz. Total height 36" and 18" wide at widest point. Comes complete with 4m of RG58 coax cable and BNC connector. High performance antenna, ideal indoor or as a car antenna when vehicle is stationary. **£49.00** + £3 P&P.



Wideband mini-mag antenna – Wideband (25-1300MHz) receive antenna featuring super strong miniature magnet and coax cable terminated in BNC connector. **£29.95** + £3 P&P.



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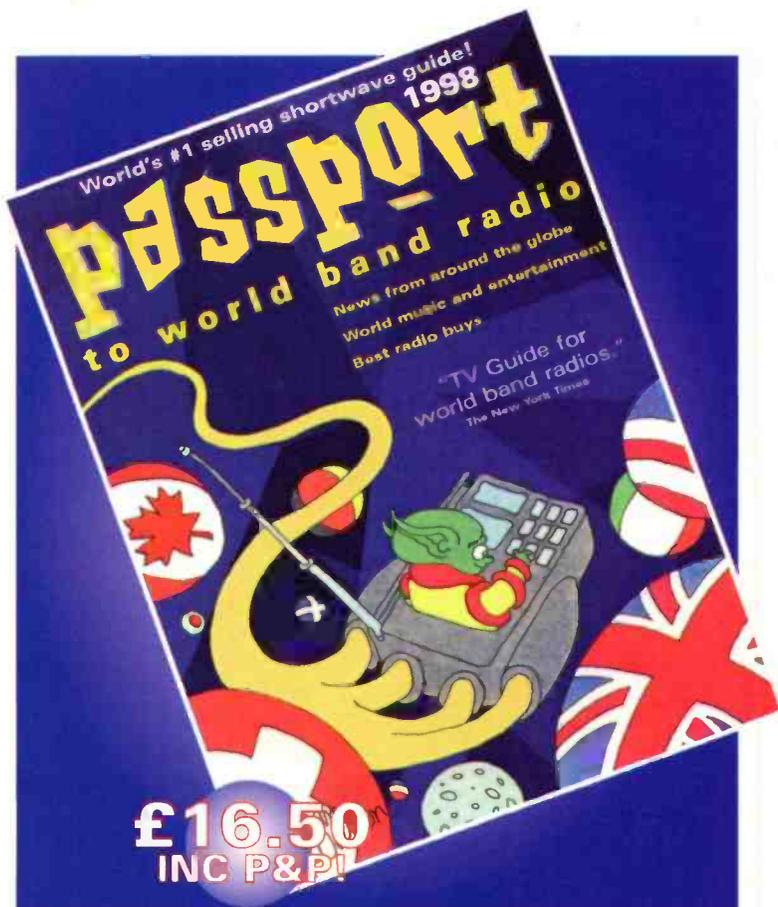
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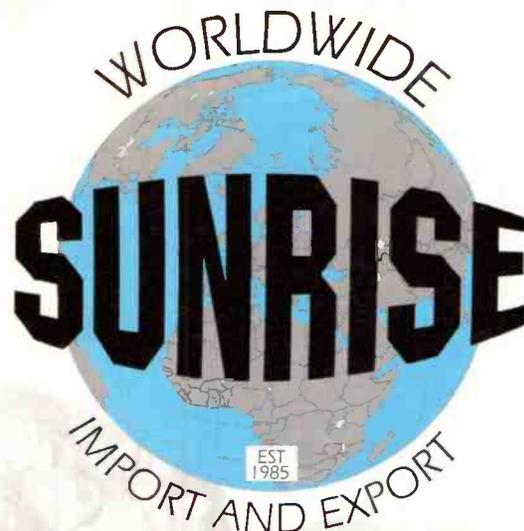
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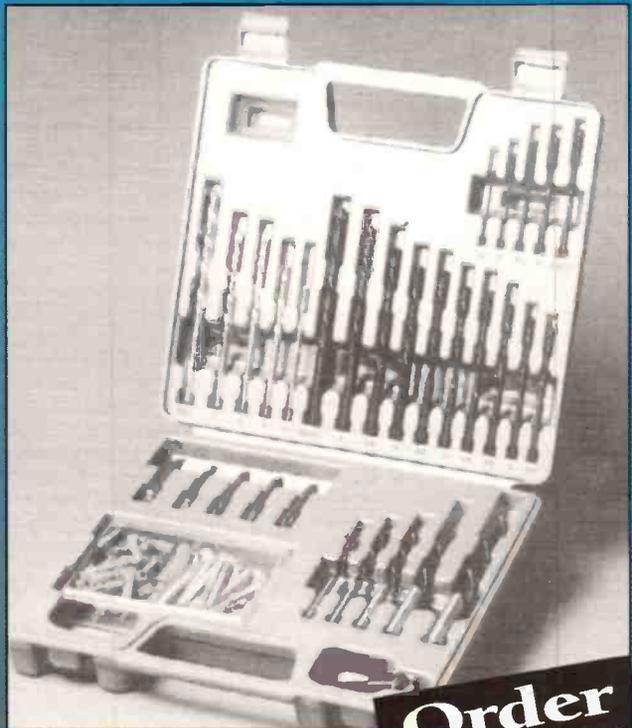
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short wave magazine

Amateur Bands

Round-up

■ PAUL ESSERY GW3KFE
 ■ PO BOX 4
 NEWTOWN
 POWYS SY16 1ZZ

Another month comes, another one passes, and another lesson is learned! When last my end-fed came down, I decided, rather than use the usual Nylon over the ridge of the house, to use some of the green garden string of the traditional, non-plastics variety, on the argument that it would rapidly weather to an appropriate colour and blend into the scenery. It did just that - but the snag has turned out to be that as it weathered, so it quite rapidly lost physical strength; and worse, its resistance to chafe where it goes over the top of the ridge of the house. Never again! Interestingly enough, it fell while I was away at a wedding on t'other side of the country and no wind.

However, I always have logged tuner settings for each band so I did a spot of improvisation and experimentation - precisely the same, undamaged, length of wire, but temporarily a totally different 'run' around the garden mostly only a metre or less above the soil. I was quite surprised how closely the totally different layout compared, as far as the tuner was concerned, with the old. It'll do, at least until I can get around to slinging a new line over the roof - but this time, I will have a spare second line also run over the roof. Then, if one breaks I can use the spare to haul another couple over without any bother.

Why didn't I think of that years ago??

Simple Receivers

I'm quite sure that most of us old-timers began by building a very simple one-valve receiver out of parts salvaged from war-surplus or - as in my own case - the remains of a domestic receiver from a house which had been bombed in Hitler's War. I don't think anything in radio gave me the pleasure I got as a lad of thirteen in cobbling together a circuit from the little I knew, finding the bits, making the chassis - it took me all one evening just to file out the hole for the valve holder! - then putting it together, creating h.t. and l.t. voltages, persuading it to make a noise, then making it work better, better again, and so on, until at last I had a quite respectable one-valver to listen to the world.

In the process I learned about tin-bashing, what a dry joint looks like, and lots of other things too; perhaps most important, how to do things if the 'proper' tool was not available! It didn't look much - no walnut cabinet with Bakelite trim from pre-war or even a one-band 'Utility' set box - but it worked better on such DX signals as were about then than our home domestic mains-driven receiver - and I was accordingly rather chuffed. It didn't even dent my pocket-money!

Several years later I was to find the knowledge I got would come in handy in a REME radar course, by which time I was already some way into a career in communications and radar which took me to retirement and beyond. Amateur radio has given me a good life, by and large.

"So what?" you say.

Well, I recently turned out my workshop thoroughly for the first time in years, searching for a missing item. I came across the old clunker, which I'd thought thrown away when I moved here. I gave it a valve from the junk box, renewed some by-now leaky capacitors, found some h.t.

and l.t., and put it on the antenna. Up to around 15MHz it's a cracker; above that it tends to be a mite 'touchy' on the controls, and perhaps the replacement valve is showing either its age or signs of its first years - Heaven only knows how it originally came to me.

I could build another one like it for **nothing**, given perhaps an old transistor portable for the variable capacitor, some wire for the coils, and a scrounge round the club's junk boxes. To be up-to-date, I'd probably change the valve for an f.e.t. and I might re-vamp the circuitry to cover up to 30MHz, only because I also found a forgotten home-brew two-metre converter!

Are we discouraging youngsters from coming in to this hobby of ours? We need them to be 'hooked' on pocket-money priced receivers - thousand-pound boxes come years later. How many potential s.w.l.s are we turning away from our hobby? And of those who do come in, how much practical knowledge have they?

ET?

John Collins included a copy of a piece in the *Birmingham Mail* by a staff reporter who had discovered that SETI - Search for Extra-Terrestrial Intelligence - existed. One recalls G3YJO talking about this as a diversion from his main theme of Long-Delayed Echoes around 1966 at a talk he gave to the Bishops Stortford club. The chances nowadays of ever solving this one become less and less with the ever-increasing radio pollution by more and more pointless applications.

Still with John, on 7MHz between 2200 and 0030UTC, he picked out JY5HX, 9K2OK, TAIAR, V85HG, EU6AF all asking for cards via the Bureau, while UA1AKJ, who appears around 2300 on Sundays, asks for his cards to be sent direct. From West Siberia RW9AB gave PO Box 7212 Chelyabinsk 454138, Russia. Readers should note that the six-digit number following the town in ex-USSR country addresses seems to be very important; one suspects that the number directs your letter to the right town even though the sorter may not recognise the remainder of the address if it is written in our Arabic letters.

A Mongolian club station was noted by John, but was buried under the Italian 'net control' - isn't that typical?

At the time of writing his letter, **Ted Hearn** from Newcastle, Staffs was just preparing for his holiday - lucky chap! He mentions OK2BNG and RW0QA on 3.5MHz, while on 7MHz G13TTY, G0OYO and DL4HRH were logged. At 14MHz we see lots of Europeans of course, plus LU3DFS, N3HYB, N4XBE, OH0/DL2BUE PPIBG, RZ6FC, W2ONB (or was it 'ONV, Ted?'), ZA1MH, Z31FK, 3V8BB, A44LZ, HB0/DL2SBY, HZIAB, TA3LZ, with TT8JWM, and 5N0T noted on 18MHz. As for 21MHz, there were plenty of Europeans, but nothing beyond Italy. On 18MHz among the EUs we spotted TZ6JA, UA9CK, YC8IXN, ZP7GCA, ZS5XA, and 9G1YR.

Best Times?

To stick to the same operating hours year in year out won't do! For example, the low bands are best after dark with Eighty and Forty, too, sometimes producing interesting things in the

pre-dawn period. Up at h.f., the daylight hours are best, and the borderline between the two bits of spectrum varies as the sunspot cycle does its eleven-year thing.

Again, there's not much point in listening for say some rare Pacific island just 'cos the computer says that's when propagation is best, if it's also the time when the only op is tucked up in bed and asleep - a less than optimum time when he's operating would serve better! And, of course, the dawn and dusk periods sometimes see signals come up for a while and then fade back into the noise. The moral is to try a change!

Again, it is instructive to listen to a big DXpedition and note the stations they are working. Finally, never forget the big contests. The Big Guns will often head for some exotic spot for the sake of the rare prefix, many a new country can be found by listening to the contesters, even though they be only Little Pistols - they too are looking for the Big Guns.

Another Ted now - **Ted Trowell** on the Isle of Sheppey - seems to have deserted Top Band and seems to have given up telephony too - he is all-c.w. On 7MHz around 0500z, he noted CO23SG, HJ1RRR, ZL2UV, ZP7BIA, VP2EXM, CP6IB, P40XM, KP2/KD4D, CY0NCD, CL0VP, ZL1BM, and HK6KKK. At 10MHz the focus shifted to 0700, and EA6BH, 1500 and OY3QN, and at 1700 TF4/DJ7RU. The injected the idea of a QSY to 14MHz around 1500, where Ted netted JA0RYN/7, Y19SK, JA2CEZ, VESUA, W0ZR, JA4AHV, AA7JV, JM3APP, JM3APP, OY1G, JA7SSB, JA1APD, JH1GNU, JA4EKO, JA1FYG, TA2JJ, JS1WTT, JA3KM, JA1NUT, 9H3ZV(G4ZV), JY8WA, and TF4/DJ7RU. Up once again, and 18MHz to turn up 5X1P, JA4AHV, and JY5HX.

QSLs

Ted Trowell offers the following: VP2EXM via DL3XM; Y19SK via HA0HW; J41WCA via SV1CXX; CY0NCD via CD8RCG, JH5HX via PO Box 182700 Amman, Jordan. Ted notes that while some of the above are different from previously published data, they represent what he himself copied from the station at the time.

Incidentally, Ted has been a bit unwell of late writing amusingly of his latest trip to hospital as a 'blue light' job! Let's hope it all comes out OK.

A nice letter from **Harry Richards** in Barton-upon-Humber, who reckons that SWM - and indeed southrons generally - know nowt of what goes on north of Watford.

As an afterthought, Harry wants to know about my problems in the June column with the TS-520 and the TS-440 - mended, Harry, mended! On a different tack, Harry enclosed a full page article on Tetney Beam Radio Station and the GB70GBH commemoration seventy years after the opening. Lincoln Short Wave Club deserves congratulations not just for the station, but, more, for making sure that it was free from the taint of reporters' imagination.

Finis

That's it once again. Input by the first of the month, to me, at Box 4, Newtown SY16 1ZZ. If there's anything you particularly want to have covered, then please say so, and I'll try to oblige!

Satellite TV News

■ ROGER BUNNEY
 ■ 35 GRAYLING MEAD
 FISHLAKE
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The Presidential motorcade sweeps down through the streets of Manhattan towards the waterfront. An expectant crowd awaits. Cut back to an airborne shot of skyscrapers and then slowly zoom in to the open 1950s Cadillac - it's not the President of the United States, but the Rolling Stones sweeping onwards to their press conference beneath (!) Brooklyn Bridge. The remarkable shots were monitored August 18th via Intelsat K - 21°W, 11.540GHz vertical - the 'Stones en-route for their press call concerning their '97 American tour marking their new *Riches to Babylon* album. The press question time was less than remarkable and terminated after about ten minutes. More successful was the Virgin Megastore opening in New York a week earlier, but on Orion-1 @ 37°W. This time the 'Backstreet Boys' sang their latest rendition - at least this crowd enjoyed the happening!

Just two days later - August 14th - an old friend appeared on Orion, that of the BBC Plymouth's SNG truck UKI-231, which crossed the Channel to cover the St. Helier, CI 'Battle of Flowers' along the Esplanade. Shots of flower bedecked trucks and local interviews were fed into the evening news magazine programme. Back to the mainland and a less happy event, the Plymouth truck again, at Whitesands Bay, Cornwall, the scene of a drowning tragedy, the mother saved her toddlers but herself was lost in the surf. The Plymouth truck normally uses Orion and is still analogue.

A reader advises that he saw 'Tower Broadcast Centre' across colour bars on Intelsat K, evening of August 29th. Checking he found that this was BT ex London - they've joined with Brightstar to offer increased facilities and are using formally leased Br*star transponders. Intelsat K was used 22/23rd August for a 'Honda Test Transmission - Honda UK Outside Broadcast' corporate event, rehearsing late into the evening of the 22nd with the main presentation the following morning. SISLink UKI-117 provided facilities and the uplink truck. SISLink can often be seen uplinking from numerous UK locations, they've contracts with Central, Meridian, Harlech, Yorkshire and Anglia. Frequently used is Eutelsat I F5 @ 25°E, an inclined orbiting satellite, now rather ancient and in an elliptical orbit - and is therefore cheap to lease for short term feeds. Central often use this bird for inserts into their local evening magazine programme. Fortunately, SIS are always careful to include their unit number, client and location before and after any news feed - August 22nd for example when SISLink came South and used I F5 there appeared the flashing ident 'Meridian TV OB Portsmouth', then 'SISLINK 26 UKI 257' and also contact telephone numbers. The 22nd was a busy night with British Telecom 'BTI UKI 100' truck uplinking, via Orion, a visit by the Pope to a French cathedral town, blessings, bells, etc. Though BTI were less thorough with no location details on their colour bars.

It was an early rising **Roy Carman** (Sandown, IoW) that noticed another more exotic SISLink feed, this time 'SIS 28 UKI-736' then 'Monseratt for Sky News' and 'SISLink Global Satellite Comms'. This on August 22nd, 0820BST using an NTSC feed at 12.704GHz hor. on PAS-3R, 43°W. I logged the same uplink that evening at 1730 with Jeremy Thompson reporting live for Sky and the American networks with billowing smoke, etc., from the volcano behind. The Sky/SISLink operation was the first live satellite unit on Monseratt - others followed for the American

networks.

Monitoring crew discussions, Roy gathered the camera was on South Monseratt looking North with the main lava flow from the Western face. As an aside, Roy comments that volcanos are terrifying, he having stood on the edge of Mt. St. Helens, Washington State, "you have to see one to appreciate its awesome power"!

Both Roy and **John Locker** (Wirral) reported on the activities of the MIR space station and problems thereon which have been relayed live from the MIR Control Centre/Houston Space Centre. The live pictures seen on Intelsat K, 21°W @ 11.529GHz horizontal were linked back to the 'States ex Morolev MIR Control, Moscow. Up to recently the MIR video downlink was carried via an elderly and inclined COSMOS 2054 bird at 16°W, around the 10.825-10.830GHz circular. This satellite has been replaced by a later ALTAIR-2 craft, downlinking at 10.825GHz with a 1 degree spot beam (or is claimed) on Moscow. A Dutch sat-zapper has received signals on a 1.2m dish though efforts by several UK counterparts has drawn a blank after several weeks, if a 1° beamwidth is employed then signal levels in the UK will be marginal. Transmissions from MIR are random and its a matter of luck if you see anything, I once saw MIR crew pictures, but very low level using a 1.5m dish and 0.9dB noise LNB. As I bash out these lines early September MIR is in trouble tonight with a computer drop out...

Welcome to **James Broughton** (Yateley, Hants) who uses a motorised 950mm dish with 0.6dB Cambridge LNB and comments on the Telecom birds 2B/2D at 5°W which give him eight analogue TV channels. He has also monitored the France Telecom Sainte Assise test pattern in black and white - this suggests that James uses a PAL receiver since the French transmissions use SECAM (try a SECAM to PAL transcoder). Two transmissions are in the Ku-FSS band at 11.466, 11.685GHz - a departure from the norm which is usually Telecom band between 12.5-12.75GHz.

Analogue is active but digital lurks...a few readers have purchased Nokia 9200 or 9500 receivers and cautiously are stepping into the digital world. Once my planning permission has been approved (?) - yes another month and still the authorities have yet to return with an answer to my small dish in the garden - I, too, will be stepping into the digital world though from comments arising from **Julian Redwood** (Christchurch) much of the tuning and parameter setting for digital reception is time consuming, there's not the luxury of just tuning in frequency (or turning a knob). We'd appreciate any user observations



A UK reader's 3.1m mast + 2m panel fence. He obviously has happy neighbours and an equally happy planning department.



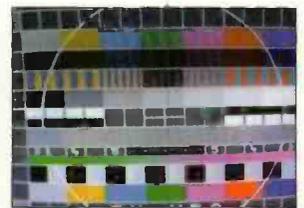
Dean Rogers (London SE2) receiving this VTR clock on his 800mm dish.



Another shot from Dean, satellite unidentified.



Church programming feed via 7°E. (John Locker, Wirral)



East European (Warsaw?) using the Russian test card via 7°E. (John Locker, Wirral)



Good to see Zagreb back in operation after hostilities. (John Locker, Wirral)

Lots of info on this 7°E test card! Czech TV sending a programme feed to Japan's NHK office in Paris. (John Locker, Wirral)



from readers using digital receivers please...

Readers may well recall the visit of the Test Valley Borough Council's planning enforcement officer to my address (19/6/97) concerning a breach of DOE regulations in that more than one satellite dish was present upon my property. Planning permission was applied for as - 'Retention of satellite dish on post' and sent in mid July (five copies, photos, £90 fee). The top of the laurel green 1.2 metre dish in question projects above the fence line by approx. 380mm in an area surrounded by detached and terraced housing i.e. a modern estate. The application now has to be decided at a main Southern Area Planning Committee meeting on 23 September as an objector has appeared. His objections commented that I didn't need all my antennas, that I was inconsiderate to neighbours and that the antennas were not professionally installed. Following recently introduced guidelines allowing both objectors and applicants to speak at planning meetings I will be exercising my rights...the saga continues...

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Excellent news first off for owners of the apparently magnificent AOR AR5000. Did you know that your set has a stunning 2000 channel memory capacity? You didn't? Well, neither did I until I received a letter from DJ of Llanelli.

This is a copy of what was sent to me: "On page 71 the following information can be found in the manual for the AR5000: Power On (Search) EEPROM Bank 0 selection. A decimal point at the 1Hz position **extinguishes**.

Power On (Scan) EEPROM Bank 1 selection. A decimal point is **added** at the 1Hz position.

By switching back and forth during testing it was discovered that the AR5000 has **two** individual memory banks - 0 and 1 - and **each** bank contains 1000 channels - thus doubling the capacity of the set. Bank 0 is also pre-programmed with frequencies at the factory.

