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SWM

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- A Potted History

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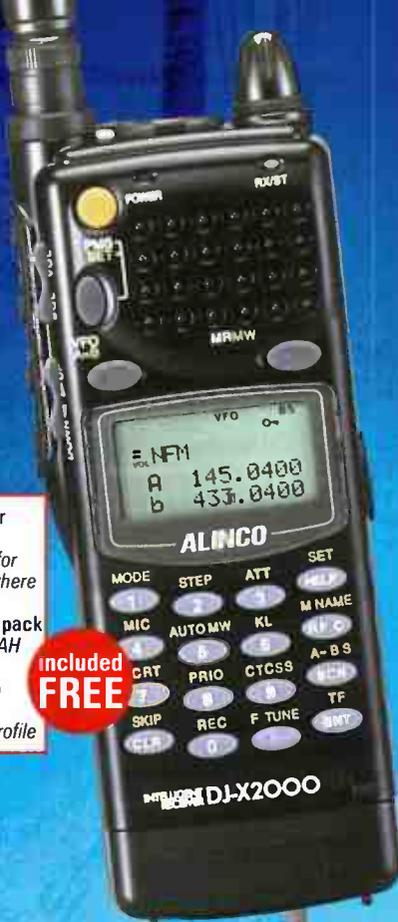
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BROADSTONE
Dorset BH18 8PW
Directors: Stephen Hunt & Roger Hall

Editorial Department

☎ 0870 224 7810
Fax: 0870 224 7850

Editor

Kevin Nice G3UNR, BRS95787
kevin.nice@pwpublishing.ltd.uk

Production Editor

Donna Vincent G7TZB, M3TZB
donna@pwpublishing.ltd.uk

Deputy Production Editor

Zoë Shortland
zoe@pwpublishing.ltd.uk

Technical Editor

NG (Tex) Swann G1TEX, M3NGS
tex@pwpublishing.ltd.uk

Art Department

☎ 0870 224 7820
Fax: 0870 224 7850

Art Editor

Stephen Hunt
steve@pwpublishing.ltd.uk

Layouts

Bob Kemp
bob@pwpublishing.ltd.uk

Typesetting

Peter Eldrett
peter@pwpublishing.ltd.uk

Sales Department

Fax: 0870 224 7850

Advertisements

Eileen Saunders M3TTO
eileen@pwpublishing.ltd.uk
☎ 0870 224 7820

Book Orders

Clive Hardy G4SLU
clive@pwpublishing.ltd.uk
☎ 0870 224 7830

Subscription Orders

Joan Adams
joan@pwpublishing.ltd.uk
☎ 0870 224 7830

Subscription Administration

(For all queries regarding existing subscriptions)
Kathy Moore
subs@pwpublishing.ltd.uk
☎ 01590 641148

Finance Department

☎ 0870 224 7840
Fax: 0870 224 7850

Finance Manager

Alan Burgess
alan@pwpublishing.ltd.uk

Finance Assistant

Margaret Hasted
margaret@pwpublishing.ltd.uk

Web Site

www.pwpublishing.ltd.uk

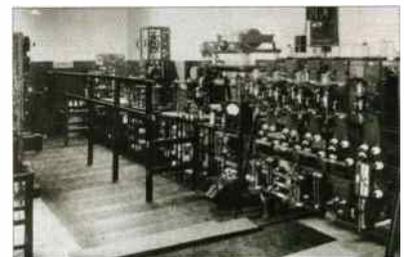
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● Broadcasting Special



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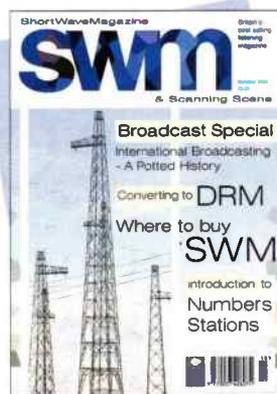
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For the latest radio news, see our web site www.pwpublishing.ltd.uk/swm/news/

Share your thoughts

Join in with the on-line action on the SWM Readers' E-mail Forum - send an E-mail to swm_readers-subscribe@yahoo.com to subscribe - don't miss the on-line action!