I checked this out with AOR in the UK and **Richard Hillier** had the following comments to make. "The earlier series starting serial 5xxxxx did not support this feature although consideration had been given to provision of additional EEPROM storage and switching. While development moved to support the AR5000+3, the opportunity was taken to increase the size of the EEPROM and add software (rather than hardware) switching.

The 2000 location memory capability has been noted on the AR5000+3 operating manual addendum since release, but is applicable to recent AR5000 (serial number 7xxxxx) as well. This information has been freely available from all distributors for some time.

In fact, it is not simply 2000 memories but 10 scan banks, 20 extra search banks, 5 extra VFOs, etc... in fact everything **twice**."

To gain access to the other section hold in either the SRCH or SCAN button whilst powering up. The bank selected is indicated by the presence, or absence of, the decimal point at the 1Hz position.

When the point is present bank 1 is selected and you have access to the factory default. When the point is not present, you are in bank 0 - and have access to the extra 1000 channels.

Configuration settings for both bank 0 and 1 are independent of each other. This means that if you are using *ScanCat Gold for Windows* you must set up your

CAT can be contacted at scancat.com or by snail mail at: **CAT, PO Box 18285, Shreveport LA 71138, FAX: 001-318-686-0449.**

Richard at AOR, also stated, "A new AOR software package "Spectrum Master" (for Win 3.1x, Win95 and Windows NT) has been under development for some time and has already passed into the second stage of beta testing. It will be displayed at the Leicester show, if we can get our skates on there is a chance it will be released there too.

It will provide both a virtual radio and text based interface. All AR5000+3 facilities (noise blanker, A.F.C. and synchronous detection) are supported as well as EEPROM bank switching for 2,000 memory channels. The package also contains a data-base, world map projections and various useful modulation & propagation tools."

AOR Japan are not supporting retro-upgrades of the AR5000 to AR5000+3 receiver. However, we are beginning to receive part upgrades for retro fitting. So far, the AFC upgrade has been supplied to us for fitting in our workshop.

The installation requires intensive work and potentially one board swap. We expect to see NB and sync. upgrades over the next couple of months. Upgrade will only be possible in AOR Japan and German Boger workshop, as far as I am aware.

If your set serial number starts with a 7 then this looks possible but not probably if it starts with a 5. Number 5xxxxx sets require microprocessor upgrade and a problem then appears due to slightly different input bandpass filter ranges.

It looks like each part of the "+3" will be £89 inc. VAT in the UK, carriage extra. The MF5000 optional c.w. filter is available from stock priced at £69.95 plus £2 postage inc. VAT.

So, that's the latest. If anyone discovers this amazing fact and increases their scanning will they confirm here with me? Meanwhile DJ informs me that the AR5000 does compete with his JRC NRD-535 set when used on the same antenna...which makes it, all in all, a brilliant bit of kit.

Simplex & Duplex

Radios owned by lesser mortals now, and from Amlwch in Anglesey, a letter from **Dafydd Tangraig**. He is new to scanning, concentrating on the marine band, and asks if I can explain the meaning of the terms heard amongst many mariners - simplex and duplex.

Firstly, simplex is quite really just that. A ship

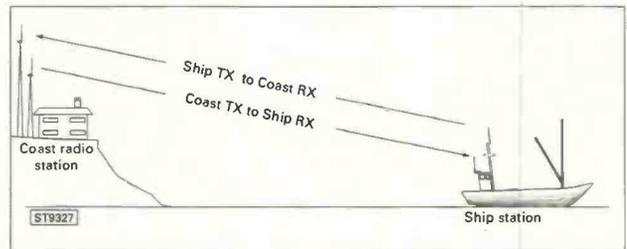


Fig. 2: Duplex v.h.f. operation.

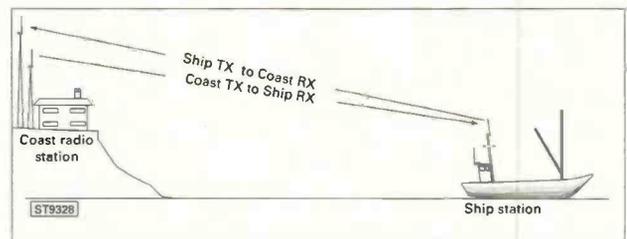


Fig. 3: Semi-duplex v.h.f. operation. In this case, the coast station transmits and receives on one frequency and the ship maintains one frequency throughout.

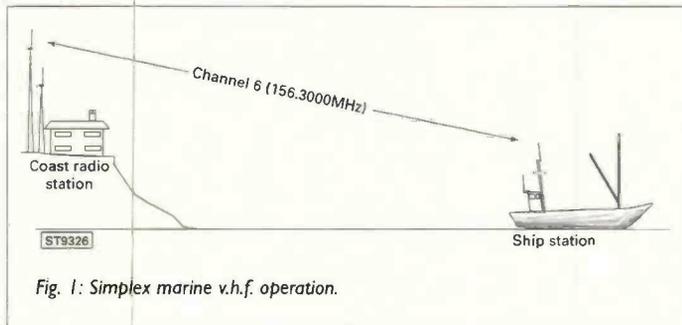


Fig. 1: Simplex marine v.h.f. operation.

configuration for the RS-232 port separately for each bank.

See sections 6-19 on page 29 of the AR5000 manual for complete details of the configuration settings. For data connection, CAT recommend using the 19200Baud as the fastest possible data connection.

Using *ScanCat Gold with Windows* gives you complete control of uploading and downloading all 2000 frequencies from both banks".

comprises a transmitter and receiver and both require an antenna. The one antenna does both jobs but not at the same time!

If one antenna is available then it must be switched between TX and RX and this is done by the p.t.t. bar on the handset used by the operator. Press To Talk. It requires the co-operation of both parties and means that while one is talking, the other is listening.

In simplex, both transmitter and receiver operate on the same frequency although, at times, two separate ones are used. Fig. 1 shows a simplex operation.

Duplex works really well if operators are skilled in marine v.h.f. radio. By skilled, I mean people like HMCG, lifeboat crews and so forth. This does not involve a p.t.t. bar on the handset.

Transmission and reception are done simultaneously. Duplex allows calls to be made to land subscribers - like the BT network, mobiles, etc. and works on two separate frequencies in order to avoid interference. It is better than simplex, avoids having to say 'over!' Fig. 2 shows duplex operation.

Semi-Duplex

There is another operation used, known as semi-duplex. It mainly concerns small vessels fitted with a simplex-only transceiver. When communicating with a duplex fitted shore station then the whole operation is done in simplex mode with the shore. As two frequencies are used the correct name for it is two frequency simplex. Fig. 3 shows this.

Dafydd also asks me what channels are worth listening to. That's hard, really, but I would certainly programme Channel 16 v.h.f. in and follow on from

Continued on page 73

DX Television

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

Sporadic-E reception conditions usually deteriorate around mid-August with fewer prolonged openings. Not so this August and judging by comments from DXers, this season has been one of the better ones in recent years. Over the past few seasons **Peter Barber** (Coventry) has compiled a graph showing the density of openings (days versus the length of openings) and so far the results indicate that this season has been exceptional.

Reception Log For August

Several readers have commented about the collective log and think it's a good idea. We will try and keep it going throughout the winter months but bear in mind its continued success depends upon reception conditions and what you send in to us; no reports, no log!

- 1 Italy (VIDEO - private transmitter) E2, (RAI UNO) IA and IB; Spain (TVE-1) E2; Slovenia (SLO-1) E3; Hungary (MTV-1) R1 and R2.
- 3 Spain E2, E3 and E4; Portugal (RTP-1) E3; Italy (VIDEO) E2, (RAI UNO) IA and IB.
- 4 Spain E2, E3 and E4; Italy (RAI UNO) IA and IB; Germany (ARD-1) E2.
- 5 Italy (VIDEO) E2, (RAI UNO) IA and IB; Sweden (SVT-1) E2, E3 and E4; Portugal E3; Unidentified signals R1 and R2. Tropospheric reception: the Netherlands (NED-1) E4, (NED-3) E30; Germany (ARD-1) E5 and 8 Portugal E2 and E3; Spain E2, E3 and E4; Corsica (Canal Plus) L2 and L4; Italy (RAI UNO) IA and IB; Switzerland (DRS SF-1) E2; Germany E2.
- 9 Spain E2, E3 and E4; Portugal E3.
- 10 Spain E2, E3 and E4; Portugal E2 and E3; Croatia (HRT-1) E4; Slovenia E3; Serbia (RTS-1) E3; Italy (RAI UNO) IA and IB; Corsica (Canal Plus) L2; France (Canal Plus) L3.
- 11 Spain E2 and E4; Italy (VIDEO) E2; Portugal E3; Sweden E2, E3 and E4; Norway (NRK-1) E2 and E3; Lithuania (LTV) R2.
- 12 Ukraine (YT-1) R1 and (YT-2) R2; Russia (ORT-1) R1 and R2; Hungary (MTV-1) R1 and R2; Czech Republic (TV NOVA) R1 and R2; Slovakia (STV-1) R2; Italy (VIDEO) E2, (RAI UNO) IA and IB; Norway (NRK-1) E2 and E4; Iceland (RUV) E4; Serbia (RTS-1) E3; Slovenia (SLO-1) E3; Lithuania (LTV) R2. Tropospheric reception included various Norwegian UHF transmitters.
- 13 Lithuania (LTV) R2; Sweden E2, E3 and E4; Norway (NRK-1) E2; Spain E2.
- 14 Serbia (RTS-1) E3; Italy (VIDEO) E2, (RAI UNO) IA and IB; Corsica (Canal Plus) L2; France (Canal Plus) L3; Spain E2, E3 and E4; Slovenia (SLO-1) E3.
- 15 Italy (VIDEO) E2, (RAI UNO) IA and IB; Slovenia (SLO-1) E3; Sweden E2, E3 and E4; Spain E3.
- 16 Italy (RAI UNO) IA and IB; Corsica (Canal Plus) L2 and L4; Spain E2 and E4.
- 17 Italy (RAI UNO) IA.
- 19 Tropospheric reception: Belgium (RTBF-1) E8, (BRTN-1) E10.
- 20 Spain E2, E3 and E4 (with bullfight during the late afternoon).

- 21 Sweden E2 and E3.
- 22 Sweden E2 and E3; Denmark (DR-TV) E3; Iceland (RUV) E4.
- 23 Italy (VIDEO) E2, (RAI UNO) IA; Corsica (Canal Plus) L2 and L4.
- 24 Norway (NRK-1) E2 and E3; Spain E2, E3 and E4. Tropospheric reception: Belgium (RTBF-1) E8.
- 25 Sweden E2 and E3; Norway (NRK-1) E2 and E3; Italy (RAI UNO) IA and IB; Unidentified 'I+I' logo on R2.
- 26 Estonia (ETV) R2 and R3; Russia (ORT-1) R1 and R2; Norway (NRK-1) E2, E3 and E4; Finland (YLE-1) E3; Sweden E2, E3 and E4.
- 27 Spain E2, E3 and E4; Portugal E2 and E3; Rumania (TVR-1) R2; Ukraine (YT-1) R2; Slovenia (SLO-1) E3; Croatia (HRT-1) E4; Italy (VIDEO) E2, (TVA private station) IA, (RAI UNO) IA and IB.
- 28 Italy (RAI UNO) IA; Spain E2 and E3; Portugal E3.
- 31 Tropospheric reception: Belgium, Netherlands and France (various channels).

Sporadic-E Reception Reports

Sporadic-E activity on the 14th produced an intense all-day opening with reception mainly from the south-east. The 26th was impressive too with high m.u.f.s during the morning producing Band II TV signals (Channels R3 and R4) as well as a deluge of f.m. stations. Tuning up to 143.625MHz, Peter Barber (Coventry) heard Russian speech.

Iceland has been a surprise catch this August with at least two long-duration sightings. **Tim Bucknall** (Congleton) saw it during the day on the 12th with the usual test transmissions consisting of text pages and programme schedules headed 'RAS' and 'RUV'. Iceland was also seen by Peter Barber on Channel E4 from 1102UTC and again at 1551UTC. A 'UR' logo has been queried again. This is SVT-1 (Sweden) and it displays this logo during schools programmes. The clock also features the 'UR' identification in large letters. The 'tgi' (Telegiornale) logo shown during RAI UNO's news programme has been seen in the top-left of the screen instead of the lower-right.

Simon Hockenhull (Bristol) has commented that most of his reception during the first half of August came from the south but Scandinavian signals were favoured towards the end of the month.

Tropospheric Reception Reports

More Norwegian u.h.f. signals have been logged by **George Garden** (Edinburgh). On August 12th, a new transmitter on Channel E51 was resolved in colour until closedown. It was similar to the NRK-2 programme on Channel E44 but no test card was shown on this occasion. Other signals included TV Norge, identified by its 'N' logo (see Fig. 1). A regional 'TV Vest' identification caption was also seen (see Fig. 2). Programme previews headed 'IKVELD' were identified as NRK-2 (TV TO) on Channel E41. After closedown the PM5534 test card was shown.



Fig. 1: TV Norge identification caption.



Fig. 2: Regional TV Norge identification symbol.



Fig. 3: This month's excursion down memory lane. The first BBC-2 Clock caption was radiated on 21 April 1964. BBC-2 was due to begin on 20 April, but, a power failure at Battersea Powerstation plunged the BBC Television Centre into darkness. Just as well because someone had forgotten to attach the hands onto the clock!



Fig. 4: One for the archives: a Channel 5 test transmission via tropospheric reception snapped by Simon Bryant (Farnham, Surrey).

DXTV continued on page 73.

dressler

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Mast diameter 30-50mm can be fitted

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ARA40 TEL 125cm total length with telescopic whip extended. 45cm minimum length. Antenna tube 40mm x 140mm

Ideal for portable radio

Ideal for portable radio

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Frequency range 40kHz-60MHz (full performance) 60-120MHz 2-3dB less gain

Output impedance 50-75 ohm coaxial

Connector to Rx PL type delivered as standard. Other standards can be fitted upon request

Gain 10dB +/-0.2dBs

Intercept Point +50dBm IP 3rd order (10MHz/12V)

DC power supply 11.5-13 volt DC at 80mA typ. (230V/12V DC stabilised mains adaptor is supplied with the antenna)

Mast diameter 30-50mm can be fitted

Dimensions 115cm total length. Antenna tube 50mm x 160mm

Ideal for base stations

ARA 2000

Technical performance

Frequency range 50-2000MHz

Output impedance 50-75 ohms coaxial

Gain 15dB -1000MHz
18dB -1400MHz
16dB -2000MHz

Noise figure 1.5-2dB -1000MHz
1.8-2.5dB -1500MHz
2.5-4dB -2000MHz

3rd order IP +35dB typical

Output impedance 50-75 ohms coaxial

Connector standards N type connector at the antenna. BNC male connector to the receiver

Power supply 12V DC at 160mA DC. Power supply for 230V AC is delivered with the antenna

Dimensions Length 450mm. Diameter 90mm

Weight 2kg

Accessories Mains wall plug adaptor (230V A/12V DC). interface unit (remote supply unit) 12m coaxial cable and mast mounting clamps

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DXTV continued from page 71.

While on holiday at Gigha Island (off the Mull of Kintyre), George resolved various RTE-1 and RTE-2 outlets using a Maxview amplified set-top antenna fed into a portable mini colour TV, a JVC-610GB.

Tim Bucknall has successfully received most of the new Channel 35 outlets of Channel 5 at various stages of testing. All of these stations are now on-air full time.

FM Reports

Mike Gaskin (Cornwall) comments that this August has been the most active one for many years with at least eight days of activity (Mike was on holiday for two weeks, so there may have been more). Intense Meteor-Shower activity was apparent between the 9th and 12th with many stations exceeding 30dB for up to a minute. By 1830UTC, the 14th was absolute chaos with Spanish (RNE) stations almost everywhere. Mike noted an unusual selective frequency effect on the f.m. band on a couple of days when there was high activity between 105-107MHz but virtually nothing at the lower end of the band.

Transatlantic FM DX

Although too late to include in the last column, Mike Gaskin tells us of an incredible transatlantic f.m. opening on July 10th. In fact, odd things started to happen on the 9th when a fairly normal Spanish opening was still in progress at 2300UTC. A check on the 10m band revealed stations in southern Eire were working outlets in the north

of England, either by very short-skip Sporadic-E or, more likely, via backscatter. During this period a London radio amateur reported north American contacts at 50MHz. At 0900UTC the following day, Mike noticed a weak station on 87.80MHz playing pop and country music followed by an announcement 'Easy listening through the night on your downtown radio' in an American accent. There was no identification and the signal had faded completely by 0915. Nordic and Icelandic TV signals were around at the time but shortly after 2000UTC the station on 87.80MHz re-appeared with the announcement 'Eastern Standard Time is now 1310'. Swedish and Icelandic TV signals were around at the time. Mike adds that a Japanese 50MHz amateur station was heard in the London area around that period.

For Disposal

Roger Bunney (Romsey) has installed a new antenna system geared up to Band I DX-ing. Consequently he has a Triax 92-element wideband u.h.f. antenna for disposal for only a tanner but it must be collected. Please write to Roger via the address shown at the top of his 'Sat TV News' column.

Keep On Writing!

We're always delighted to hear from readers. Please send off-screen photographs, reception reports and general information by the 3rd of the month to:- Garry Smith, 17 Collingham Gardens, Derby DE22 4FS.

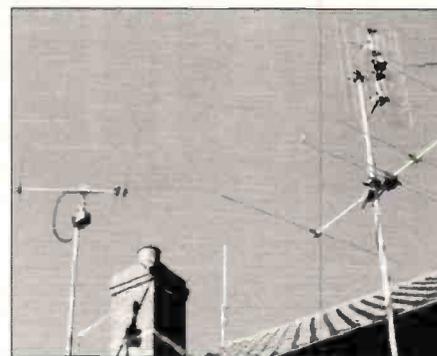


Fig. 5: A new antenna system under evaluation by Roger Bunney (Romsey). The antennas to the right (the u.h.f. grid and 4-element f.m.) are for domestic reception while the one on the left is a rotatable wideband Band I array for sporadic-E DXing.

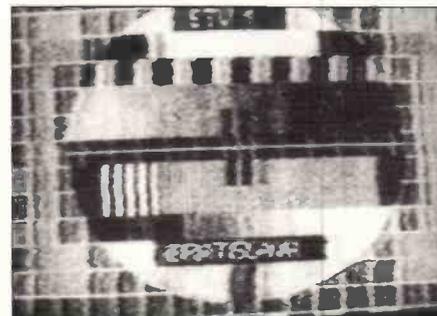


Fig. 6: Slovakian PM5544 received from Bratislava on channel R2 by Stephen Michie (Bristol).

Scanning continued from page 70.

there. It is also good to know Channel 67 and Zero - both used by SAR agencies.

Dafydd has erected a single pole marine v.h.f. antenna which was given to him by his uncle. It currently adorns the chimney breast at his QTHR - and for marine purposes, there would be no better type of antenna.

Frequency Ranges

A question from **Alan Gavin** of Redruth, Cornwall, asks about the frequency range covered by scanners. Alan says that, nowadays, some of the big h.f. RXers tune by scanning with, for example, an up/down button. My old warhorse Sony PRO-80 does that, so is it technically a scanner or a short wave receiver? He asks can I define the scanning brief.

Okay, in my own estimation, the hobby covers, quite legitimately, anything from 30MHz through to 2GHz. That's from the end of the scale supplied by a lot of short wave radios right up to satellite bands.

However, and as you can see from the pages within the magazine, the spectrum is interleaved with hobbies within the hobby. For example, amateur slow-scan TV goes in somewhere in that little lot as does sat zapping. Aircraft, both civil and military, are in the portion (and covered, excellently, by Godfrey Manning in his 'Airband' column) so it's a bit of a mess, isn't it?

Not really. I deal in frequencies, sort of like a communications broker, and consider my area to be defined as p.m.r. (of all sorts) with specialist areas like marine band and so forth.

I carry the odd bit of military aviation and civvy news, but wouldn't dream of putting Godfrey out of a wage! It's therefore quite hard to define, but we seem to get along nicely enough, thanks!

Thanks too, to **Norman D. Locke** who sent

me a QSL card from his QTH. Norman is a member of the International Short Wave League - **RS 95104** - and tells me about his longwire set-up with his scanner and that the results are amazing.

My own memories of joining the ISWL stem from a late childhood with a remarkably antique and heavy valved set which lived in the garden shed. On a chilly winter's night it doubled up as a space heater! I did join the ISWL and the RSGB as a listener but, as happens, moved clear a bit later on. Still, it's good to hear that the ISWL are still going strong.

Mark Painter writes in from my old stamping ground of Holyhead and asks if anyone in that area has frequencies for swap/exchange then could they get in touch with him direct at: **Llanfawr Road, Holyhead, Gwynedd, North Wales.**

I apologise to Mark for not getting back with the info as requested on a particular channel, but was called to undertake a couple of writing commissions which meant travel. If anyone can supply Mark with the air-to-ground frequencies as used by November Whiskey Alpha - Channel 66 being one - then that would be brilliant.

Interception Ban

Now it's soapbox time. A letter reached me via Godfrey Manning and culled from the 'net concerning new moves in the good old US of A aimed at banning radio listening as a hobby. Not just portions of the spectrum, we're talking total ban here!

Apparently, it was taken to Congress and is aimed at banning the reception of everything apart from amateurs, local radio, national radio and TV and that sort of thing. If this should get through, and we do not have sufficient national political conscience in this country to walk on our own of late, then you can bet that it will not be too long before we kiss that particular portion of Uncle

Sam's anatomy and follow suit.

This will, I think, not be a problem here. Interception is already banned by law and, as I've said on numerous occasions, so long as we act responsibly, we are seen as anoraks and harmless. However, what if it did get through?

Okay, as regards the US, there are some things which have a habit of disappearing now and again and they still go on. We would, I think, see an underground movement start up. I don't think it will be the death knell it's made out to be. However, on the 'net, the editor of both *Monitoring* - and *Satellite Times* is looking for support to "Kill The Bill" as we tend to shout here in the UK.

If you have any information on this or see anything posted on the 'net, then get the details downloaded to me and I'll take it into print. I do believe it may be something that we should look at and not dismiss until we know the full details.

From a policing point of view, I think it's safe to say it would be unworkable. We can't educate nor provide for our disadvantaged in society and I believe that the spending of millions to hunt down the average scanner owner would be met with some opposition. I hope so. Whatever, we should keep an eye on developments.

On that note - soapbox booted back into the corner - I'll call it quits. Remember that I'm still on the go for paranormal reports, airmiss, sightings, taped intercepts, as well as for scanning items so get them in.

Replies will be sent with an s.s.a.e. and anyone who finds out my telephone number is welcome to ring, but don't expect instant high-tech solutions to the sort of problem which is a five minute job for the average rocket scientist!

I'd appreciate it if you'd leave it until after 1930 and before 2200. Don't ring at all on a Friday as I watch Rab C. Nesbitt - and I will not be denied my bit of hero worship/role modelling!

Until next month anyway, be careful and be aware!

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Glasureit. Christine Mlynek.

Sixty-one years later to the month, **Mike Le Ves Conte G6YCT** (Kent) sent me a copy of the news from the *Daily Mail* of Tuesday 25 August, 1936. Slough Urban Council was to spend £63000 buying 200 acres of land to make an airport at Colnbrook.

In modern times, have you driven past the Colnbrook Roundabout at the western end of Heathrow? I think Heston aerodrome was built to the east, the two sites virtually merging to form the present-day airport.

Germany was doubling the size of its army and Italy was expanding its air force, French aircraft, described as 'three-engined machines' engaged in the Spanish Civil War. Newspapers received pictures from the battle either by the film being flown out or by an early type of facsimile machine.

The *Graf Zeppelin* was seen from Folkestone as it overflowed bound for South America. The latest FROG fully aerobatic powered model aeroplane cost 5/- at Hamley's with 6d postage (meaningless if converted to decimal money).

Lissen offered their 8214 broadcast receiver, a superheterodyne with just three valves.

Radar

Last month I detailed several special squawk codes. Another interesting one cropped up in an occurrence report from the CAA: 0030 means "Am lost outside controlled airspace."

I also mentioned 0027 meaning that an aircraft in uncontrolled airspace was receiving a non-radar Flight Information Service. **Martin Sutton** (CAA) tells me that this code might not be implemented after all.

Your Flying Experiences

Not needing radar, just binoculars, **Robert Samuel** (Holywell) watched Rescue 122 flying over the River Dee on its return to base at RAF Valley. Am I correct that it's now a Sea King, Robert? A typical task would be to land casualties at a local hospital such as Murrayfield, on the Wirral. There's no fuel available there so helicopters put in to Liverpool for this.

Why are aerodromes allocated u.h.f. channels for Tower? An example is Manchester 455.55MHz (probably f.m.) and **Nick** (Stoke-on-Trent) wants to know. The aircraft are actually on v.h.f. as usual (Manchester Tower 118.625MHz) but the transmission is also relayed on a u.h.f. channel allocated to ground operations vehicles.

Certain vehicles have to drive on the runway for scaring away birds (lest the birds scare the pilots) and for removing debris from burst undercarriage tyres, etc. A safety principal is that

one person only is in total control of the runway, both in respect of aircraft and vehicles. This is to prevent collisions.

Aerodrome Control (known colloquially as Tower) does this. So vehicle drivers will need to hear Tower's transmissions relayed on their own u.h.f. transceivers.

Please note, information sent from within the UK will reach me more quickly by first-class mail than if E-mailed to the Editorial Offices. In the latter case, they have to print it out and then send it to me by first-class mail!

Information Sources

Various (expensive) pre-recorded weather bulletins are available over the 'phone. These are listed in the *Get Met* booklet, free if you send a reply-paid self-addressed envelope to: **CAA Safety Promotion Section, Aviation House, Gatwick Airport, West Sussex RH6 0YR**. Smaller than A5, it weighs about 17g.

The rest of us, who can't afford expensive 'phone bills, can obtain a summary on Teletext, ITV, page 109. I'm not sure this is detailed enough for flight planning but is a help when knowing what conditions to expect.

For example, will your local airport be subject to low-visibility operations or even diversions? If flying as a passenger, will you be able to see the ground?

My *Airband Factsheet* is now on issue 7, hopefully reflecting the latest details of CAA and Aerad publications. As these are still in a state of flux, please let me know if further amendment is needed!

Send a reply-paid self-addressed envelope to the Broadstone Editorial Office (not to me!). The two A4 sheets include the only supersonic routes chart that you're probably likely to get.

Flight Ops Dept

One way to find military frequencies is from the *RAF En Route Supplement* and the *Factsheet* tells you how to order one. Meanwhile, to help **W** (Rotherham), whose request is on page 10 of the September issue, here are some examples (all MHz).

Waddington. Approach: 299.975, 312.5, 362.3, Radar: 123.3, 125.35, 127.35, 249.85, 296.75, 300.575, 344.0, Talkdown (precision approach radar): 309.675, 385.4, Tower: 257.8, 388.225. Ground: 342.125, Operations: 244.275 and ATIS: 291.675.

Coningsby. Approach: 120.8, 122.1, 299.975, 312.225, 344.625, 362.3, Radar: 262.95, 344.0, Talkdown: 123.3, 300.925, 337.975, Tower: 119.975, 120.8, 122.1, 275.875 and Ground: 122.1, 358.55.

My *Helicopter Landing Sites United Kingdom* (also from the RAF) is a little dated, but Catterick Garrison's various helipads (including the military hospital) are not shown to have any associated radio frequency.

Some notes on the above, 299.975 is a centrally-controlled frequency, part of London Mil. 122.1, 123.3, 257.8, 344.0 362.3, 385.4 are common NATO frequencies to be found at nearly all main military aerodromes.

Correct radio procedure during visual flight is to report position in relation to well-known



Jodel D.120. Christine Mlynek.

Continued on page 77

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 BROADSTONE

You have obviously all been on your holidays chasing the aircraft during the past two months as July and August saw a marked reduction in letters. Since the changes earlier in the year there has not been a great deal of new frequency information. A letter from **JD** via the Internet has several snippets of frequency news. He has heard **387.675** in use at Donna Nook range and believes that this may have replaced **232.075**. He confirms **232.025** in use as London Military East and another source also reports this frequency as replacing **251.625**, has anyone heard the latter frequency recently? Also, two new London Military East frequencies have been reported as active recently, (1) **267.625** - I have no record of this frequency whatsoever. (2) **293.575** - This is an old Eastern frequency which I have not noted for some years, can anyone confirm if either of these frequencies are active.

Jim in Axminster reports that **244.375**, is being used as a new FRADU air-to-air operations frequency. This is quite a common assumption as the frequency is used regularly by the Fleet Requirements Hawks in co-ordination with the Falcon 20s from Hurn. This is actually a London Military South, special tasks cell frequency. It is allocated when needed for operations, (mainly low level), in the Southwest coastal area between Portland Bill, Berry Head and Start Point. Finally, the UK Practice Emergency Test Frequency (PETF), **245.1** is scheduled to be changed to **389.6** but no date for this change is yet known. As always any comments on the above would be most welcome.

Airband Antennas

The information I included earlier this year, regarding antennas suitable for airband listening has prompted several letters on the subject. Two readers have sent in quite comprehensive self-build projects for antennas they have tried and tested themselves. Unfortunately, such detailed construction projects do not really fall under the remit of the 'MilAir' column, but I do appreciate the letters. (They could well be of interest to readers of *SWM* as a constructional article - **Ed**.)

My own experiences with a Log Periodic antenna as detailed in the June 'MilAir' column have now been resolved. It took the efforts of the Consumer Association legal department, plus the fact that I bought the antenna using a credit card, that eventually enabled me to get my money back. Basically, the antenna worked very well, but the rotor that was recommended and fitted was not up to the job and failed six times. In my defence, this original rotor was quite a hefty item and appeared to be well built, but it soon showed its true colours in a good blow. The heavy-duty rotor that should have been fitted with that the antenna would have cost me over £225 which would have put me miles over budget. (The original rotor cost me £99.95). My original costing of £240 for the whole project would have become nearly £400. Consequently, I had to scrap the whole project and my dream antenna is still a dream. If you are considering installing a directional Log Periodic antenna, let this be a warning to you of the likely costs involved!

Callsigns

Most of the letters I get are connected with frequency information, so it was good to get some Callsigns from **Bob** in South Wales. A quick report on the Ample Train exercise at St. Mawgan saw participating aircraft from eight countries - The following callsigns were noted - RAF 12 Sqn Tornado, WOLF and JACKAL - RNAS F-16B, 313 Sqn TIGER - Belgian AF F-16A, 10 Wing LION - I hope to include a more detailed report on this exercise in a later column.

Air Defence Radar

I have had several letters from readers requesting information regarding the organisation, structure and frequencies of the UK Air Defence radar system. This is an emotive subject which in the past has been the cause of much fevered scribbling of pens and bashing of keyboards. Before I took on the 'MilAir' column I read with great interest the ADR/TADS debate in the 'Scanning' column during 1996, there certainly seems to be a wide variety of views regarding this subject. Having recently spoken about this topic to a number of people it seems that there are generally two very distinct viewpoints on the subject - Those who would like to see more information published and those that quite definitely do not. With all that in mind, next month I intend to dip my toe into stormy waters and I will present a general overview of the workings of the UK Air Defence Radar system. Let me know of any new ADR frequencies - Good Listening - See you next month.

Airband

Continued from page 75

landmarks, towns, etc. For example, the Forth Road Bridge would be unmistakable. In the aviation world, aerodromes are a safe bet, even closed ones being well-known. So, what's to stop a pilot reporting position as, say, overhead Finningley?

John Richards (Glastonbury) notes that the move to 8.33kHz channel spacing for the v.h.f. communications airband is still being debated. One suggestion is that better management would release many frequencies, for example if any allocations are no longer used despite being officially registered as active.

I'd personally be worried if official frequency registration was this sloppy, after all, the users have presumably continued to pay their licence fees! Anyway, if space can be made by such a review then narrower channels won't be necessary.

Also, John, where a LATCC/Scottish relay or VOLMET broadcast originates at more than one site but on the same nominal frequency, the actual transmissions are slightly spaced so as to prevent mutual interference. An accurate receiver will therefore tune one of the relays a few kHz above the published frequency; the other rely will

be a similar amount below the frequency.

This is to prevent the carriers beating with each other and causing an audible heterodyne whistle in the receiver (it's nothing to do with echoes, John). In fact a heterodyne inevitably arises when the receiver is in range of both relays. The chosen offsets make this whistle too high pitched to pass the audio filtering, so it can't be heard.

I suppose the E-mail from John came off the Internet. Just shows you can't believe everything you see there - one contributor admits to "technical inconsistencies!" John also sent in some information on USA radio law which I've passed to our 'Scanning' columnist who is better placed to comment.

Frequency & Operational News

Thanks again to Martin Sutton for the following. Eday has ICAO locator EGED. A new aerodrome is Elmsted (130.425MHz). London (Stansted) a.t.i.s. is now broadcast on Clacton v.o.r. 114.55 instead of 127.175MHz. I'm always reminding you that receiver coverage should begin at 108 not 118MHz!

New beacon. Stansted again; n.d.b. SSD 429kHz.

Reporting points. Where UG106 crosses into French airspace, the reporting point is now called CRABE. In the East Shetland Basin, a new one is FLARE and existing DEPSO becomes CARBO. On the east coast, EASIN (near Easington) on Helicopter Main Routes (HMRs) 7 & 8 is deleted. Northern North Sea and Atlantic

Rim: deleted points are ALICE, BORVE, RUSEL, TOMIN along with associated HMR Victor.

This reminds me that HMRs in the North Sea are shown on the half-million topographical charts from the CAA or other suppliers (see *Airband Factsheet*). These routes serve North Sea oil and gas installations. Do any readers specialise in following this type of operation?

Affecting the Northern North Sea and Atlantic Rim is frequency 131.3. This was Scottish Information, but that's changed to 126.25; new incumbent is Sumburgh Off-shore Radar which moves in from its previous 126.1MHz. More details of Scottish Information appeared last month.

On the airways, A20 between Brookmans Park and abeam Birmingham takes on what appears to be a new LATCC frequency 130.925 (instead of 124.925MHz).

How do aircraft approach Biggin Hill? **N.S. Chapman** (Sevenoaks) won't find them on A20 as airways are for high-flying aircraft in the cruise. Descending to approach is handled by different means. In the case of Biggin, Thames Radar 132.7 and Biggin Approach 129.4 share the work prior to handing off to Biggin Tower 134.8MHz.

Next Deadlines

The next three deadlines (for topical information) are November 10, December 8 and January 5. Replies always appear in this column and it is regretted that no direct correspondence is possible.

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A few months back I mentioned a letter from **Derrick Hine** who wanted to know about Concorde routes and frequencies. I have received several comments since then, including one to remind me that I should have mentioned the *Airband Factsheet* produced by **Godfrey Manning** and available from the *SWM* Editorial Offices in Broadstone. In fact, in the past few days Godfrey has sent me a copy of the *Factsheet*, and it does indeed show the routes flown out into the Bristol Channel, and a map of the routes across the Atlantic. However, it does not list the v.h.f. frequencies used by Concorde as it communicates with the various ATC centres during its flight. Godfrey says that he will mention the *Factsheet* in his column, so I'll refer readers to those pages if they want their own personal copy.

More Architect

The subject of the RAF Architect service seems to have struck a chord with some people. It seems to have generated more letters and questions than any other subject in the past year.

I have received a number of letters and messages, some requesting anonymity, so some of the following information comes from uncredited sources.

The Architect service used to be transmitted from Upavon in Wiltshire, but that base is now closed (as far as Architect is concerned), and the service now comes from elsewhere. **J.I.** writes to say that the Flight Watch service (its proper name) was taken-over by a new Signals Unit based at RAF Bampton Castle in Oxfordshire. I have driven past this site many times, and the notice board outside says that it is home to No.2 Signals Unit and No.81 Signals Unit. **J.I.** also says that a second Architect was set-up in the early 1990s in Scotland, probably at Kinloss in Morayshire. This last part just adds to the confusion. Imagine the situation where a flight calls Architect; it is only ever answered by one signal. If there were two sites, surely there would be occasions where the aircraft was audible to both locations, and different Radio Operators called the aircraft. How many times have you heard this happen? I certainly have never heard it, and I have never seen any reports of it.

Therefore, I still believe that the various sites around the UK associated with Architect are either transmitter sites or receiver sites. I do understand that one of the transmitter sites is at Kinloss in Scotland, so maybe that is where that part of the story comes from.

On the subject of the RAF VOLMET service, **J.I.** says that the whole VOLMET system comprises three parts - Compilation, Generation and Transmission, and each of these is now undertaken at separate sites. Compilation is the process where the data for the Airfields and Regions is collected, collated and checked for consistency. The Generation step is where the data is recorded into a tape-loop and prepared for transmission. Finally, the recording is piped to the transmitter site, where the spoken words are blasted into the ether for all to hear.

Nowadays, as we all know, the voice is actually a computer generated voice where the message comes from a bank of sampled voices. It is highly likely that much of this system is now automated, with just a few computer people checking a few times each day that the whole system is functioning correctly. When **J.I.** started with VOLMET, it was situated in two small rooms at RAF West Drayton, and the information was received via teleprinter. After a few months, they were moved into a sound-proof booth within the LATCC Met-office.

J.I. points out that before you start hastily writing-out your QSL requests, it is certainly not the policy of the RAF to acknowledge receipt of QSLs, and there is every chance that your efforts may end up in the in-tray of an RAF Policeman. Also, **J.I.** says that he has a vague recollection that Room 200 at RAF West Drayton was actually the gents toilets! Now you know why your QSL requests were not always answered.

Staying with the VOLMET service for a moment, **J. Parry** writes from Cyprus to say that he has not heard the VOLMET broadcast in the 4.700MHz range in recent months. Well John, the 4MHz transmission changed to 5.450MHz quite some time ago.

More SAR

NM from Yorkshire writes with a long list of requests and suggestions relating to SAR subjects.

NM asks for a page devoted to Search and Rescue services using s.s.b., including bases, callsigns, frequencies, operating areas and equipment used. As well as aviation services, **NM** wants to know about North Sea rescue services as well.

Well, with the information that I currently have, I could probably fill two pages, but that would only cover about a third of the areas requested by **NM**. Search and

Rescue is a very large subject, and there are large areas where I have no information, so I have to rely upon the readers of this column to supply me with suitable information. For example, **NM** wants to know about SAR services in the countries surrounding the UK. But I have next to no information at all for most of these countries (I know a bit about Belgium and the Netherlands); if anyone can tell me about SAR services in European countries, and explain where the services are based, what callsigns and frequencies they use, what kind of equipment they use - then I'll gladly produce an article based upon the information received. I would particularly like to hear from anyone who can provide information about the North Sea oil-rig safety vessels (**NM** uses the word *Tharos*, but that means nothing to me).

The best publication about Search and Rescue in the UK is the book *Rescue* which appeared seven or eight years ago, and then it only really covered the RAF and RN SAR helicopter services. There have been a number of changes since then, but I am not aware of any other single book which lists everything as **NM** wants.

Finally, **NM** asks where readers can obtain information without having to go onto the Internet. Well, the only other option is books, books and more books. I have spent many hours looking through various books in public libraries; all that I can say is that the bigger the library, the wider the selection of books, and the more likely you are to find answers. However, this method does require a lot of effort on your part to find the information that you are looking for. Where the Internet scores, is that you can ask a question, and receive literally hundreds of replies with different bits of information; from this, you can collate a very complete answer to your question.

If you want timely information, then the Internet is probably the only answer. There is absolutely no possibility of this column in *SWM* being able to predict what is going to happen in the near future, and list the frequencies likely to be used. By the time that any given issue of *SWM* appears in the shops, almost all the information is history. Sure, there are many frequencies and callsigns that never seem to change, but details of exercises and frequencies, special events and one-off happenings are usually over-and-done by the time you get to read about it.

Every so often I receive requests for details of future events, and this is usually followed by a request for all the frequencies to be used. Unfortunately, I do not have a magic source of information, and I have to rely on the same sources as everyone else - newspapers, enthusiast magazines, pure luck and letters from readers.

Deadlines

Please note that my deadlines for information have been brought forward by a few weeks. I now have to get my copy to the *SWM* Editorial Offices by the 15th of each month, so I need to have your letters with logs, questions and information by about the 10th of each month.