Coming Up Next Month

In November 2004 SWM

- SWM Software CD Offer - Radio software without pain
- Info In Orbit Special with Lawrence Harris
- Converting to DRM - Part 2
- Beginners Series - Getting Started Part 6
- Keep on top of the world of monitoring with SWM
- all the regulars and much more...

*contents subject to change

SWM Author Info

To provide you with a ready reference here are the contact details of all our regular authors.

Amateur Bands

Clive Hardy G4SLU,
c/o SWM Editorial Offices
E-mail: clive@pwpublishing.ltd.uk

Attention 123!

Enigma, 17-21 Chapel Street, Bradford, West Yorkshire BD1 5DT.
E-mail: enigma@pwpublishing.ltd.uk

Bandscan

Bandscan America

Gerry Dexter,
c/o SWM Editorial Offices.
E-mail: gdxeter@pwpublishing.ltd.uk

Bandscan Australia

Greg Baker, PO Box 3307, Manuka, ACT2603, Australia.
E-mail: greg.baker@pwpublishing.ltd.uk

Bandscan Europe

Martin Peters,
11 Filbert Drive,
Reading RG31 5DZ.
E-mail: martin.peters@pwpublishing.ltd.uk

Decode

Mike Richards G4WNC,
49 Cloughs Road,
Ringwood,
Hampshire BH24 1UU.
E-mail: decode@pwpublishing.ltd.uk

DXTV

Keith Hamer and Garry Smith,
17 Collingham Gardens,
Derby DE2 4FS
E-mail: dxtv@pwpublishing.ltd.uk

Info In Orbit

Lawrence Harris,
55 Richville Road,
Shirley,
Southampton SO16 4GH.
E-mail: info.orbit@pwpublishing.ltd.uk

LM&S

Martin Peters,
11 Filbert Drive,
Reading RG31 5DZ.
E-mail: lms@pwpublishing.ltd.uk

Maritime Beacons

Robert Connolly,
21 Eleaston Park,
Co. Down
N.Ireland BT34 4DA
E-mail: beacons@pwpublishing.ltd.uk

Off The Record

Oscar,
c/o SWM Editorial Offices
E-mail: off.the.record@pwpublishing.ltd.uk

Propagation

Jacques d'Avignon VE3VIA
E-mail: jacques@pwpublishing.ltd.uk

Satellite TV News

Roger Bunney,
35 Grayling Mead,
Fishlake,
Romsey,
Hampshire
SO51 7RU.
E-mail: roger.bunney@pwpublishing.ltd.uk

Scanning

Dave Roberts,
c/o SWM Editorial Offices.
E-mail: scanning@pwpublishing.ltd.uk

ShackWeb

Jerry Glenwright,
c/o SWM Editorial Offices
E-mail: shackweb@pwpublishing.ltd.uk

Sky High

Peter Bond,
c/o SWM Editorial Offices.
E-mail: skyhigh@pwpublishing.ltd.uk

SSB Utilities

Ben Hogan,
c/o SWM Editorial Offices.
E-mail: ssbutils@pwpublishing.ltd.uk

SWM Services

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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.

Photocopies & 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 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 for SWM are £5.00 inc P&P each and photocopies are £3.00 per article inc P&P.

Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 P&P for two or more, UK or overseas. Prices include VAT where appropriate.

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Technical Help

We regret that due to Editorial time scales, replies to technical queries cannot be given over the telephone. Any technical queries by E-mail are very unlikely to receive immediate attention either. So, if you require help with problems relating to topics covered by SWM, then please write to the Editorial Offices, we will do our best to help and reply by mail.

ED's



comments

WHS

In an attempt to assist you in finding your favourite radio magazine in the face of WHS policy of stocking fewer specialised magazines, this month we have included a list that best represents the current WHS outlets stocking SWM. If you discover any discrepancies, either stores not listed that stock SWM, or ones listed that don't, please let me know and I'll update everyone.

DRM

If you read SWM regularly, then you'll know that DRM's popularity is growing. The digital system has been taken up by many international broadcasters. If you've been tempted to see what DRM reception is all about but not dipped your 'toe in the digital pond', then look no further than page 39 of this issue for an account of how to investigate it relatively cheaply. **Kevin Ryan** shares his own conversion (and that of his radio) to DRM capability.