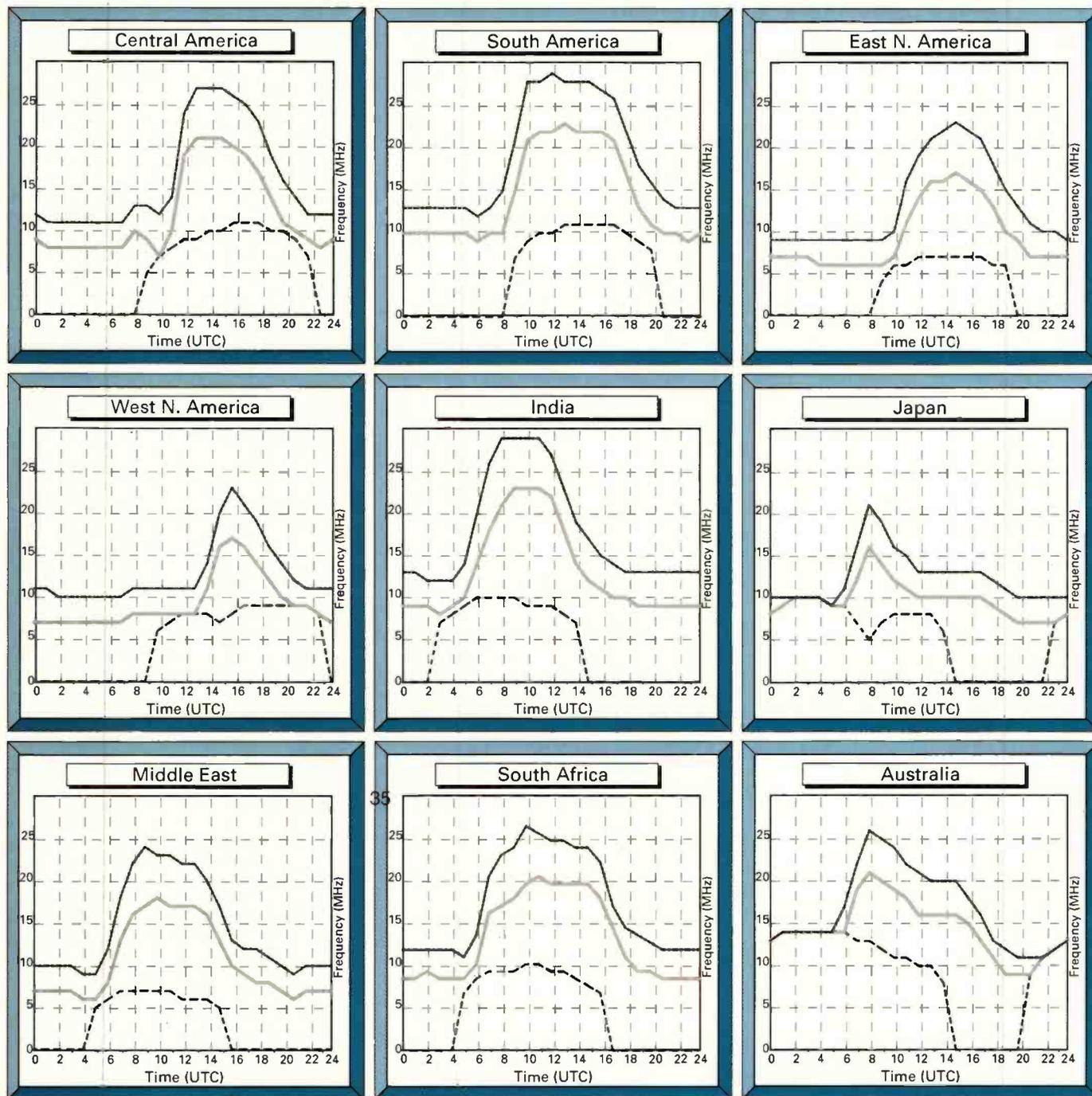


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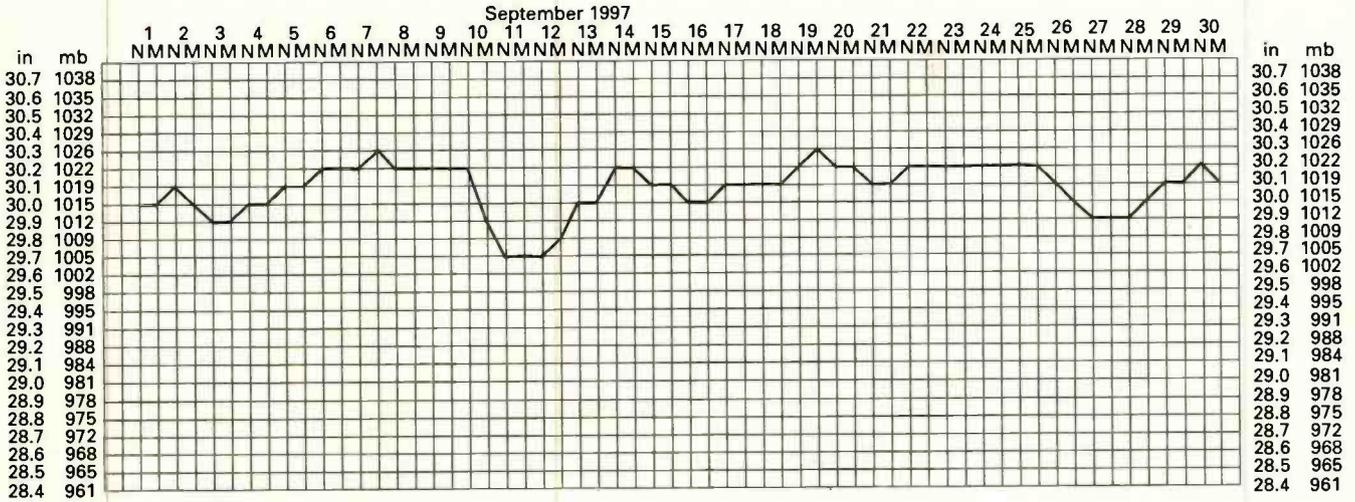
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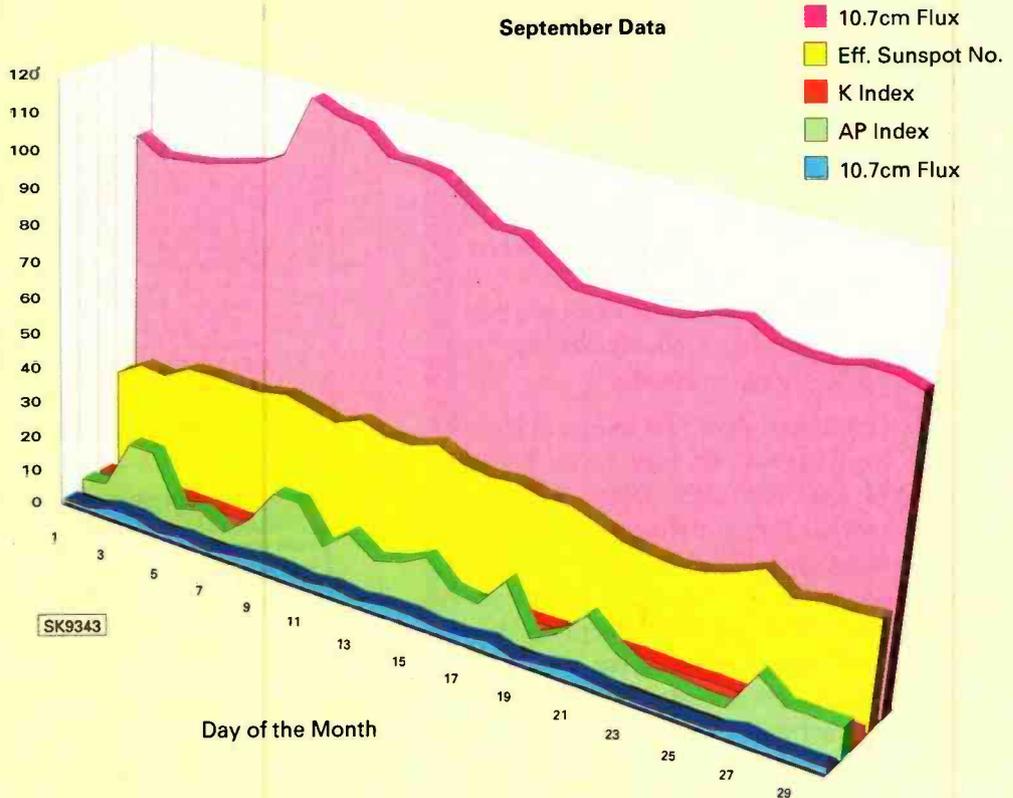
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Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, September 1997.



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.



Info in Orbit

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The latest WXSAT in the METEOSAT series - see Fig. 1 - was launched successfully (together with the Hot Bird-3 television satellite) by Arianespace on an Ariane-44LP rocket at 22:11 UTC on 2 September. Launch was from Guiana Space Centre in Kourou, French Guiana, South America. It entered geostationary transfer orbit (GTO), a highly elliptical orbit with an apogee at the height of the geostationary ring (about 36000km above the earth's surface) and a perigee within a few hundred kilometres of the earth. At an early perigee of METEOSAT-7, the apogee boost motor was fired, injecting METEOSAT into geostationary orbit.

On 8 September control of METEOSAT-7 was handed over from ESOC (European Space Operations Centre) to EUMETSAT; their control centre in Darmstadt handles all commissioning activities. All the satellite's systems will be checked out by EUMETSAT's Control Centre before METEOSAT-7 is declared operational in about three months time.



Fig. 1: METEOSAT series.

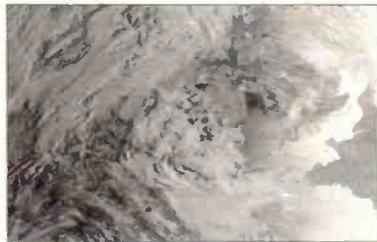


Fig. 2: NOAA-12 10 September from Plymouth.

FENGYUN-2 operations (shortly!)

Ben Ramsden sent me two August editions of *China Daily*, each carrying information about China's satellite launcher programme. Reporter Chen Chunmei quoted comments from Zhang Xinxia, president of China Great Wall Industry Corp., stating that China expects to increase its share of the international commercial satellite launching market, following recent successful launches. China's FENGYUN-II (FY-2) geostationary WXSAT is currently undergoing a three month testing phase in orbit and is due to be handed over for routine operations in early October. China has previously had to use data from the Japanese GMS WXSAT which only covered east China. FY-2 should provide hourly images, helping to increase the accuracy of local forecasts.

Current WXSATS

I have done even more WXSAT monitoring than usual recently, due to a surge in requests for software reviews. Some readers may know I am also a keen astronomer, and correspondence with an American solar physicist led to an invitation to review an Internet program which collects a variety of solar data to enable amateurs and professionals to monitor and possibly predict the effects on radio propagation of solar activity. A review is likely to appear in *SWM* in due course.

As a result of this extra monitoring activity, I noticed that GOMS images have been disseminated fairly regularly, with just a few missing scans. Unusually, when an image is not available EUMETSAT have repeated transmission of the previous image.

Morning passes of NOAA-12 have been very

good - at least at my QTH. Fig. 2 shows the satellite catching the reflection from the late summer morning sun during September. Where the skies are clear, the reflection/glare off the sea produces a dramatic scene. For those interested in the processing sequence, the original image occupied about 2Mb; the required section was extracted and saved in BMP format, occupying 973Kb. This was imported into an image processing program, contrast enhanced and saved in JPG format - finally occupying 95Kb! Close

inspection shows a high degree of image integrity - in other words not much detail has been lost by the compression process.

Receiving WXSATS - Part 2

Last month I explained about the use of the different types of antennas for monitoring or decoding WXSATS. To summarise:

- for those wishing to merely monitor satellites, many antennas will suffice; the dish has very wide-band reception characteristics (but usually requires a wide-band pre-amp due to its low gain). Additionally, tuned dipoles, turnstiles and crossed-dipoles can be used.

- for decoding purposes, a right-circularly polarised crossed-dipole, a quadrifilar helix or other purpose-designed WXSAT antenna is essential because of the WXSAT's special characteristics.

Receivers - General Purpose

The topic of receivers and their suitability - or otherwise - for WXSAT reception, is one which concerns many 'Info' correspondents. If you decide to simply monitor WXSATS (amongst many other satellites which can be received) then you can go for a general purpose receiver which can be tuned to a wide range of frequencies. The pages of *SWM* provide ample reference material from advertisers, and you have a wide choice of hardware. You can use the antenna of your choice, without worrying about having to receive the maximum signal from any particular type of satellite. You could even buy a portable receiver, and there are many instances of such receivers being used to monitor satellites at frequencies other than just the WXSAT bands.

WXSAT Receivers

If you want to decode WXSAT signals then you enter a new 'ball-park'. The two satellite constellations (geostationary and polar) which provide WXSAT images, each require different 'front-ends'. In this instance, we are looking at a.p.t. and WEFAX receivers. (Receivers for decoding PDUS and h.r.p.t. WXSAT telemetry are not included in this article - but they will be looked at in a future edition.) Before looking at the



Fig. 3: NOAA-14 April images from George Newport.

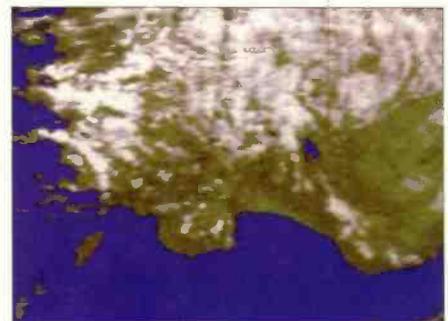


Fig. 4: NOAA-14 10 August from Harry Wagg.

characteristics required of a good WXSAT receiver, an understanding of how the image content is incorporated into the r.f. downlink is helpful.

The WXSATS carry what is, in effect, an astronomical telescope. To image the scene below, there are mirrors and a set of sensors to measure the energy radiated in the different spectral bands. METEOSAT's spin (100r.p.m.) produces a line of image data from each spin, and the sensors detect brightness variations along its length. In visible-light wavelengths, clear sea normally appears dark, and bright clouds (which have a high albedo - reflectance) appear white. Consequently, daylight (visible-light wavelength) images vary from black to white, with many intermediate shades between - the number depending on the resolution of the on-board optical/electronic system. The thermal sensors also produce a grey scale image, and this is precisely calibrated; white represents cold areas and black represents hot areas.

The sensors for each channel convert the instantaneous grey-scale measurement to a signal; this is used to amplitude modulate a 2.4kHz carrier (actually a sub-carrier). The resulting signal (which now contains the image information) frequency-

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modulates the main r.f. carrier. The transmitted signal therefore contains an unusually wide spectrum of frequencies - approximately 35kHz. The relative movement of the polar WXSATs can add up to 10kHz variation due to the Doppler effect.

To extract the image data from this signal, one must use a receiver designed to perform data extraction in a precise manner. This is the reason that general purpose scanners - which normally have an i.f. bandwidth of about 15kHz (and are therefore usually called narrow band) - are usually unsuitable for WXSAT reception. I have to say "usually unsuitable" because some people with electronics experience have successfully converted their utility receivers to achieve WXSAT specifications. However, this is not simply a case of replacing one i.f. filter with one of wider bandwidth! There is another factor.

Pager Interference

I mentioned earlier about the re-allocation of frequencies which threaten the WXSAT band. Some years ago, within the UK, frequencies bordering on the 137.9MHz end of the band were made available to commercial interests for use by paging units. Any standard receiver will pick up these bursts of (what to us is) interference, and it comes in loud and clear on v.h.f. WXSAT frequencies! A well designed WXSAT receiver must therefore be fitted with properly specified filters to at least minimise this source of interference.

Scanning - Computer Control

Other facilities required on a good WXSAT receiver include the ability to scan known frequencies and to lock on an a.p.t. signal, discriminating the signal in the presence of noise. Receivers are designed and constructed in various ways depending on research and tests done by the manufacturer. Some synthesise frequencies, others use crystal oscillators. The former are generally more versatile because they can synthesise a large range of frequencies, whereas crystal receivers require a separate crystal for each frequency. Sometimes the facility to control the receiver by computer is built-in, making it very versatile.

My own receiver is now quite old. I bought it in kit form, with the actual receiver section already constructed and aligned, leaving the mounting and outside connections to be completed. Interestingly, I notice that a similar unit is still available through RIG (see contact details later). After allowing for the cost of the other items which are required, were I to be starting now I would definitely opt for a completed unit even though they are more expensive.

There are two UK commercial polar receivers available, the Martelec Communication Systems MSR50 - virtual WXSAT receiver which can be controlled by a PC or Amiga computer. Priced at about £179 ex P&P. Tel: (01420) 82752 for full details (including other WXSAT equipment). And the Timestep Weather Satellite Systems PROscan receiver - independent autoscanning receiver which can be controlled by computer using a suitable internal card interface. Price £340 plus VAT. Tel: (01440) 820040 for full details (including other WXSAT equipment).

Combined Polar/WEFAX Reception

If you are not familiar with WXSAT equipment, another option for METEOSAT reception is worth knowing. When planning your WXSAT system, there may be an alternative method available for WEFAX reception depending on your current system. For just METEOSAT monitoring you can simply purchase a METEOSAT receiver. If you

already have a polar system (and therefore an a.p.t. receiver) you can consider buying a downconverter.

The a.p.t. receiver (of which suggested characteristics have just been described) can be used to receive WEFAX data (from METEOSAT) because WEFAX transmissions are fully compatible with a.p.t. Each contains image data which has been amplitude modulated onto a 2.4kHz sub-carrier which then frequency modulates the main r.f. carrier. It is perfectly practical to use a down-converter to convert the 1691.0/1694.5MHz signals to 137.50MHz, and then connect the output to your WXSAT receiver; there is usually an extra socket available for this purpose. So one a.p.t. receiver can do both jobs. Suitable downconverters are available from a few suppliers, such as Martelec. It may be worth comparing costs and the convenience of using either a downconverter or a direct 1691.0/1694.5MHz receiver.

Again Timestep METEOSAT receiver costs £250 plus VAT and Martelec's Downconverter is £220 inc. VAT.

Decoding WXSAT Data

If you made the big decision to actually decode the signal - and that is what this column is about - then you can choose a suitable method of decoding for your circumstances. You will almost certainly want to use your computer. With the exception of the Amiga - for which Martelec still cater - virtually all products are designed for the PC. You can fit a manufacturer's decoding card into a suitable expansion slot in your computer, and then process the signal using their supplied software. Programs cope with both WEFAX and a.p.t.

New cards have been manufactured to make full use of the Windows 95 operating system, allowing the user to program WXSAT image collection. I have recently reviewed Timestep's new PROsat for Windows 95 - see last month's SWM.

Another method now available involves using a suitable soundcard in your computer, as mentioned in recent editions of 'Info'. Free software is available which uses the card to decode a.p.t. and WEFAX images, as long as your computer has a suitable specification. This limitation also applies to most commercial products.

RIG (Remote Imaging Group - UK branch)

Details of membership can be obtained from **Ray Godden G4GCE, Wayfield Cottage, The Clump, Chorleywood, Herts. WD3 4BG. Tel: (01923) 720714.**

Letters & Pictures

George Newport of Canterbury sent me a collection of high quality colour prints from which I selected a NOAA-14 image of Cyprus taken in April. This region is just beyond the limit of my NOAA reception circle.

Harry Wagg of Birkenhead on Merseyside has been involved in constructing WXSAT receiving equipment for several years and wrote about his progress. He originally built the Maplin receiver and decoder, but bad paging interference led him to upgrade to the Cirkit receiver. His

original BBC computer was subsequently discarded when he moved to a Pentium PC which enabled him to produce several NOAA images - see Fig. 4.

His main query concerned updating the Kepler elements used within *TrackIt*, the Timestep satellite tracking program. As with most programs using Kepler elements, there is an option to update the elements either manually (uggghhh!) or automatically from a file. To do this you need a recent set of elements in a file called (for instance) 'apt.tle' or 'weather.tle'. Tracking programs expect to find a file with a standard terminator (*.tle or *.2le) and will then read the contents. Updated Kepler element files can be found on the Internet at <ftp://ftp.funet.fi/pub/astro/pc/satel/>

This source contains selected groups of Kepler elements including 'amsats' and 'WXSATs', as well as 'geosats' and much more. If you do not have Internet access but you have a modem, you can dial up any of several BBS (bulletin board services) which carry Kepler data - using settings 8N1: Starbase 1: 0171-703 3593 and 0171-701 6914, RIG: (01344) 874140, Timestep BBS: (01440) 820002 I keep a list of people to whom I send Kepler elements each month - see below.

MIR Conversations

Many readers have asked about monitoring voice conversations from MIR tuned to 143.625MHz so I am putting a sample recording on my Web page for those who have never heard one. The idea arose from an E-mail from **Domenico Diiorio** who sent me a huge file (ouch!) containing such a recording. He transferred it from tape to his computer's sound card. His receiver is a Kenwood R-5000 fed by a wideband discone mounted in the loft.

Shuttle Launch Schedule

STS-87 *Columbia* is scheduled for launch on 19 November at 1818UTC into a 28.45° inclination orbit. A comprehensive listing of all Shuttle flights and payloads, together with associated information is available from me as the *Shuttle Pack*. Please include a £1 and stamped s.a.e. for the A4 booklet.

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 uses 137.85MHz
 OKEAN-4 and SICH-1 use 137.40MHz for brief, scheduled transmissions.
 METEOSAT-6 (geostationary) uses 1691 and 1694.5MHz for WEFAX
 GOES-8 (western horizon) uses 1691MHz for WEFAX
 MIR voice on 143.625MHz.

Kepler Elements - MIR and Shuttle

- 1 For a print-out of the latest WXSAT elements, MIR, and the Shuttle (when available), 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. I send Kepler elements 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.

Decode

Oops! Several readers have recently pointed out that the Web site address printed in recent issues is wrong. This has now been updated - sorry for the inconvenience. I've also updated the site to include all the latest software so it should be well worth a visit.

Analysis for Beginners

One of the great attractions of the world of Decoding is the many different facets to the hobby. Most new listeners are initially attracted by the ability to receive press reports or maybe a FAX chart or two. Whilst this may satisfy many, most soon encounter what is at the centre of this decoding hobby. That is tracking down the various warbles and whines and working out the type of signal. Now if you want to get really serious in this area you will probably need to part with some hard earned cash as only the most sophisticated decoders include detailed analysis tools. At this point I know a lot of listeners give up. But what I'll try and do here is show you how you can carry-out lots of analysis using the simplest of decoding systems.