Whilst on the subject of DRM, I've just heard from the DRM consortium, the driving force behind the mode. They tell me of a forthcoming (at the time of writing) press conference to be held at IBC in Amsterdam on Saturday 11 September, where Digital Radio Mondiale (DRM) will introduce its latest products, including the Digital World Traveller - the world's first DRM-capable USB (Universal Serial Bus) receiver.

The Digital World Traveller is made by DRM Member, Coding Technologies. The press conference is due to feature DRM Chairman **Peter Senger** (COO, Deutsche Welle), who received the EBU Lifetime Achievement Award for Services to International Broadcasting at the IBC Conference last year. Also featured will be DRM Vice Chairman **Jan Hoek** (Acting Director General, Radio Netherlands), Coding Technologies' **Stefan Meltzer** and other DRM Members.

IBC attendees would have had the opportunity to listen to live DRM broadcasts on DRM-capable consumer and software products at the DRM booth. DRM Member VT Communications offered complimentary DRM Mobile Reception Tours in a specially-fitted car during IBC.

Featured in the vehicle was the DRM 2010 Receiver Car Kit by DRM Supporter AFG Engineering GmbH.

Coding Technologies will introduce the Digital World Traveller, a small, USB device that connects to a PC or a laptop without needing any additional power supply or battery. It comes with the Digital World Traveller Radio Software, and can receive DRM, f.m. and a.m. programs. It will be sold for £199+VAT after IBC.

Coding Technologies will also display MAYAH's DRM 2010 radio which was reviewed in SWM December 2003. The set is a joint development by Coding Technologies, BBC R&D and DRM Supporters MAYAH and AFG Engineering GmbH.

Fraunhofer IIS will have showcased its new, palm-sized, DRM Chipset Evaluation kit. The kit is based on a combination of dedicated signal processing hardware and a flexible embedded ARM9 processor core running software, enabling chip-set and system manufacturers to build up and brand their own highly integrated DRM products. The demo's composed of a standard r.f. tuner, a prototyping board and a PDA.

DRM is the world's only non-proprietary, universally standardised, digital on-air system for short wave, medium wave and long wave. More than 60 commercial, public, international, national and local broadcasters world-wide have sent DRM transmissions. More than 350 hours of DRM broadcasts are currently transmitted per day. DRM offers crystal clear audio quality and excellent reception, even over long distances.

Both Russia and China are now testing DRM for both domestic and international use. The first DRM consumer products became available this year.

With DRM's global reach growing, the range of consumer receivers is expected to expand. DRM membership recently reached a record high of 84 Members from 27 countries. DRM's web presence is available at www.drm.org

SSE

I've had lots of positive feedback regarding last month's *Scanning Scene Extra*, supplement. It seems that we've got the balance just about right. I recently had a telephone conversation with a new reader who's attention was taken by the *Getting Started - Airband* bonus magazine in the July issue. He's read every issue since and he tells me that he's enjoying the hobby more since he's discovered SWM. That is very reassuring indeed.

I must extend apologies to AOR UK Ltd., for a typographical error on page 19 of last month's SSE. We incorrectly gave their AR8200 Mk3 hand-held high-end scanning receiver a price of £199. The other references to the AR8200's price stated the correct value of £439. I hope that we didn't cause too much confusion. The type-gremlins also managed to snaffle the AOR website URL from our 'Website Guide'. AOR's site can be found at www.aoruk.com

CD Offer

Next month we embark on a first for SWM. We will be offering a radio software CD. The CD, whilst offering nothing that isn't available elsewhere, for instance via the Internet, provides a convenient compilation of useful programs and utilities at your fingertips. The convenience of the *SWM Radio Software Compilation* is that you don't have a fast Internet connection then you can access the programs almost instantly. Even if you do have access to a fast 'net connection the CD will save you the effort of having to find the site for download.

If you've read about a program in your favourite SWM column over the past year and thought to yourself, I must get a copy of that, then look no further you can find a copy on the CD. How convenient is that?

Don't miss the November issue of SWM for details of how to obtain your copy.

AW 73 Kevin

QSL

THE BEST LETTER WILL RECEIVE A £20 VOUCHER TO SPEND ON ANY SWM SERVICE.