One very important point to remember is that by far the most effective analysis tool is completely free - your ear! If you talk to anyone who's spent some time with this aspect of the hobby you will find that the initial analysis is done by ear. In the same way that most new listeners can easily recognise a Morse signal, the experienced listener can usually recognise, or at least tell the difference between, RTTY, ARQ, FEC, FAX and MCVFT. This may seem almost impossible for the newcomer, but it's really done through familiarisation with the various rhythms created by the different modulation/encoding systems.

You may now be asking why bother to train your ear and learn analysis techniques when there are so many decoders around that feature automatic signal identification. If you've used any of these automatic systems you'll find that they're very easily confused especially if the signal is suffering any of the usual h.f. degradations such as noise, fading or just a plain old weak signal. You will also find that most of the automatic systems take quite a while to decide they don't know what the signal is. If you're just tuning around looking for new signals this can get very frustrating. The whole process can be speeded-up considerably if you can use your ear to eliminate unwanted signal types. For example, if you're looking for some ARQ-E to try decoding you can easily use a trained ear to immediately recognise and step over RTTY and other ARQ-A signals.

Detective Game

On the packed h.f. bands this can make the whole operation considerably quicker. As you've probably already twigged, signal analysis is rather like a detective game where you gather together important clues until you have enough to confirm the type of signal. So let's take a look at how you can start to train your ear and use a few tricks to

quickly gather those clues and identify data signals. One of the easiest facts to gather is the shift of the signal. In case you're not familiar with the term, this is the amount the signal wobbles or swings. This can usually be taken straight from the tuning indicator on your decoding system. For *Hamcomm* users you just need to press 'ALT' 'T' followed by 'P' to start the spectrum analyser display (assuming you've already started the program).

On this display you just need to note the difference between the two peaks that make up the signal. Fig. 1 shows an example of a RTTY signal with a 400Hz shift. You can see that this really is very easy for *Hamcomm* users. If your tuning display is not calibrated don't panic! All you have to do is tune to one or two signals with a known shift and note how far the tuning display is displaced.

In order to make really effective use of the shift information you've just collected you also need to find out the speed or baud rate of the signal in question. The ease of this operation will depend very much on the type of decoder you have as quite a few have a built-in speed measurement system. If you're using the excellent *RadioRaft* decoding system you will find that you don't really need to use analysis techniques for the simpler modes such as RTTY and ARQ/FEC as the program's built-in analysis can identify these signals very quickly indeed. If you do want to manually analyse a signal you need to disable the mode scanning. This is dead easy - you just use your mouse and click on the mode-scan to toggle so that the tick disappears. *RadioRaft* will then just examine the speed of the signal and select the most appropriate rate.

A more accurate alternative is to select the BPS-Meter option from the 'mode' menu. This provides a direct measurement of the baud rate of the signal. If you have a more basic decoder and there's no facility to measure speed, all is not lost as you can use your ear. Instead of using an experienced ear (which you don't have yet!) you can use the comparison technique to sort out the speed. This simply means you listen to a selection of signals of known types and compare them with the one you're analysing. The trick is finding the known signals. If your receiver has the facility to store frequencies of your favourite signals you are halfway there. All you have to do is store the known signal types in the memory system and you can then quickly switch between the memories and the signal your chasing to see which is the closest match.

Known Signals

So where do you get the known signals from? Here's a few to get you started but if anyone knows of some better examples please drop me a line with the detail. 7.646MHz Hamburg Met RTTY 50baud 400Hz shift 518kHz Various NAVTEX stations FEC 100baud 170Hz shift (you will probably have to wait for a signal to appear) 9.994MHz Santa Maria Air RTTY 50baud 800Hz shift This can be a very effective solution to the problem, the only drawback being the availability

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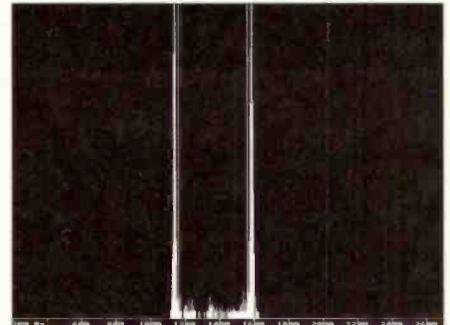


Fig. 1: *Hamcomm* Spectrum Display.

of known signals. Clearly you can only carry out a comparison if the reference station is on the air! An alternative here is to make a recording of the reference signals so the signals are always on tap. The snag here is that you have to listen right through the tape and it's not easy to flip between two similar signal types.

A more sophisticated solution would be to go for a copy of the Klingenfuss CD *Recording of Modulation Types*. This very comprehensive CD set includes good quality recordings of just about every signal type that you will encounter. The beauty of it being packaged on CD is that you can quickly step straight to the required track. Another advantage of the CD is that the recordings can be used to test your decoder and provide valuable practice in using your decoder under controlled conditions.

If you have a Windows based PC to hand there is another tool available that can help you identify the speed of a signal. This is the program *Spectrogram* that I've covered in recent *Decode's* and copies can be found on my Web Site. This is a more scientific approach to analysis that once learnt can be applied to the vast majority of data signals. I would recommend starting by making a digital recording of the data signal in question. This is just a matter of connecting the 'line out' of your receiver to the appropriate input socket on your soundcard and following the instructions detailed in *Spectrogram*.

Once you've captured the signal you can then work at your leisure to take the signal apart. First of all you need to make some adjustment so that you can zoom-in on the appropriate part of the signal. Select Modify from the File menu and adjust the setting for the best display.

I've found the following settings provide the best results for this type of analysis
 FFT = 512 point
 Resolution = 8 bit
 FFT Window = BB 8ms
 Horizontal Scale = 1ms
 Palette = Greyscale

The choice of greyscale is a personal preference but I think it provides for a far less confusing display. As you zoom-in and clarify the display you will see the square wave that represents the encoded data appear within the display. Once you have a nice clean display you need to use the cursor to measure the width of the smallest element in the signal. This should be

easily recognised as the smallest rectangle in the signal - don't get confused with any very sharp spikes as they are just interference. The result you get will be measured in milliseconds and needs to be converted to baud rate. This is a very simple calculation as you just divide the result in ms into 1000. Here's a practical example. If the width of the smallest part of the signal is 20ms then the baud rate must be $1000/20 = 50$ baud. To help minimise the number of calculations you have to make here's a list of smallest element size for some of the most common speeds:

Time (ms)	Baud Rate
20.0	50.0
72.0	13.9
13.3	75.0
10.4	96.0
10.0	100.0

You can also identify the shift using Spectrogram. All you do is set the cursor on the top line of the square wave and note the reading in Hz from the Cursor coordinates panel. Now move the cursor to the bottom of the square wave and repeat the operation. The difference between the two readings is the shift of the signal. Now you're probably wondering why I'm putting so much emphasis on establishing just the speed and shift without gathering any data on the mode itself. Over the years a number of experienced listeners have proved that these two factors in themselves are often enough to identify the complete signal. Even in cases where the link is not so clear, it serves to limit the possibilities down to just a very small number of modes. One of the areas where this technique fails is when dealing with the multi-channel telegraph systems. The solution is to learn to recognise the sound as all these stations are very distinctive. Having established the speed and shift you now need some form of look-up table that will show the most likely mode for a particular combination of speed and shift. The solution to this can be found in a number of locations. One of the most famous systems is called the *Yarborough Matrix*. This comprises a plasticised A4 sheet that provides an easy to use ready-reference from speed/shift to mode. My only problem is I'm not sure if it's still in print and if so who's selling it! If anyone can help with this please drop me a line.

All is not lost though as there is another source of this valuable information. This can be found through the Internet on the Worldwide Utility News site at <http://www.gem.net/~berri/wun> The document to get is Stan Scalscky and Mike Chace's excellent *Digital Signals FAQ* which has recently been updated to Version 5. As well as

providing a mass of useful information the Baud Rate Summary table provides a valuable cross reference between speed and mode. To get you started here's a few of the more common speed/shift associations

Speed (baud)	Shift (Hz)	
100	170	ITA2, ARQ-A
45	170	Amateur RTTY
200	170	Amateur packet
50	400	Commercial RTTY (press/weather)
100	400	
50	800	pseudo-random

There are loads of pseudo-random signals around and they sound for all the world like RTTY, but you won't make any sense of them! If you want to add a further level of sophistication to your aural analysis technique (sounds good doesn't it!) you can quite easily tell the difference between synchronous and asynchronous signals.

The most noticeable difference is that an asynchronous signal will often contain pauses with a short period of just a steady carrier being sent. This never happens in a synchronous signal because the receiving station is dependant on a constant stream of data to maintain synchronisation with the distant end. When there are natural breaks in the message, synchronous systems add what are called idle characters to keep the link alive. That about concludes this introduction to data signal analysis - if you'd like to see more please either E-mail or write to me.

Interference Strikes!

I seem to be majoring on your detective skills this month! Anyway, I've noticed a recent increase in the number of interference queries in your letters, so I'd better include a few tips. As computer based decoding systems are so readily available it's no surprise to find that listeners are having problems with computer noise spoiling their listening.

Before we start breaking the problem down you need to make sure you're not expecting too much. If you speak to any operator who uses a computer for decoding you will find that computer noise is audible over at least some of the h.f. band. The trick is to reduce it to a level where it doesn't significantly degrade your ability to decode wanted signals. Before you put all the blame on the computer try turning off and unplugging all your computing equipment. Now tune around the bands and make sure you're getting a clean signal. If not, one of the worst offenders for h.f. noise is the domestic TV. If you

think you're having problem on this front you need to make sure by unplugging the TV. Simply switching it off is not good enough as many have standby circuits that are left active even with the main switch off.

By far the most common cause of TV interference is pick-up from the TV's antenna lead. You must ensure that your antenna lead is kept well clear of the TV antenna and preferably well away from mains power runs. I know it's tempting to use the TV antenna mast as a high point for your antenna but, if you do, you'll regret it! With TV interference separation is the best solution.

If you've done all you can and you're still faced with interference you need to see if it's radiated or mains borne. To do this you just operate your h.f. receiver with the antenna disconnected. If the noise is still there it must be mains borne and you should be able to make some good reductions by fitting an r.f. filter in the mains lead. Most radio dealers can help with these, but make sure you explain what you want it for before you buy, as there's quite a range available.

Now for that dreaded computer interference. Although the computer normally gets the blame, you will probably find that the noise is coming from one of the peripheral devices such as the monitor, printer or maybe the connecting leads. If you're to find the root cause you must adopt a logical approach or you'll end up spending a fortune on fancy leads and filters and still not solve the problem. The approach is much like the TV interference I've just described.

Start by running the computer with everything except the mouse and keyboard disconnected. If the noise is reduced to a tolerable level (it usually is) you need to gradually introduce the other items one at a time until you find the culprit. If when you plug the printer in the noise reappears, try it with just the power on and the data lead to the computer removed. If it's still noisy see if fitting a ferrite ring in the mains lead reduces the noise. If it does you need to put some filtering in this mains lead.

To help ensure you stick to a logical approach it's worth drawing the layout of your equipment on a piece of paper. Make sure you include all the interconnecting and mains leads. As you test each connection add a note showing the difference it made. A good way to measure the difference is to use the 'S-meter' on your receiver and note down the change in the reading as you work through. By the end of the exercise you should have a pretty clear idea of the offending item. In a future column I'll give a few tips on various noise reduction tricks. In the meantime please write with details of how you solved your interference problems.

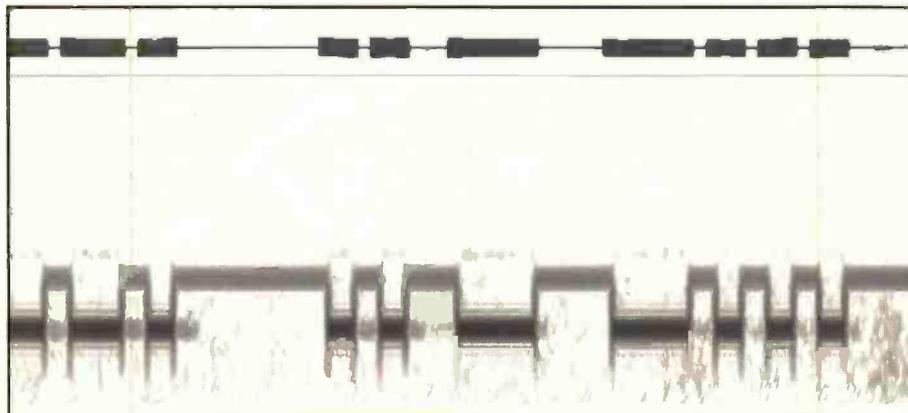


Fig.2: Spectrogram Analysis of a RTTY Signal.

See last August issue's 'Decode' column for details of software available.

READERS' SPECIAL OFFERS

LM&S

■ BRIAN ODDY G3FEX
 ■ THREE CORNERS
 MERRYFIELD WAY
 STORRINGTON
 WEST SUSSEX RH20 4NS

On October 25, two days after this issue arrives on the bookstalls, the clocks in the UK will be put back one hour to display Greenwich Mean Time (GMT), which is similar to Universal Time Co-ordinated (UTC), the time system adopted by international broadcasters.

Listeners who keep a clock displaying UTC by their receiver should not alter it when the changeover takes place. The times quoted in LM&S are in UTC.

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 August.

Test transmissions on **189kHz**, which may have come from a new 100kW long wave station in Iceland, were picked up at night by some listeners. On several occasions **Bernard Curtis** (Stalbridge) heard pop music on 189 after Europe 1 had closed down but no station ident was received. Non-stop pop music was also heard at night on 189 by **David Edwardson** in Wallsend but there was no ident. It was a potent SINPO 45554 at 0030UTC so it was unlikely that it was coming from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanissetta, Italy on 189.

Over in E.Canada **Alan Roberts** (Quebec) first noticed the transmission at 0205UTC on July 30, when a series of pop songs from the 60s & 70s were played until 0250. A 1kHz tone was then radiated for a few minutes. There was no announcement or time pips at 0300. More music then followed but the signal gradually faded out.

Medium Wave Reports

Despite the increasing hours of darkness in August very few broadcasts from m.w. stations in E.Canada and E.USA reached our shores at night. Up in Shetland, **John Slater** (Scalloway) logged on the 5th CJYQ in St.John's, Newfoundland, on 930 as SIO333 at 0320 - he heard it on several other nights too. On the 6th he noted WTOP in Washington, DC on 1500 as SIO322 at 0330; on 16th, WBBR New York, NY 1130 as SIO222 at 0330; on 20th, CJCH Halifax, NS 920 as SIO322 at 0340; on 21st, CHCM Marystown, NF 740 as SIO333 at 0410 & CJFX Antigonish, NS 580 as SIO232 at 0415. Down in Thornton Heath **Tony Stickells** heard on the 10th WNRB in Boston, MA on 1510, which he rated 34133 at 0156. On the 24th he logged CJYQ on 930 as 21132 at 0042 & WTOP on 1500 as 34333 at 0052.

At the beginning of the month Tony picked up the sky waves from the All India Radio (AIR) 1MW outlet at Nagpur on 1566 but the conditions then deteriorated. Over on the Isle of Wight **George Millmore** (Wootton) found reception poor and some stations could not be heard at all.

The hunt for distant local radio stations is much enjoyed by some listeners. During one night in early August **Nicola Hutchings** (Wellington, Somerset) picked up the sky waves from ILR Red Rose 9-99 (Preston) on 999kHz at 0005UTC. Reception from Asian Sound (E.Lancashire) on 1377 was extremely clear at 0115. During her checks she noticed that ILR Sabras Sound

(Leicester) on 1260 was using the ident Sabras Radio.

The reception of ILR Magic 1161 via Goxhill, Humberside at 0531 on the 12th was a first for **Brian Keyte** in Bookham. Catching BBC R.Cumbria via Carlisle on 756 at 0624 was unusual for him. He noticed that Wyvern AM now refers to "Classic Gold 954 and 1530" on their Hereford & Worcester outlets.

Short Wave Reports

Until the propagation conditions in the 25MHz (11m) band improve, it is unlikely to be used for broadcasting.

The conditions in the 21MHz (13m) band vary from day to day but broadcasts from several countries have often reached the UK. Those noted came from R.Prague via Litomysl 21.705 (Cz to Australia? 0830-0858), rated 25343 at 0851 by **Fred Pallant** in Storrington; DW via Wertachtal? 21.600 (Eng to Asia, Pacific 0900-0950) 33333 at 0920 by **Thomas Williams** in Truro; DW via Julich? 21.680 (Eng to S.E.Asia 0900-0950) 55444 at 0920 in Scalloway; BSKSA Saudi Arabia 21.670 (In to SE.Asia 1000-1200) 44454 at 1015 by **Norman Thompson** in Oadby; R.Portugal Int via Sines? 21.720 (Port to Africa? 0900-1100) 34333 at 1045 by **John Eaton** in Woking; RAI Rome 21.520 (It to Africa 0600-1300) 43333 at 1050 in Stalbridge; UAER, Dubai 21.605 (Eng to Eur 1030-1055) 25332 at 1053 by **Tim Allison** in Middlesbrough; Vatican R, Italy 21.850 (Port, Sp to S.America 1100-1200) 24332 at 1135 by **Rhoderick Illman** in Oxted; BBC via Ascension Is 21.660 (Eng to W/E.S.Africa 1100-1700) 35543 at 1301 in Wallsend; RFI via Issoudun 21.620 (Fr to E.Africa 0800-1500) 35433 at 1330 by **Simon Hockenull** in E.Bristol; R.Portugal Int via Sines 21.515 (Eng to M.East, India 1330-1400) 35132 at 1330 by **Eddie McKeown** in Newry; BBC via Ascension Is 21.490 (Eng to S.Africa 1400-1430, Sat/Sun) 34433 at 1425 by **Stan Evans** in Herstmonceux; BBC via Cyprus 21.470 (Eng to E.Africa 1400-1700) 34443 at 1440 by **Robert Connolly** in Kilkeel; UAER, Dubai 21.605 (Eng to Eur 1600-1640) 55545 at 1630 by **Vic Prier** in Colyton; WYFR via Okeechobee 21.745 (Eng to Eur, Africa 1600-?) 25232 at 1654 by **Darren Beasley** in Bridgwater; WYFR via Okeechobee 21.525 (Eng to Eur, Africa 1600?-2200?) 33333 at 2042 by **Vera Brindley** in Woodhall Spa.

The conditions in the 17MHz (16m) band have also varied daily. During the morning the BBC via Mayhe, Seychelles 17.885 (Eng to E.Africa 0500-1400) was rated 34333 at 0635 in Herstmonceux; R.Australia via Shepparton 17.750 (Eng to Asia 0000-0400, 0600-0900) 24542 at 0649 in Wallsend; Israel R, Jerusalem 17.545 (Heb [Home Sce rly] to W.Eur, N.America 0700-1730?) 34344 at 0747 in Woking; R.Slovakia Int 17.570 (Eng to Australia 0830-0857) 44444 at 0830 by **Sheila Hughes** in Morden; R.Prague, Czech Rep 17.485 (Eng to W.Africa 0900-0925) 53343 at 0908 by **Chris Shorten** in Norwich; SRI via Schwarzenburg? 17.515 (It, Eng, Fr, Ger, Port to Australia 0830-1100) 44333 at 0915 in Truro; DW via Rwanda? 17.800 (Eng to Asia, Australia 0900-0950) 43344 at 0940 by **Tony Hall** in Freshwater Bay, IoW; AIR via Bangalore 17.387 (Eng to Pacific areas

LONG WAVE CHART

Freq kHz	Station	Country (kW)	Power	Listener
153	Bechar	Algeria	1000	K
153	Donebach DLF	Germany	500	B*,D*,E,G,J,K
153	Bod	Romania	1200	C*,J,K
162	Allouis	France	2000	A,C,D*,E,F,G,I,J,K
171	Nador Medi-1	Morocco	2000	J*,K
171	B'shskovo etc	Russia	1200	C*,D*,E,J
171	Lvov	Ukraine	500	D*,J
177	Oranienburg	Germany	750	B*,D*,E,F,J
180	Polati	Turkey	1200	J*
183	Saarouis	Germany	2000	A,C*,D*,E,F,G,I,J,K
189	Caltanissetta	Italy	10	J,K
198	Droitwich BBC	UK	500	C,D,E,I,J,K
207	Munich DLF	Germany	500	B*,C*,D*,E,J
207	Azail	Morocco	800	B*,H*
216	Roumoules RMC	S.France	1400	B,C,D*,E,F,G*,J
225	Raszyn Resv	Poland	?	B*,C*,D*,E,G*,I,J
234	Beidweiler	Luxembourg	200	A,C,D*,E,G*,J
243	Kalundborg	Denmark	300	B,C,D,E,F,G*,J,K
252	Tipaza	Algeria	1500	C*,E*
252	Atlantic 252	S.Ireland	500	C,D,E,F,G,I,J,K,L
261	Burg(R.Ropal)	Germany	200	C,E,G*,J
261	Taldom Moscow	Russia	2500	D*,J
270	Topolna	Czech Rep	1500	A*,C*,D*,E,G*,J,K
279	Sasnovy	Belarus	500	C*,D*,J

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

Listeners:-

- (A) John Eaton, Woking.
- (B) Simon Hockenull, E.Bristol.
- (C) Sheila Hughes, Morden.
- (D) Eddie McKeown, Newry.
- (E) George Millmore, Wootton, IoW.
- (F) Fred Pallant, Storrington.
- (G) Vic Prier, Colyton.
- (H) John Slater, Scalloway.
- (I) Tom Smyth, Co.Fermanagh.
- (J) Tony Stickells, Thornton Heath.
- (K) Norman Thompson, Dadbey.
- (L) Thomas Williams, Truro.

1000-1100) 25333 at 1052 in Storrington; Voice of Russia 17.610 (Eng [VWS]) 35433 at 1104 in Middlesbrough; SRI via Schwarzenburg? 17.515 (Eng, Fr, Ger, It to Far East 1100-1245) 24232 at 1115 in Bridgwater.

After mid-day the BBC via Skelton, UK 17.705 (Eng to Eur, Africa 1200-1630) was 22421 at 1309 in Oxted; R.Cairo via Abis 17.595 (Eng to S.Asia 1215-1330) 34222 at 1315 in Scalloway; RCI via Sackville, Canada 17.820 (Eng to Eur, Africa 1330-1400 Mon-Sat) 44444 at 1354 in Woodhall Spa; Africa No.1, Gabon 17.630 (Fr to W.Africa 0700-1600) 44444 at 1540 in Kilkeel; VOA via Morocco 17.895 (Eng to Africa 1600-1900) 24433 at 1720 in Colyton; R.Nederlands via Bonaire, Ned Antilles 17.605 (Eng to S/E/W.Africa 1830-2025) 35223 at 1834 in Newry; BBC via Ascension Is 17.830 (Eng to W/C.Africa 0730-2100) 54554 at 1825 by **Bill Griffith** (W.London) while in Sao Carlos, Brazil; WYFR via Okeechobee, USA 17.555 (Eng to Eur 1600-2145) 34443 at 2011 by **Tom Winzor** in Plymouth; VOFC Taiwan via WYFR 17.750 (Eng to Eur 2200-2300) 32222 at 2200 by **Clare Pinder** in Appleby.

More reliable conditions have been evident in the 15MHz (19m) band. In the morning the R.Japan via Moyabi, Gabon 15.230 (Eng 0700-0800) was 43433 at 0705 in Herstmonceux; R.Finland via Pori 15.235 (Eng to E.Eur, E.Asia 0800-0830) 54444 at 0800 in Norwich; Voice of Armenia, Yerevan 15.270 (Fr, Eng to Eur 0800-0900 Sun) 44434 at 0848 in Freshwater Bay; BBC via Ascension Is 15.190 (Eng, Sp to S.America 0900-1130) 34433 at 0900 by **Ernest Wiles** in Bedford; R.Ulan Bator, Mongolia 15.170 (Eng to Pacific 0900-0930) 33333 at 0905 in Scalloway;

AIR via Aligarh? 15.050 (Eng to NE.Asia 1000-1100) 35433 at 1015 in Bridgwater; R.Pakistan, Islamabad 15.520 (Eng to Eur 1100-1120) 33333 at 1100 in Stalbridge.

During the afternoon the BBC via Masirah Is, Oman 15.310 (Eng to S.Asia 0300-0915, 1000-1400) was rated SIO222 at 1259 in Woking & 44444 at 1300 by Bill Griffith while in San Pedro, Chile; Voice of Vietnam, Hanoi 15.010 (Eng to Asia 1330-1400) 35233 at 1343 in Newry; R.Sweden via Horby? 15.240 (Eng to Asia, Pacific 1330-1400) 44444 at 1345 in Truro; VOA via Morocco 15.410 (Eng to Africa 1600-2200) SIO222 at 1700 by Tom Smyth in Co.Fermanagh.

Later, RNB Brazil 15.265 (Port, Eng, Ger to Eur 1630-2020) was 23232 at 1800 in Oadby; WYFR via Okeechobee 15.695 (Eng to Eur, Africa 1600-1900) 54444 at 1808 in Plymouth; R.Cairo via Abis, Egypt 15.255 (Eng to C/S.Africa 1630-1830) 33433 at 1817 in Woodhall Spa; WWCR Nashville, USA 15.685 (Eng to N.America, Eur 1100-2200) 45544 at 1830 in Colyton; R.Nederlands via Bonaire 15.315 (Eng to S/E/W.Africa 1830-2025) 34443 at 1955 in Kilkeel; RCI via Sackville 15.325 (Eng to Eur, Africa 2000-2129) 44434 at 2107 in Oxted; VOFC Taiwan via WYFR 15.600 (Eng to Eur 2200-2300) 44444 at 2225 in Morden; RAE Buenos Aires, Argentina 15.345 (Eng, Fr, Ger, It, Sp to Eur, N.Africa 1900-2300) 25542 at 2245 in Wallsend.

Good reception from some areas has been noted in the 13MHz (22m) band. In the morning, R.Austria Int via Moosbrunn 13.730 (Ger, Eng, Fr, Sp to Eur 0400-1800) was SIO444 at 0754 by Francis Hearne in N.Bristol; R.Finland via Pori 13.645 (Eng to Eur, Australia 0800-0827) 45444 at 0803 in Woodhall Spa; R.Korea via Kimjae 13.670 (Eng to Eur 0800-0900) 33333 at 0815 in Scalloway; SRI via Sottens? 13.685 (It, Eng, Fr, Ger, Port to Australasia 0830-1100) 44433 at 0900 in Truro; SRI via Sottens? 13.635 (Eng, Fr, Ger, It to Far East 1100-1245) 45433 at 1116 in Middlesbrough.

During the afternoon R.Kuwait via Kabd 13.620 (Ar to Eur, N.America 0930-1605) was 43334 at 1257 in Woking; R.Prague, Czech Rep 13.580 (Eng to Eur, E.Africa, N.America 1300-1327) 45444 at 1310 in Newry; UAER, Dubai 13.675 (Eng to Eur 1330-1355) 44444 at 1330 in Morden; Vatican R, Italy 13.765 (Eng to Africa? 1345-1405) 34333 at 1350 by Peter Pollard in Rugby; UAER, Dubai 13.675 (Eng to Eur 1600-1640) 45554 at 1632 in Wallsend.

Later, R.Vlaanderen Int, Belgium 13.645 (Eng, Fr to Africa? 1800-1900?) was 54444 at 1815 in Plymouth; WWCR Nashville, USA 13.845 (Eng to E.USA 1200-0100) 23332 at 1815 in Bedford; Voice of Turkey 13.695 (Eng to Eur, USA 1830-1925) 44544 at 1830 in Colyton; WHRI South Bend, USA 13.760 (Eng to E.USA, Eur 1500-2057) 44433 at 1950 in Kilkeel; RCI via Sackville 13.650 (Fr, Eng to Eur, Africa 1900-2200) 45444 at 2040 in E.Bristol; R.Havana Cuba 13.715 (Eng to Eur 2030-2130) 24232 at 2100 in Bridgwater; RCI via Sackville 13.670 (Fr, Eng to Eur, Africa 1900-2200) 24333 at 2107 in Oxted; R.Damascus, Syria 13.610 (Eng to Eur 2005-2105; to N.America 2105-2205) 34333 at 2118 in Freshwater Bay; R.Ukraine Int, Kiev 13.590 (Eng to Eur 2100-2158) SIO323 at 2130 in Co.Fermanagh.

Broadcasts from several continents can usually be received in the 11MHz (25m) band. Those noted came from the Voice of Greece, Athens 11.645 (Gr, Eng to Eur 0600-0800), rated 55555 at 0708 in Plymouth; Slovak R.Int, via Velke Kostolany 11.990 (Eng, Slov to Australia 0830-0927) SIO333 at 0834 in N.Bristol; R.Sweden via

LOCAL RADIO CHART

Freq kHz	Station BBC	ILR (kW)	e.m.r.p	Listener
558	Spectrum, London	I	0.80	D,H,I,L,M
585	R.Solway	B	2.00	B
603	Cheltenham R.	I	0.10	B,D,F,H,I,L,M
603	Invicta SG, Litt'brne	I	0.10	E,H,I,L
630	R.Bedfordshire(3CR)	B	0.20	B,E,G,H,I,L
630	R.Cornwall	B	2.00	B,H,I,K
657	R.Clywd	B	2.00	B,H,I,M
657	R.Cornwall	B	0.50	H,I,L
666	Gemini AM, Caser	I	0.34	B,C,D,H,I,L,M
666	R.York	B	0.80	B,H
729	BBC Essex	B	0.20	E,H,I,L
738	Hereford/Worcester	B	0.037	C,D,H,I
756	R.Cumbria	B	1.00	A,H
756	R.Maldwyn, Powys	I	0.63	D,H,I,L
765	BBC Essex	B	0.50	A,B,E,H,I,L
774	R.Kent	B	0.70	E,H,I,L,M
774	R.Leeds	B	0.50	A,B,H
774	3 Counties SG, Glos	I	0.14	B,C,I
792	Classic Gold 792	I	0.27	A,H,I,L,M
792	R.Foyle	B	1.00	B
801	R.Devon & Dorset	B	2.00	B,D,H,I,L
828	Classic Gold 828	I	0.20	G,H,L
828	Magic 828, Leeds	I	0.12	F*,A
828	2CR CG, Bournemouth	I	0.27	D,I
828	Townland R, Ulster	I	0.80	B,J
837	R.Cumbria/Furness	B	1.50	A,B,I
837	Asian Netwk Leics	B	0.45	A,H,I,L,M
855	R.Devon & Dorset	B	1.00	H,I
855	R.Lancashire	B	1.50	A,B
855	R.Norfolk, Postwick	B	1.50	H,I
855	Sunshine 855,Ludlow	I	0.15	C,F,H,I,L,M
873	R.Norfolk, W.Lynn	B	0.30	A,H,I,L,M
936	Brunel CG, W.Wilts	I	0.18	C,H,I,L
936	Yorkshire Dales R	I	?	A,B,F*,H,J
945	Derby (Gem AM)	I	0.20	A,B,G*,H,M
945	S.Coast R, Bexhill	I	0.75	H,I
954	Gemini AM, Torquay	I	0.32	H,I,L
954	CI.Gold 954, H'ford	I	0.16	C,H,I,L,M
963	Asian Sd,Manchester	I	0.80	A,B
963	963 Liberty (Viva)	I	1.00	G,H,I,L,M
990	R.Devon & Dorset	B	1.00	B,C,H,I,K,I
990	Big Easy Magic AM	I	0.25	H
990	WABC, Wolverhampton	I	0.09	H,M
999	Gem AM, Nottingham	I	0.25	H,L*,M
999	Red Rose 9.99 Pstn	I	0.80	B,F*,J
999	R.Solent	B	1.00	H,I,L
999	Valleys R, Aberdare	I	0.300	F
1017	WABC, Shrewsbury	I	0.70	H,M,M
1026	R.Cambridgeshire	B	0.50	H,M
1026	Downtown, Belfast	I	1.70	B,I,K
1026	Rulsey	B	1.00	B,C,H,I
1035	RTL Country 1035	I	1.00	H,I,L
1035	N.Sound, Aberdeen	I	0.78	A*,B,H*
1035	W.Sound, Ayr	I	0.32	J
1107	Moray Fth,Inverness	I	1.50	K
1116	R.Derby	B	1.20	B,G*,L,M
1116	R.Guernsey	B	0.50	B,H,I,L
1116	Valleys R, Ebbw Vale	I	0.50	D,J
1152	Amber, Norwich	I	0.83	F*,G*,H
1152	Clyde 2, Glasgow	I	3.06	J
1152	LBC 1152	I	23.50	F*,H,I,L
1152	Pic'ly 1152, Manch'r	I	1.50	B
1152	Xtra-AM, Birmingham	I	3.00	F*,H
1161	R.Bedfordshire(3CR)	B	0.10	H,I
1161	Brunel CG, Swindon	I	0.16	B,C,H,I
1161	Big Easy Magic 1161	I	0.35	F*,H
1161	Southern Counties R	B	1.00	H,I,L
1161	Tay AM, Dundee	I	1.40	J
1170	Amber SGR, Ipswich	I	0.28	H,M
1170	GNR, Stockton	I	0.32	B
1170	SCR, Portsmouth	I	0.50	H,I,L

Freq kHz	Station BBC	ILR (kW)	e.m.r.p	Listener
1170	Swansea Snd,Swansea	I	0.58	E*,J
1170	1170AM,High Wycombe	I	0.25	G*,H,I
1242	Invicta SG, Maidstone	I	0.32	E,H,I,L,M
1242	IoW Radio, Wootton	I	0.50	D,H,J
1251	Amber SGR, Bury StEd	I	0.76	B,H,J,L
1260	Marcher G, Wrexham	I	0.64	J
1260	Sabras Snd,Leicester	I	0.29	G*,M
1260	R.York	B	0.50	B
1296	Radio XL, Birmingham	I	5.00	A,B,F*,G*,H,I,J,L,M
1305	Big Easy Magic AM	I	0.15	B
1305	Premier via ?	I	0.50	H,I,L
1305	Touch AM, Newport	I	0.20	C,I
1323	S.Coast R, Southwick	I	0.50	H,I,L
1323	Somerset Snd, Bristol	B	0.63	B,H
1332	Premier, Battersea	I	1.00	B,H,I,L
1332	CG 1332, Peterbor'	I	0.60	G*,M
1332	Wiltshire Sound	B	0.30	C,H,J
1358	Breeze AM, Chelmsford	I	0.28	H,L
1359	CG 1359, Coventry	I	0.27	H
1359	R.Solent	B	0.85	H,I
1359	Touch AM, Cardiff	I	0.20	A*,C,J
1368	Southern Counties R	B	0.50	E*,H,I,L
1368	Wiltshire Sound	B	0.10	C,I
1377	Asian Sd,Manchester	I	?	*
1413	Premier via ?	I	0.50	F*,G*,H,I,L
1413	Yorkshire Dales R	I	?	B,J
1431	Breeze AM, Southend	I	0.35	H,I,L
1431	CI.Gid via Reading	I	0.14	G*,H,I,J,L
1449	R.Peterboro/Cambis	B	0.15	B*
1458	R.Cumbria	B	0.50	B
1458	R.Devon & Dorset	B	2.00	B,I
1458	1458 Lite AM Manch'	I	5.00	J
1458	Sunrise, London	I	50.00	F*,H,I,L
1458	Asian Netwk Langley	B	5.00	C,G
1476	County Snd, Guildford	I	0.50	B,D*,F*,G*,H,I,L
1485	CI.Gid via Newbury	I	1.00	D,H,I
1485	R.Merseaside	B	1.20	B,E*,I,K
1485	Southern Counties R	B	1.00	H,I,L
1503	R.Stoke-on-Trent	B	1.00	B,E*,H,I*,L
1521	R.1521 Craigavon,NI	I	0.50	B,F*,K
1521	Fame 1521, Reigate	I	0.64	F*,G*,H,I,L
1530	R.Essex	B	0.15	E,H,I,L
1530	CI.Gold West Yorks	I	0.74	A,B,F*,H,J
1530	CI.Gold Worcester	I	0.52	F*,H,I,J,L
1548	R.Bristol	B	5.00	H,I,L
1548	Capital G, London	I	97.50	H,I,L
1548	Magic 1548 Liverpool	I	4.40	B,J
1557	R.Lancashire	B	0.25	B*,E
1557	Mellow, Clacton	I	0.8	F*,H,I
1557	CG 1557, N'hampton	I	0.76	G*,H,I,L
1557	S.Coast R, Soton	I	0.50	E*,H,I,L
1584	KCBC, Kettering	I	0.04	F*,G*,H,M
1584	London Turkish R	I	0.20	H,I,L
1584	R.Nottingham	B	1.00	B,E*,H,M
1584	R.Shropshire	B	0.50	H
1602	R.Kent	B	0.25	E,H,I,L

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

Listeners:-

- (A) Tim Allison, Middlesbrough.
- (B) Robert Connolly, Kilkeel.
- (C) Francis Hearne, N.Bristol.
- (D) Simon Hockenfull, E.Bristol.
- (E) Sheila Hughes, Morden.
- (F) Nicola Hutchings, Wellington.
- (G) Nicola Hutchings, while in Kettering.
- (H) Brian Keyte, Bookham.
- (I) George Millmore, Wootton, IoW.
- (J) Chris Ridley, Co.Sligo, Eire.
- (K) Tom Smyth, Co.Fermanagh.
- (L) Tony Stickells, Thornton Heath.
- (M) Norman Thompson, Oadby.

Horby? 11.650 (Eng to N.America 1130-1200) 54554 at 1150 in Herstmonceux; R.Ukraine Int, Kiev 12.050 (Eng to Eur 1200-1300) 33222 at 1200 in Appleby; ISBS Reykjavik 11.402 (Ic [u.s.b.+ p.c] to Eur 1215-1300) 34443 at 1215 in Scalloway; Vatican R, Italy 11.625 (Eng to Asia, Pacific 1345-1403) 34333 at 1349 in Appleby; R.Jordan via Al Karanah 11.690 (Eng to W.Eur, E.USA 1000-1630) 34333 at 1428 in Middlesbrough; R.Australia via Shepparton 11.660 (Eng to Asia 1330-1700) 54344 at 1438 by Robert Hughes in Liverpool; R.Pakistan, Islamabad 11.565 (Eng to M.East 1600-1630) 45433 at 1600 in Bridgwater; Family R (WYFR) via VOFC Taiwan 11.550 (Eng to S.Asia? 1600?-1800?) 22232 at 1645 in Colyton.

Later, they were R.Japan via Sri Lanka 11.880 (Eng to M.East, N.Africa 1700-1800) rated SIO433 at 1730 in Co.Fermanagh; R.Kuwait via Kabd 11.990 (Eng to Eur, N.America 1800-2100) 43333 at 1810 in Stalbridge; R.Romania Int, Bucharest 11.940 (Eng to Eur 1900-1955) 43333 at 1945 in Morden; HCJB Quito, Ecuador 12.015 (Eng to Eur 1900-2157) 44444 at 1945 in

Bedford; WWCR Nashville, USA 12.160 (Eng to N.America, Eur 1400-2300) 44433 at 1945 in Kilkeel; R.Algiers Int via Bouchaoui 11.715 (Eng to M.East, Eur 2000-2100) 54444 at 2010 in Norwich; REE via Noblejas, Spain 11.775 (Eng to Eur, Africa 2000-2100) 44333 at 2040 in Rugby; AVR via Slovakia 11.610 (Eng to Africa? 2000-2100) 44334 at 2041 in Freshwater Bay; AIR via Bangalore 11.620 (Eng, Hi to Eur 1745-2230) 44444 at 2045 in Storrington; RCI via Sackville 11.690 (Eng to Eur, Africa 2000-2130) 34343 at 2045 in E.Bristol; VOA via Sao Tome? 11.715 (Serb to Eur 2100-?) 54544 at 2100 by Martin Cowin in Kirkby Stephen; R.Bulgaria, Sofia 11.720 (Eng to W.Eur 2100-2200) 44544 at 2100 by Ross Lockley in Galashiels; R.Australia via Shepparton 11.695 (Eng to Asia 2130-2300) 32223 at 2130 by Gerald Guest in Dudley; BBC via Skelton & Woofferton, UK 12.095 (Eng to Eur, N/W.Africa 0400-2230) 34433 at 2156 in Woking & 44444 in Sao Carlos, Brazil; R.Damascus via Adra 12.085 (Eng to America, Pacific 2105-2205) 34333 at 2144 in Newry; BBC via Ascension Is 11.750 (Eng to S.America 2000-