Dear Sir

I have recently enjoyed a few days break on the small Channel island of Alderney, an island that is totally different from both Jersey and Guernsey. Alderney is reached on Trilander aircraft from Southampton/Eastleigh or Hurn airports. There is no regular surface ferry to Alderney, few tourists and



consequently cannot compare to the bustling commercial activities on the larger islands, the local population has risen in recent years to 2400, at peak tourist season add another 350 but in mid-winter a migration by locals to warmer climes results in a population drop to 1700.

'The boat from England' - a small coaster from Weymouth - arrives with food and supplies alternate Wednesdays. Narrow cobblestone streets and a 15mph speed limit suggests an England of the mid-1930s! A lovely place for a very quiet holiday.

There are other sights of interests, German bunkers in remarkably preserved conditions, I entered one with the original (rusted) three tier bunk beds still inside. But to radio enthusiasts there is a remarkable site above Braye Bay. There amongst the gorse and bracken on rising ground is a large dish some 9m in diameter. This was the original method of receiving the 405-line ch. 9 vertical transmissions from Stockland Hill, Devon, the large dish received the off-air cross Channel signal from Westward TV and then microwave linked it to the main Channel Islands ITV transmitter at Fremont Point, Jersey for re-radiation on ch.9 horizontal.

Eventually, with the arrival of 625-line u.h.f. TV, the IBA developed and installed their 'Sabre' adaptive aerial system for Alderney in 197 - an antenna that automatically sensed interference pick-up on the main off-air Stockland Hill transmissions and nulled out the interference.

Near to the old 9m dish at Braye is the Alderney local u.h.f. transmitter and on that lattice structure is the

'Sabre' antenna aimed North West towards Stockland - though technology marches ever onwards and a small satellite dish at Fremont Point can now provide the UK network TV for the Channel Islands broadcasters.

The 9m monster dish, now out of use, can be easily inspected as the protective fence has fallen down, it's on the Northern slopes of Braye Bay, just clamber up through the undergrowth on the West side of the Battery Reservoir, cross the railway line and there's an overgrown track that eventually emerges by the dish and further on by the transmitter fence itself.

The 'Sabre' antenna resembles that used by the Point Mugu missile test facility, see my 'Satellite TV News' column on page 70. Check out www.tx.mb21.co.uk/features/sabre/ for the full story of the TV link.
Roger Bunney



Dear Sir

I read with interest Clive Hardy's article in the June issue about the seeming decline in the use of CB in the UK. I also read his reply to **Duncan Large** in August's *SWM*. Duncan disputed the original article's conclusions.

I thought you may be interested to know the situation in the parts of Ireland (ROI) that I travel to I use a Yaesu VR-500 to listen. Dublin: nothing whatsoever on CB (UK/EU) for the last several months from regular users. Both bands are extensively used nonetheless, for broadcasting church services.

In Stillorgan (south Co. Dublin), I can receive up to about 20 different (Catholic) church services on the UK and EU bands - and a few stations located inbetween the two bands! They are broadcast both in a.m. and narrow f.m. modes. The church I attend broadcasts on EU Ch16 at 5W. When the churches are not broadcasting, the CB airwaves are empty. South West County Donegal (town of Kilcar) very, very seldom do I pick up anything at all. I check once a

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 at *QSL*, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

topqsl

Dear Sir

I've just dusted off my s.w. radio for the first time in several years and picked up a copy of *SWM* for the first time in a similar length of time. Firstly, I'd like to say the magazine is every bit as good as I remember it (and even better in many ways).

Things have changed in the last 10 years with the advent of the Internet, computers and digital radio, yet I'm glad to find that the h.f. bands are still active and producing interesting content. True, some stations have gone, but there is still a lot of activity and many fascinating programs.

Having just completed a Computer Science degree I am particularly interested in the current debate about the role of computers and the Internet in the radio world. Computers are a wonderful tool, decoding of the data modes now no longer needs large, clunky equipment, logging software saves on paper and is more flexible and the radio control of computers can be very useful.