MEDIUM WAVE CHART

Freq kHz	Station	Country (kW)	Power	Listener	Freq kHz	Station	Country (kW)	Power	Listener
520	Hof/Wurzburg (BR)	Germany	0.2	B*,K	1197	Virgin via ?	UK	?	C,G,J,K
526	Vatican R	Italy	5	K*	1206	Wroclaw	Poland	200	K
531	Ain Beida	Algeria	600/300	D*,K*	1215	COPE via ?	Spain	?	K*
531	Leipzig	Germany	100	F*,G	1215	Virgin via ?	UK	?	G,I,J,K
531	RNE5 via ?	Spain	?	F*,G,K*	1224	Lelystad	Holland	50	F*,K
531	Beromunster	Switzerland	500	K	1224	COPE via ?	Spain	?	K
540	Wavre	Belgium	150/50	F*,G,K	1233	Liege	Belgium	5	F*,J*
540	Solt	Hungary	2000	K*	1233	Virgin via ?	UK	?	C,K
540	Sidi Benour	Morocco	600	F*,G*,K*	1242	Marseille	France	150	F*,K
549	Les Trembles	Algeria	500	F*,G*,K	1242	Virgin via ?	UK	?	K,L
549	Thurnau (DLF)	Germany	200	F*,G,K	1251	Marcali	Hungary	500	K,L
558	Espoo	Finland	100	F*,L	1251	Huisberg	Netherlands	10	F*,K*
558	Tirgu Jiu	Romania	200	G*	1260	SER via ?	Spain	?	F*,K*
558	RNE5 via ?	Spain	?	G*	1260	Guidford (V)	UK	0.5	G,J,K
567	Tullamore(RTE1)	Ireland (S)	50	C,D,E,G,J,K,L	1269	Neumunster(DLF)	Germany	600	F*,G*,J,K,L
567	Bologna	Italy	20	K	1269	COPE via ?	Spain	?	K*
567	RNE5 via ?	Spain	?	K*	1278	Dublin(Cork)(RTE2)	Ireland (S)	10	EF*,G*,I,J,K*
576	Muhlacker(SDR)	Germany	500	F*,G,K	1287	RFE via ?	Czech Rep.	400	F*,G*,K,L
576	Riga	Latvia	500	G*	1287	Lerida(SER)	Spain	10	G*,K*
576	Barcelona(RNE5)	Spain	50	F*,G*,K	1296	Kardzali	Bulgaria	150	G*
585	Paris(FIP)	France	8	G,K	1296	Valencia(COPE)	Spain	10	F*,K
585	Riyadh	Saudi Arabia	1200	K*	1296	Orfordness(BBC)	UK	500	E,J,K,L
585	Madrid(RNE1)	Spain	200	F*,G*,K*	1305	Rzeszow	Poland	100	F*,G*
585	Dumfries(BBC Scot)	UK	2	F*,J,K*	1314	Kvitsoy	Norway	1200	F*,G*,H,K,L
594	Frankfurt(HR)	Germany	1000/400	F*,G,K	1323	Zyji(BBC)	Cyprus	200	F*,K
594	Oujda-1	Morocco	100	G*,K	1323	W brunn (V.Russia)	Germany	1000/150	F*,K
594	Muge	Portugal	100	F*	1332	Rome	Italy	300	F*,G*,K
603	Sevilla(RNE5)	Spain	50	G*,K*	1341	Lakhegy	Hungary	300	K,L
603	Newcastle(BBC)	UK	2	E,J	1341	Lisnagarvey(BBC)	Ireland (N)	100	C*,D*,E,G*,J,K*
612	Athlone(RTE2)	Ireland (S)	100	E,G,J,K	1341	Tarrasa(SER)	Spain	2	G*,K*
612	Sebba Aioun	Morocco	300	K*	1350	Pecs	Hungary	10	K
612	RNE1 via ?	Spain	10	G*,K	1350	Cesvaine/Kuldiga	Latvia	50	F*,G*,K
621	Wavre	Belgium	80	F*,G,K	1359	Arganda (RNE-FS)	Spain	600	F*,G*,K*
621	Batra	Egypt	2000	L	1368	Foxdale(Manx R)	I.O.M.	20	D*,F*,G*,J
621	RNE1 via ?	Spain	10	K*	1377	Lille	France	300	F*,G,K,L
621	Barcelona(OCR)	Spain	50	F*	1386	Athens	Greece	50	K
630	Vigra	Norway	100	F*	1386	Bolshakov	Russia	2500	C*,F*,G*,K,L
630	Sta. Isabel	Portugal	50	K	1395	Flake	Albania	1000	F*,G*
630	Tunis-Ojedeida	Tunisia	600	F*,G*,K*	1395	Lopic	Netherlands	120/40	F*,G,K
639	Prahla(Libice)	Czech	1500	F*,K	1404	Brest	France	20	F*,G
639	RNE1 via ?	Spain	?	F*,G*,K*	1413	RNE5 via ?	Spain	?	F*,K
648	RNE1 via ?	Spain	10	K*	1422	Heusweiler(DLF)	Germany	1200/600	F*,G*,K,L*
648	Orfordness(BBC)	UK	500	G,K,L	1431	Kopani	Ukraine	500	F*
657	Napoli	Italy	120	G*,K	1440	Marnach(RTL)	Luxembourg	1200	C*,F*,G*,J,K,L*
657	Madrid(RNE5)	Spain	20	F*,G*	1440	Dammam	Saudi Arabia	1600	D*
657	Wrexham(BBC Wales)	UK	2	D,E,F*,J,K	1449	RAI via ?	Italy	?	K
666	Messkirch(Rohrd/SWF)	Germany	150	F*,K*	1449	Redimoss(BBC)	UK	2	F*
666	Sirkunai(R.Vinius)	Lithuania	500	F*	1467	Monte Carlo(TWR)	Monaco	1000/400	F*,G*,K,L*
666	Lisboa	Portugal	135	F*,G*	1476	Wien-Bisamberg	Austria	600	D*,F*,H*,K,L*
666	Barcelona(SER)	Spain	50	K*	1485	SER via ?	Spain	?	D*,K
675	Lopic(R10 Gold)	Holland	120	B*,C,D,F*,G,J,K	1494	Clermont-Ferrand	France	20	K*
684	Sevilla(RNE1)	Spain	500	F*,G*,K*	1494	St.Petersburg	Russia	1000	C*,F*,G*,K
684	Availa(Beograd-1)	Yugoslavia	2000	F*,G*,K*	1503	Ardabil	Iran	50	L
693	Tortosa(RNE1)	Spain	2	F*,K*	1503	Stargard	Poland	300	K*
693	Droitwich(BBC5)	UK	150	G,I,K,L	1503	RNE5 via ?	Spain	?	K*
693	Enniskillen(BBC5)	UK	1	J	1512	Volvertent	Belgium	600	D*,F*,G*,H*,J,K,M*
702	Flensburg(NDR)	Germany	5	K*	1521	Kosice(Czatece)	Slovakia	600	G*
702	Monte Carlo	Monaco	40	F*,G*,K	1521	Duba	Saudi Arabia	2000	F*,K*
711	Rennes 1	France	300	C,F*,G,K	1530	Vatican R	Italy	150/450	F*,G*,K*
711	Heidelberg	Germany	5	K*	1539	Mainflingen(ERF)	Germany	350/700	F*,G*,J*,K
711	Laayoune	Morocco	600	G*,K*	1557	NER via ?	Spain	?	K*
711	Murcia(COPE)	Spain	5	K	1566	Nice	France	300	J*,K
720	Tayeavad	Iran	400	G*	1566	Nagpur	India	1000	K
720	Lisnagarvey(BBC4)	Ireland (N)	10	L	1566	Sarnen	Switzerland	300	B*,G*
720	Norte	Portugal	100	F*	1566	Stax	Tunisia	1200	K*
720	Lots Rd.Ldn(BBC4)	UK	0.5	E,G,J,K	1575	Genova	Italy	50	K
729	Cork(RTE1)	Ireland (S)	10	E,F*,G	1575	SER via ?	Spain	5	B*,G*,K
729	RNE1 via ?	Spain	?	F*,G*,K*	1584	SER via ?	Spain	?	B*,G*,K
738	Paris	France	4	G,K	1593	Holzkirchen(VOA)	Germany	150	F*,G*,K
738	Poznan	Poland	300	F*,G*	1602	SER via ?	Spain	?	B*,K*
738	Barcelona(RNE1)	Spain	500	F*,G*,K*	1602	Vitoria(EI)	Spain	10	G*,J*
747	Flevo(Hilv2)	Holland	400	F*,G*,K	1611	Vatican R	Italy	15	K
756	Braunschweig(DLF)	Germany	800/200	F*,G*,K*					
756	Bilbao(EI)	Spain	5	K*					
756	Redruth(BBC)	UK	2	E,F*,G					
765	Sottens	Switzerland	500	F*,G*,J*,K*,L					
774	Hrvatski R	Croatia	50/10	K*					
774	Abis	Egypt	500	K*,L					
774	RNE1 via ?	Spain	?	F*,G*,K*					
783	Leipzig(MDR)	Germany	100	F*,G*,K*					
783	Miramar(R.Porto)	Portugal	100	K*					
783	Dammam	Saudi Arabia	100	K*					
792	Limoges	France	300	G					
792	Lingen(NDR)	Germany	5	K*					
792	Sevilla(SER)	Spain	20	F*,G*,K*					
792	Londonderry(BBC)	UK	1	I					
801	Munichen-Ismaning	Germany	300	F*,G*,K*					
801	Ajlun	Jordan	2000	G*					
801	RNE1 via ?	Spain	?	F*,G*,K*					
810	Volgograd	Russia	150	G*					
810	Madrid(SER)	Spain	20	F*,K*					
810	Westerglen(BBC Scot)	UK	100	A,C*,E,G*,J,K*					
819	Batra	Egypt	450	G*,K*					
819	Toulouse	France	50	F*,K*					
819	Trieste	Italy	25	K					
819	Warsaw	Poland	300	F*,G*,K*					
828	Hannover(NDR)	Germany	100/5	K*					
828	Rotterdam	Holland	20	F*,K					
837	Nancy	France	200	K					
837	COPE via ?	Spain	?	F*,G*,K*					
846	Rome	Italy	540	G*,K*					
855	RNE1 via ?	Spain	?	F*,G*,K*					
864	Santah	Egypt	500	G*,K*					
864	Paris	France	300	G,K					
864	Socuellamos(RNE1)	Spain	2	K*					
873	Frankfurt(AFN)	Germany	150	C*,E,F*,G*,K*					
873	Zaragoza(SER)	Spain	20	F*,G*,K*					
882	COPE via ?	Spain	?	F*,G*,K*					
882	Washford(BBC Wales)	UK	100	A,D,E,G,K,L					
891	Algiers	Algeria	600/300	D*,F*,G*,K*					
891	Huisberg	Netherlands	20	F*,G*,K					
900	Brno(Pro2)	Czech Rep.	25	F*,G*					
900	Milan	Italy	600	F*,K*					
900	Qurayyat	Saudi Arabia	1000	G*,K					
900	COPE via ?	Spain	?	G*,K*					
909	B mans Pk(BBC5)	UK	140	G,I,J,K,L					
918	Pljesivac(Sloven nR)	Slovenia	600/100	F*,G*,K*					
918	Madrid(R.Int)	Spain	20	G*,K					
927	Volvertent	Belgium	300	F*,G,K,L					
936	Bremen	Germany	100	F*,G*,K*					
936	RNE5 via ?	Spain	?	F*,G*,K*					
936	Lvov	Ukraine	500	K					
945	Toulouse	France	300	F*,K*,L					
954	Brno (Pro2)	Czech Rep.	200	F*,K*,K*					
954	Madrid(Cl)	Spain	20	F*,G*,K*					
963	Pori	Finland	600	A*,E*,G*,H*					
963	Tir Chonaill	Ireland (S)	10	G*					
972	Hamburg(NDR)	Germany	300	F*,G*,K*					
981	Alger	Algeria	600/200	D*,G*,K					
981	Megara	Greece	200	K*					
981	Berlin	Germany	300	F*,G*,K*					
990	Potenza	Italy	10	K					
990	R.Bilbao(SER)	Spain	10	G*,K*					
990	Redimoss(BBC)	UK	1	F*					
990	Twynn(BBC)	UK	1	E					
999	Torino	Italy	20	K*					
999	Madrid(COPE)	Spain	50	F*,K*					
1008	SER via ?	Canaries/Spain	?	K*					
1008	Flevo(Hilv-5)	Holland	400	F*,G,K,L					
1017	Rhinsender(SWF)	Germany	600	F*,G*,J*,K*,L					
1017	RNE5 via ?	Spain	?	K*					
1026	NER via ?	Spain	?	G*,K					
1035	Lisbon(Prog3)	Portugal	120	F*,G*					
1044	Dresden(MDR)	Germany	250	F*,K*					
1044	Sebba-Aioun	Morocco	300	G*,K*					
1044	S.Sebastian(SER)	Spain	10	G*,K*					
1053	Zaragoza(COPE)	Spain	10	F*,K*					
1053	Talk R.UK via ?	UK	?	G,I,J,K,L,N					
1062	Kalundborg	Denmark	250	F*,G*,K					
1062	R.Uno via ?	Italy	?	K					
1071	Brest	France	20	G*					
1071	Riga	Latvia	50	F*,G*					
1071	Bilbao(EI)	Spain	5	K					
1071	Talk Radio UK via ?	UK	?	J,K					
1080	Katowice	Poland	1500	F*,G*,K					
1080	Toledo(OCR)	Spain	5	K*					
1080	NER via ?	Spain	?	G*,K*					
1089	Talk Radio UK via ?	UK	?	G,I,J,K					
1098	Nitra(Jarok)	Slovakia	1500	F*,G*,J*,K					
1098	RNE5 via ?	Spain	?	G*,K*					
1107	AFN via ?	Germany	10	F*,K*					
1107	RNE5 via ?	Spain	?	G*,K*					
1107	Talk R.UK via ?	UK	?	K,I,J,K,L					
1116	Bari	Italy	150	K					
1116	Pontevedra(SER)	Spain	5	K*					
1125	La Louviere	Belgium	20	F*,G*					
1125	Deanovec	Croatia	100	K,L					
1125	RNE5 via ?	Spain	?	F*,G*					
1125	Llandrindod Wells	UK	1	E					
1134	COPE via ?	Spain	2	F*,G*					
1134	Zadar(Croatian R)	Yugoslavia	600/1200	F*,G*,K,L					
1143	AFN via ?	Germany	1	F*,G*,K					
1143									

KVOH Rancho Simi, USA **9.975** (Eng, Sp to N.America, Carriibbean 0000-1600) 23322 at 0005 in Kilkeel; R.Nederlands via Tashkent **9.855** (Eng to S.Asia 0030-0125) 34343 at 0023 in Middlesbrough.

Quite a few beam their programmes to Europe too! Mentioned in the reports were HCJB Quito, Ecuador **9.765** (Eng 0730-0930), rated 44334 at 0730 in Dudley; TWR Monte Carlo, Monaco **9.755** (Eng 0655-0850 Sun) 45444 at 0805 in Woodhall Spa; AVWR via Slovakia **9.450** (Eng 0900-1000 Sat/Sun) 55455 at 0900 in Appleby; SRI via Sarnen **9.535** (Eng, Ger, Fr, It 1000-1300) 33333 at 1015 in Truro; RFI via Allouis? **9.805** (Fr, Eng 0600-1500) 43333 at 1245 in Stalbridge; VOIRI Tehran, Iran **9.022** (Fr, Eng 1830-2027) 44334 at 1835 in Rugby; Voice of

Hope via Tbilisi, Georgia **9.310** (Eng 1755-2000) 54444 at 1845 in Bedford; Voice of Greece, Athens **9.380** (Eng [News] 2000-2010) 55555 at 2000 in Norwich; Voice of Indonesia, Jakarta **9.525** (Eng 2000-2100) 42333 at 2020 in Freshwater Bay; Voice of Armenia, Yerevan **9.965** (Eng 2030-2100) 55545 at 2030 in Kirkby Stephen; R.Tirana, Albania **9.515** (Eng 2100-2130) 43243 at 2100 in Newry; R.Ukraine Int, Kiev **9.550** (Eng 2100-2200) 52422 at 2100 in Galashiels; R.Bulgaria, Sofia **9.700** (Eng 2100-2200) 53433 at 2115 in Herstmonceux; China R.Int via Russia **9.880** (Eng 2200-2300) 44554 at 2235 in Bridgwater; Voice of Turkey **9.655** (Eng 2200-2300, also to USA) SIO444 at 2248 in N.Bristol; R.Yugoslavia **9.580** (Eng 0000-0030, also to USA) 55545 at 0020 in E.Bristol.

Some of the broadcasts in the **7MHz (41m)** band are also intended for European listeners. They come from R.Japan via Woofferton, UK **7.230** (Jap, Eng 0400-0800) 33433 at 0610 in Herstmonceux; WYFR via Okeechobee **7.355** (Eng 0600-0800, also to Africa) 43333 at 0625 in Stalbridge; Voice of Greece **7.450** (Gr, Eng 0600-0800, also to Australia) SIO333 at 0746 in N.Bristol; BBC via Rampisham, UK **7.325** (Eng 0430-0915, also to M.East, Africa) 44444 at 0815 in Morden; Monitor R.Int via WSHB **7.535** (Eng [Various Sat/Sun] 0400-0958) 44444 at 0816 in Woodhall Spa; R.Vlaanderen Int, Belgium **7.190** (Eng 0900-0925) 35343 at 0905 in Bridgwater; R.Slovakia Int **7.345** (Eng 1830-1900) 33433 at 1830 in Galashiels; R.Thailand via Udorn Thani **7.210** (Eng 1900-1958) 43333 at 1915 in Truro; Israel R, Jerusalem **7.465** (Eng 1900-1925, also to USA) 55444 at 1900 in Scalloway; VOIRI Tehran **7.260** (Eng 1930-2028, also to M.East) 54444 at 1930 in Appleby; RAI Rome **7.230** (Eng 1935-1955) 44444 at 1935 in Kirkby Stephen; DW via Sines **7.170** (Eng 2000-2050) 54444 at 2021 in Plymouth; AIR via Aligarh? **7.410** (Hi, Eng 1745-2230) 23443 at 2050 in Woking; RCI via Skelton, UK **7.235** (Russ, Fr, Eng 1800-2200, also to Africa) 33333 at 2107 in Oxted; Voice of Turkey, Ankara **7.280** (Eng 2200-2300, also to USA) 43433 at 2249 in Middlesbrough.

Among those noted to other areas were RFI Costa Rica **7.385** (Eng 24hrs) SIO222 at 0630 in Co.Fermanagh; R.Nederlands via Madagascar **7.120** (Eng to S/E/W.Africa 1730-2025) 42233 at 1800 in Colyton; Voice of Nigeria, Ikorodu **7.255** (Eng to W.Africa 1900-2100) 43443 at 1900 in Storrington; VOA via Selebi-Phikwe, Botswana **7.415** (Eng to Africa 1900-2230) 43333 at 2047 in Freshwater Bay; WRNO New Orleans, USA **7.355** (Eng to E.USA 2300-0400) 34433 at 2350 in Kilkeel; Voice of Russia **7.125** (Eng [WVS] to N.America) 44544 at 0030 in E.Bristol.

While broadcasting to Europe in the **6MHz (49m)** band Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) was 55555 at 0815 in Bedford; R.Vlaanderen Int, Belgium **6.035** (Eng 0900-0930) 33333 at 0910 in Truro; Polish R, Warsaw **6.000** (Eng 1700-1800) 44444 at 1730 in Morden; R.Sweden via Horby? **6.065** (Eng 1730-1800, also to M.East, Africa) SIO444 at 1730 in Co.Fermanagh; R.Slovakia Int **6.055** (Eng 1830-1900) 44444 at 1830 in Dudley; R.Yugoslavia **6.100** (Eng 1830-1900, also to Africa) 32223 at 1840 in Stalbridge; R.Estonia, Tallinn **5.925** (Eng 1900-1930, Mon/Thurs only) 32222 at 1900 in Appleby; SRI via Lenk **6.165** (Fr, It, Ger, Eng 0400-2000) 54444 at 1900 in Kirkby Stephen; RAI Rome **6.015** (Eng 1935-1955) 44433 at 1935 in Galashiels; China R.Int via ? **6.950** (Eng 2000-2157) 44444 at 2126 in Newry; RCI via Skelton, UK **5.995** (Fr, Eng 1900-2200, also to M.East, N.Africa) 44544 at 2130 in Oadby; R.Austria Int via Moosbrunn **5.945** (Fr, Sp, Eng, Ger 1800-2300) SIO444 at 2156 in N.Bristol.

Noted to other areas were the BBC via Kranji, Singapore **6.195** (Eng to Asia 2100-0200) rated SIO323 at 2136 by Darren Coward in Haverthwaite; WHRI South Bend, USA **5.745** (Eng to USA 2200-0300?) 43333 at 2320 in Kilkeel; BBC via Antigua, W.Indies **5.975** (Eng to S/C.America 2100-0700) 34333 at 0050 in E.Bristol; R.Havana Cuba **6.000** (Eng to N.America 0100-0500?) 43333 at 0340 in Scalloway; WVCR Nashville, USA **5.935** (Eng to Africa 0100-1400) 33333 at 0721 in Oxted.

TROPICAL BANDS CHART

Freq MHz	Station	Country	UTC	DXer
2.310	ABC Alice Springs	Australia	2117	D
2.325	ABC Tennant Creek	Australia	2117	D
2.420	R.Sao Carlos	Brazil	2100	E
2.485	ABC Katherine	Australia	2117	D
3.204	RRI Bandung	Indonesia	2205	O
3.205	R.Ribeirao	Brazil	0100	E
3.210	Em.Nacional, Maputo	Mozambique	2005	O
3.240	TWR Shona	Swaziland	0300	B, J, O
3.250	R.Oollasuyo, Juliaca	Peru	0300	F
3.255	BBC via Meyerton	S.Africa	2021	A, B, J, K, N, O
3.260	Guizhou 1	China	2220	O
3.270	SWABC 1, Namibia	S.W.Africa	2029	A, B, K, O
3.290	Nambian BC, Windhoek	S.W.Africa	2029	B, J, K, O
3.300	R.Cultural	Guatemala	0057	B, D, O
3.306	ZBC Prog 2	Zimbabwe	2028	K, N, O
3.315	AIR Bhopal	India	1705	B, O
3.316	SLBS Goderich	Sierra Leone	2028	K, O
3.320	SABC (RSG) Meyerton	S.Africa	2019	A, B, K, P, O
3.325	FRNC Lagos	Nigeria	1959	A, B, O
3.330	Christian Voice	Zambia	2014	O
3.335	CBS Taipei	Taiwan	1850	P
3.345	AIR Jaipur	India	0045	B
3.356	R.Botswana	Gaborone	0436	J
3.365	R.Cult. Araraquara	Brazil	0215	E
3.365	GBC R-2	Ghana	2018	A, C, H, K, O
3.365	AIR Delhi	India	1756	O
3.375	R.Nacional S.Gabriel	Brazil	0105	B
3.380	R.Chortis	Guatemala	0208	J
3.380	NBC Blantyre	Malawi	1941	A, K, M, O
3.395	ZBC Gweru	Zimbabwe	2005	B, K, O
3.915	BBC via Kranji	Singapore	2110	C, G, J, P, R
3.950	Qinghai PBS, Xining	China	2237	O
3.955	BBC via Skelton	England	0400	H, J
3.955	Nexus, Milan	Italy	2020	J, M
3.965	RFI Paris	France	1915	P
3.970	R.Korea via Skelton	England	2100	J, L, P, R
3.975	R.Budapest	Hungary	2031	C, J, J, L
3.985	Nexus, Milan	Italy	0703	I
3.985	China R via SRI	Switzerland	2110	G, J, P
3.995	DW via Julich	Germany	2032	B, C, H, J, P, O
3.995	R.Budapest	Hungary	1950	P
3.995	DW via Meyerton	S.Africa	2208	C
4.005	Vatican R.	Italy	2000	B, C
4.035	Xizang PBS, Lhasa	Tibet	2300	B
4.500	Xinjiang BS, Urumqi	China	2305	B
4.735	Xinjiang, Urumqi	China	2301	B, J, O
4.750	Xizang BS, Lhasa	China	2332	J
4.755	R.Educ CP Grande	Brazil	0330	E, O
4.760	TWR Manzanil	Swaziland	0325	J, O
4.765	R.Integracao	Brazil	0340	B, O
4.770	FRNC Kaduna	Nigeria	1942	A, B, C, H, J, K, N, O, R
4.775	AIR Imphal	India	1710	O
4.777	R.Gabon, Libreville	Gabon	1915	A, B, H, J, K, O
4.783	RTM Bamako	Mali	1915	A, B, C, K, O
4.790	Azad Kashmir R.	Pakistan	0044	B, J, O
4.790	R.Atlantida	Peru	0350	O
4.795	R.Douala	Cameroon	2000	B
4.800	AIR Hyderabad	India	1714	O
4.800	LNBS Maseru	Lesotho	2016	A, B, J, K, O
4.805	R.Nac. Amazonas	Brazil	0105	B, O
4.815	R.Oifusora, Londrina	Brazil	0115	B, E
4.815	R.diff TV Burkina	Ouagadougou	2016	A, B, C, K, O
4.820	R.Botswana, Gaborone	Botswana	2150	O
4.820	AIR Calcutta	India	1714	O
4.825	R.Cancao Nova	Brazil	0405	O
4.828	ZBC R-4	Zimbabwe	2030	O
4.830	R.Bangkok	Thailand	2200	O
4.830	R.Tachira	Venezuela	0045	B, D, H, J, O
4.832	R.Rejoc	Costa Rica	0320	O
4.835	R.Tezulatlan, Coban	Guatemala	0055	B
4.835	RTM Bamako	Mali	1943	A, B, C, G, H, J, K, O, Q
4.840	AIR Bombay	India	0047	B, J, O
4.845	R.Fides, La Paz	Bolivia	0242	F
4.845	ORTM Nouakchott	Mauritania	2150	A, B, O
4.850	R.Yaounde	Cameroon	2202	A, B, C, J
4.860	AIR Delhi	India	0048	J, K, O
4.865	PBS Lanzhou	China	2205	B, C, O

Freq MHz	Station	Country	UTC	DXer
4.870	R.Cotonou	Benin	2017	C, J, K, O
4.885	R.Clube do Para	Brazil	0303	B, H, J, O
4.885	R.Difusora Acreana	Brazil	0050	B, O
4.885	KBC East Sce Nairobi	Kenya	1900	O
4.890	RFI Paris	via Gabon	0358	J, O
4.890	R.Port Moresby	New Guinea	2020	K
4.905	R.Nat.N'ijamena	Chad	1900	A, D, J, K, O
4.905	R. La Oroya	Peru	0340	B, O
4.910	Tennant Creek	Australia	2137	D
4.910	R.Zambia, Lusaka	Zambia	2112	A, J, O
4.915	R.Anhanguera	Brazil	0200	F
4.915	GBC-1, Accra	Ghana	2013	A, B, C, G, H, J, K, O
4.915	KBC Cent Sce Nairobi	Kenya	1917	K
4.915	R.Cora de Peru, Lima	Peru	0345	F, O
4.920	R.Quito, Quito	Ecuador	0317	D, J, O
4.925	R.S.Miguel, Ribeirata	Bolivia	2224	C
4.927	RRI Jambi	Indonesia	2215	O
4.935	R.Capixaba, Vitoria	Brazil	0325	O
4.935	R.Oifusora, Jatai	Brazil	0115	E
4.935	KBC Cent Sce Nairobi	Kenya	1947	A, B, K, O
4.940	AIR Gtawahati	India	0105	B, O
4.945	R.Difusora	Brazil	2115	E
4.950	R.Nacional, Mulvenos	Angola	2145	O
4.950	AIR Srinagar	India	0100	B, O
4.950	VOA via Sao Tome	Sao Tome	1947	A, J, K, L, O
4.950	R.Nac. de Colombia	Colombia	0127	B, C, J, O
4.960	VOA via Sao Tome	Sao Tome	0301	J, O
4.960	Hanoi 2	Vietnam	2225	D, O
4.975	R.Tupi, Sao Paulo	Brazil	1300	E
4.975	R.Uganda, Kampala	Uganda	2007	A, B, K, O
4.980	Ecos del Torbes	Venezuela	2340	B, D, H, J, O
4.985	R.Brazil Central	Brazil	2234	B, E, O
4.990	FRNC Lagos	Nigeria	1915	O
4.990	R.Ancash, Huaraz	Peru	0415	O
5.005	R.Nacional, Bata	Eq. Guinea	1922	K
5.005	R.Nepal, Kathmandu	Nepal	1705	O
5.009	R.TV Malagasy	Madagascar	1725	A, O
5.010	AIR Thiru-puram	India	0053	B, J
5.015	R.Brazil Tropical	Brazil	0216	J
5.020	PBS-Jiangxi Nanchang	China	2345	B
5.025	Xizang-Tb, Lhasa	China	2330	O
5.020	La V du Sahel, Niamey	Niger	2015	A, C, J, K, O, O
5.025	R.Parakou	Benin	0440	J
5.025	R.Rebelde, Habana	Cuba	0410	B, J, O
5.025	R.Uganda, Kampala	Uganda	2022	A, O
5.030	ATM Latin America	Costa Rica	2335	A, B, H, O
5.030	RWR Kuching	Sarawak	2300	O
5.035	R.Aparecida	Brazil	1000	E
5.035	R.Bangui	C.Africa	2025	B
5.040	L.V. de Yopal	Colombia	0335	O
5.040	Voz del Upano, Macas	Ecuador	2335	B
5.040	RRI Pekanbaru	Indonesia	0134	C
5.045	R.Cultura do Para	Brazil	0105	B, O
5.047	R.Togo, Lome	Togo	1849	A, B, C, J, K, O, O
5.050	R.Tanzania	Tanzania	1950	A, J, O
5.060	PBS Xinjiang, Urumqi	China	0105	B, O
5.075	Caracol Bogota	Colombia	0730	B, H, J, N, O
5.100	R.Liberia, Totota	Liberia	2150	A, C, H, O

- DXers-
 (A) Darren Beasley, Bridgwater.
 (B) Robert Connolly, Kilkeel.
 (C) John Eaton, Woking.
 (D) David Edvardson, Wallsend.
 (E) Bill Griffith, while in Sao Carlos, Brazil.
 (F) Bill Griffith, while in San Pedro, Peru.
 (G) Simon Hockenbush, E.Bristol.
 (H) Sheila Hughes, Morden.
 (I) Rhoderick Illman, Oxted.
 (J) Eddie McKeown, Newry.
 (K) Fred Pollant, Storrington.
 (L) Clare Pinder, while in Appleby.
 (M) Peter Pollard, Rugby.
 (N) Vic Prier, Colyton.
 (O) John Slater, Scalloway.
 (P) Norman Thompson, Oadby.
 (Q) Ernest Wiles, Bedford.
 (R) Thomas Williams, Truro.

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DJ-191E	As DJ-190 with keypad	£199.00	£150.00
DJ-G5E	UHF/VHF handheld inc nicad & charger	£299.00	£265.00
DJ-511E	VHF mini handheld	£109.00	£95.00
DJ-541C	UHF mini handheld	£129.00	£120.00
DR-605E	UHF/VHF mobile	£399.95	£355.00
DR-140E	VHF mobile 50 watt	£299.95	£230.00
DR-150E	VHF mobile 50 watt/wideband Rx	£329.95	£260.00

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Thanks for all your letters and E-mails offering help and advice with my NetSet Pro-2029 base scanner. The consensus is that this unit is really intended for an overseas market and has been adapted slightly for UK listening - more elsewhere in this column.

Oh, and before I continue I'd also like to apologise to you all. Here I am decrying the amount of space I have compared with the quantity of stuff to squeeze into each 'ShackWare' instalment and yet last time around, 'ShackWare' was actually short! In fact, it had more or less the same word count as usual, but the new design means that more text can be crammed into every page - I'll try to fill it to the last line this issue.

Your Letters

And so back to those helpful correspondents who responded to my pleas for PRO-2029 info. **Anne Reed G-20126** of Cheltenham writes "I bought myself a PRO-2029 about two years ago after reading an excellent review in my *Listeners Association* quarterly book. Tandy head office told me that the scanner had left the warehouse by mistake and that it was manufactured for export only. It reminded me of the old Bearcat of some years ago and although there's no manual choice of a.m./f.m. or step sizes it is a very sensitive scanner - I use it downstairs where I do my ironing as my main shack is upstairs and there's no room for an ironing board!"

Mrs Reed reports that the unit is very good on airband and the 2m amateur band which I can confirm too. Thanks for that Anne. Her explanation and sentiments were echoed by a number of others including **Andrew Emmerson**. I thank you all.

And now on to some requests for help. First up is **D. Higson** of Manchester who "took your advice and upgraded from a Vic20 to a 386 PC". Me and my big mouth! Mr Higson has installed *JVFAX*, *Hamcomm* and others on his new machine and says "I do not know how to get them running. Could you please help by sending instructions. I am a PC novice, and I can recognise an RTTY signal but not FAX or SSTV signals".

This I duly did and I sincerely hope my instructions helped Mr Higson to receive and decode his first signals. However, while I thoroughly enjoy all your letters - and those from beginners are especially welcome - do bear in mind that Mike Richards' 'Decode' column offers a number of guides and frequency lists, some of which are designed to get decode novices up and running with the minimum of fuss. I believe they're priced reasonably too.

The problem of signal identification is always a tricky one for beginners. After all, no amount of description can really convey the two-cheese-graters-rubbed-together sound a FAX signal makes. When you know them, they're unmistakable, of course, but getting to that happy state is fraught with difficulties. The best advice is to tune to 'easy' frequencies such as Bracknell on 4.610MHz (i.e. approximately 4.608MHz u.s.b.), Northwood on 3.652, 4.307 or 6.452MHz or Hamburg on 3.855 or 7.880MHz. Be aware that you might wait an hour or more before hearing anything other than a steady tone, but when you do, it'll begin with a short, but continuous, 'start' tone, then a regular pulse or blip - the phasing

signal - and then you'll get the 'grating' sound that is the FAX proper. Similarly, tuning to the RTTY old favourites (such as Bracknell again on 4.489MHz) will almost certainly give you success with a bit of perseverance.

A few years ago, at least one commercial advertiser offered tape recordings of signals to help novices to recognise those they were searching for, but I don't think these are available now. However, there are a number of sites on the Internet which feature recorded signals for novices to listen to. Use your favourite search engine with key words such as 'FAX', 'RTTY' and 'Morse'.

Also do bear in mind that there will almost inevitably be a certain amount of fiddling about - sometimes for days - before you'll bag your first FAX or bit of decoded RTTY. Be patience.

Finally for this issue (there's a lot to get in!) **Mike Huson** of Stoke on Trent writes that "I replaced my Amstrad PPC512 and now have a Dell 386 machine with a mono screen and a modest 40Mb drive. I have installed *JVFAX 7.0* and with a home made comparator interface have been using it to decode FAX".

Mike included a sea surface temperature analysis chart transmitted by Bracknell and wonders "what do you think? I've no experience with this mode and don't know what to expect". Well Mike, that chart is a corker and far better than my own results. I've always found Bracknell a tricky station to receive with any clarity and your chart is more or less perfect. There's a slight slant in the picture itself which you can correct using *JVFAX*'s timing correction tool. With a skewed picture on screen and APT in the wait state, press the '/' key. A vertical bar will appear on screen, which you can skew using the 'Control' and 'left' and 'right' cursor keys. Match the angle of skew of this vertical bar to the angle at the edge of the picture, then press return - *JVFAX* will now compensate automatically for your timing deficiencies and future pictures will be received correctly.

Other than that, continue as you are. Mike's final questions concern "sources of commercial and home-brew interfaces which don't cost the earth!" Well, there are a number of suppliers advertising excellent devices in *SWM* (including commercial versions of the comparator interface), though not having tried any, I can't recommend them. A good idea would be to contact the manufacturers of those which interest you and ask for specification sheets and sample received FAX pictures and the like to help you compare.

Now We Are Two

It's a rare event but I have the happy task of informing you of a second (!) piece of Mac decode software that is available free from the Internet (or me if you send a disk and SAE). *Mac MultiMode* works on Macs with 68020 or better processors, and sound input. The program makes use of the Mac's built-in A to D conversion and requires no interface - you simply connect up the output from a suitable receiver and start decoding!

"I've always been disgusted with the lack of decent ham/radio software for the Mac - why should the Windows boys have all the fun?" explains the program's American author **Chris Smolinski**. "I've written other radio-related software and have often had requests for a

CW/RTTY/FAX decoder for the Mac. I've never had time to write one in the past, but now finally I've started".

Mac MultiMode decodes c.w., RTTY and FAX and, while this early version of the program is certainly 'no frills' - you can't save or print decoded text and the FAX window doesn't scroll automatically, it does work, and rather well.

FAX being my favourite mode, I decided to try that first. I hooked up the line output from my HF-225 and fed it direct to the Mac's mic input. Unlike *RadFax*, the program doesn't yet offer signal processing of any kind so you'll need to ensure that the original is clean and tuned correctly. I tried Northwood on 4.307 u.s.b. - at my QTH, the quality of Hamburg varies alarmingly and Bracknell is always tainted with multipath shadows.

So, with Northwood tuned to around 2kHz below the published frequency I fired up *Mac MultiMode*, switched to FAX reception via the Control menu and waited. You can use the cursor keys to line up the received FAX and once the transmission got started, I twiddled with the cursor keys as quickly as I could then watched the Northwood schedule fill the RX window. The text modes worked with equal ease too, and there's a signal tuning window in these modes to help you to set your receiver correctly - though noise can destroy all semblance of sensible decoding. All in all though, *Mac MultiMode* looks like it might grow into an excellent program and one which all Mac-owning s.w.l.s should seek out soonest.

The most recent version can be found at <http://www.access.digex.net/~cps/sss14.html> or you can reach Chris at cps@access.digex.net or by writing to him at **4708 Trail Cir, Westminster, MD 21158 USA**. No doubt words of encouragement will help him to refine the program until it rivals those available for the PC.

Secondly on the software front, I'd like to give a brief mention to an excellent and truly useful piece of PC software called *Spectrogram*, a program which transforms your PC into a powerful signal analyser. *Spectrogram* can source signals directly via the PC's sound card or work with pre-recorded .WAV files, and then plot the frequency components of these 'captured' signals as a function of time. And what that does, is enable you to examine in minute detail a captured signal's characteristics. As the documentation puts it: "these spectrograms reveal the fascinating hidden frequency structure of audio signals and can be used for analysing and classifying particular sounds".

As a practical example of using *Spectrogram* I needed to examine tape-recorded WXSAT signals which suffered from so much wow and flutter, they were impossible to decode. Plotting a spectrogram of a recorded signal against one which was captured digitally using the excellent *WxSat*, I was able to identify the distorted portions of the signal and take steps to put it right.

Latest version is 3.2, works with Windows95 PCs with at least 8Mb of RAM and can be had as freeware (thank you author **Richard S. Horne**, rs_horne@mnsinc.com) from several sources on the Internet - do a search for 'GRAM32.ZIP' or simply 'Spectrogram' (I prefer not to provide URLs other than an author's own because they change so quickly).



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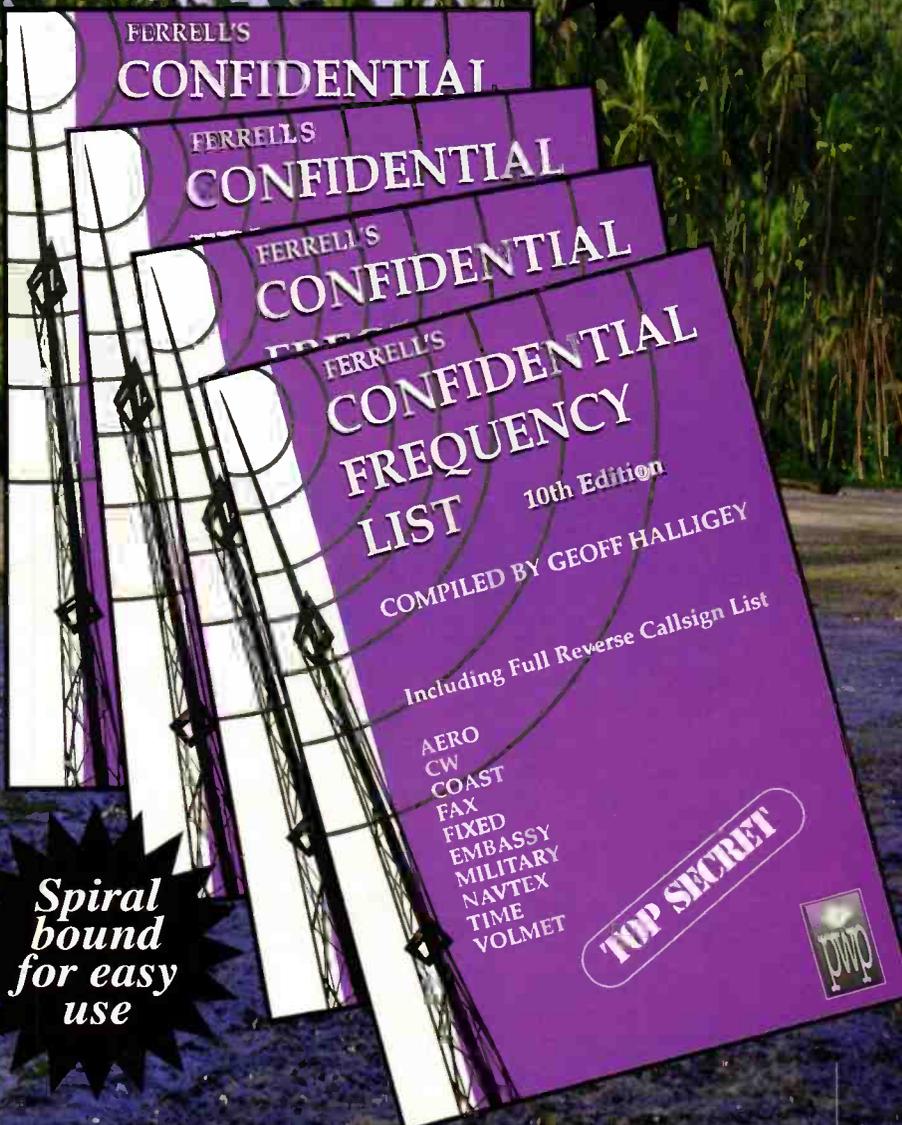
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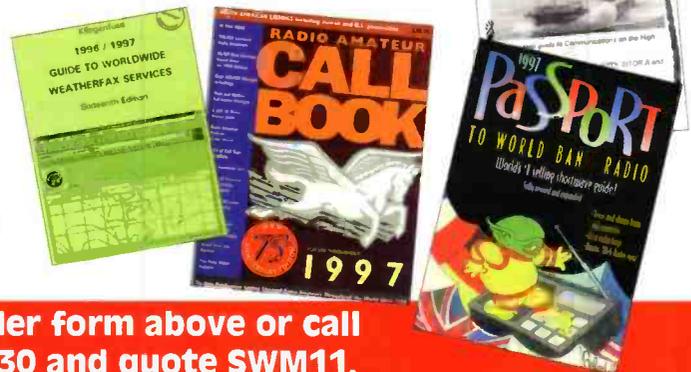
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