Whilst Internet broadcasting is on the increase, not everyone has an Internet connection, let alone the high speed connection needed for Internet radio and at the moment the Internet doesn't have a suitable infrastructure to provide the service to everyone in replacement of

wireless radio. This is an area of lots of research, and I'm sure some of it will be covered in this magazine, but there is a long way to go before Internet radio becomes the norm.

The Internet is a wonderful resource though, and its primary function is to distribute information. Its a great shame that the radio newsgroups have a very low signal-to-noise ration and seem to be preoccupied with petty squabbles, **uk.radio.amateur** would put me off the hobby if I were a newcomer to it. A wonderful resource would be a news and discussion site along the lines of www.slashdot.org for radio hobbyists and an online logbook similar to *SWM*'s 'LM&S' column, but with world-wide contributors.

This would not only give a resource to see what can be heard in your location, but also a resource to study propagation conditions. Does anything like this exist? The future of radio is bright. In the world of radio things have always changed and always will, keep up the good work.

**Tristan Mills
London**

*Hello Tristan, I'm glad you think that *SWM* is as good as ever. I'd love to know in what way you think it's improved. - Ed.*

month, i.e. when I'm up there - it has been several months since I picked up any signals. The last time I did, they were of French or Spanish sailor on the EU channels (between Ch 3 and 10) and were hard to make out. There are few churches up there broadcasting on CB yet (the local church started broadcasting on 108MHz last weekend but the signal is very weak), so the CB airwaves up there are totally dead.

Ten years ago, you would easily find several channels on the UK band with users chatting to each other. This is hardly representative of the country but bearing in mind that a third of the population of Ireland lives in Dublin, it's probably a good indication. My brother also tried (the UK channels) in Letterkenny (N. Donegal) but found no signals up there, either. This is probably why the churches have instead more or less 'taken over' the band - making it effectively a 'Church Band'! With kind regards,
**Francis Byrne
Co Dublin
Republic of Ireland**

Dear Sir

In an age when equipment service is not always as its cracked up to be, how about the following? After the recent heavy storms of 3 August, my AR1500

appeared to have been statically whacked, so much so that it had gone extremely deaf on the lower frequencies, yes, yours truly had left it connected to a long wire, like a fool.

I 'phoned AOR and was pleasantly surprised when I was informed that the 12 year old AR1500 was probably repairable. I sent it off on 6 August and on 11 August I decided to 'phone AOR to see if the AR1500 had arrived safely, only to be informed, that yes, it had arrived ok, had been checked, repaired and tested to spec. and was ready to 'rock and roll'.

A very reasonable amount was requested for the repair, return carriage, etc., and on 14 August, the AR1500 was again in my grubby paw and banging away on all cylinders. Hopefully it will be disconnected from the long wire antenna in future when not in use. Eight days for a quick and good service - well done AOR!

By the way, AOR said that the static had whacked the r.f. amplifier and protection diode. These must be the two minute components returned in a plastic bag - which I first thought was empty. How on earth do they solder them?

**John Barker
Middlesex**

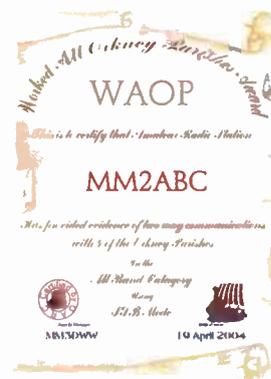
John, it is always pleasing to share good news. Thanks for the note. - Ed.

Orkney Islands EU009 Award

Colin Blunn **GM0IFM** of the **Orkney Radio Club** has sent in some information regarding an Awards Programme that has been introduced by his club. The Orkney Islands group consists of over 70 islands off the northern Scottish Coast. Many islands are small and uninhabited and the larger islands, some of which are populated, have regular amateur radio operation from resident island operators. Islands without a population or resident operator are attempted to be contacted by club visits and expeditions.

People considering applying for an award can obtain more information from the club's website - visit www.eu009.com - which also gives further details about radio operation from the Orkney Islands and the club's activities. An awards application form can also be downloaded from the site.

One of the main activities of the club is 'island activation' with some additional activity surrounding special event stations. Recently, the club activated two new islands called Holm of Grimbister and Damsay Island. The club has its own callsign - **MM0MWW** - but has historically also used **GB5RO**, **GB5LO** and **MM5DWW** on occasions.



Hot New Spot for ML&S!

Martin Lynch & Sons are pleased to announce that they have relocated from their premises in Ealing to: **Outline House, Guildford Street, Chertsey, Surrey KT16 9AS**. The new premises are situated between junctions 11 and 13 on the M25, making it easily accessible by car, plus the Chertsey train station is just 800m away. The phone, FAX, E-mail and website details remain the same.

Club Meets

Members of the **Northumbria Amateur Radio Club** meet every Thursday evening at the Clubhouse, The Old Telephone Exchange, Cresswell Road, Ellington, Nr. Morpeth NE61 5HR. The Secretary is **Charles G0ECQ** and he can be reached at **11 Chiltern Close, Seaton Manor, Ashington NE63 0HZ, Tel: (07974) 799881**.

Announcing Amateur Radio UK

Here at **SWM** we have recently heard from **Andy Jenner G7KNA** who informs us that Amateur Radio UK (ARUK) is an open news and discussion forum run by amateur radio enthusiasts for amateur radio enthusiasts. It has been set-up by **Steve ZEONSP** and like minded individuals with the aim of becoming the UK alternative to sites such as the American www.eham.net. It is hoped that the site will reinforce the traditional amateur radio spirit encouraging young and old alike to further their own "self training in communication by radio telecommunications".



It doesn't matter if you've yet to get your licence or have held it for 50 years. It doesn't matter if you operate hand-keyed Morse on h.f. or the latest digital modes via satellite. It doesn't matter if you bought your station for thousands of pounds or home-brewed it. Each of us is different, yet we share one common interest in the magic of radio.

No matter what your specific interest in radio is, point your browser at www.aruk.org.uk - log in and share your views, opinions and experience with others. Somebody, somewhere could use your advice or can answer your question. Come and join in, be part of the community and help to shape the site.

Cromer Lifeboat 200th Anniversary Special Event Station

The planned callsign **GB200CLB** for a special event station to celebrate 200 years of lifeboats in Cromer, Norfolk, will be operational 48 hours over the weekend **30/31 October 2004**, from the crew room of the lifeboat station at the end of Cromer pier. Up to three h.f. stations and a 6m, 2m and 70cm station are planned to be operational, using a.m., f.m., c.w., s.s.b., RTTY, PSK-31 and SSTV. There will also be a live colour television link on 23cm between the crew room and the town centre to show visitors the activity in the crew room and entice them down to 'have a look' and perhaps make a donation to RNLI funds.

Lord Suffield of Cromer announced the creation of a lifeboat station in Cromer, on 31 October 1804, and on this day, 200 years later, there will be a service held in Cromer parish church to celebrate the anniversary.

David M0CNP is looking for more operators, loggers and helpers for the duration of the special event station, so if you are able to help in any way, please drop him an E-mail to david@m0cnp.fsnet.co.uk. All E-mails will be answered.

This is a golden opportunity to raise funds for the RNLI and to raise awareness of amateur radio activities within the community. Internationally, David expects to make many thousands of QSOs and a special QSL card will be available for contact with the station.

Numerous Norfolk organisations are supporting this event, with equipment, operators, etc., including the newly formed Bittern DX Group www.bittern-dxers.org.uk the Norfolk Amateur Radio Club www.norfolkamateurradio.org and North Norfolk Group Raynet, as well as many individual radio amateurs and short wave listeners.

Pretty In Pink!

The Intempo KT-01 DAB Digital Radio has been designed with simplicity in mind. At the flick of a button 'Kitty', as its been nicknamed, automatically tunes into the nearest available digital radio station.

An I.c.d. screen displays station and programme information. With eight presets available to programme your favourites, an alarm, clock, sleep function f.m. and DAB, the radio offers excellent value for money. The KT-01 is also battery or mains operated, so Kitty will be a welcome companion to the beach or garden!



With digital transmissions now available in most parts of Europe and over 80% coverage throughout the UK, more and more people are tuning into DAB radio because of its interference free crystal clear sound, fast auto tuning and the huge variety of stations available. There are some stations only broadcasting exclusively on DAB giving listeners added value for money.

The KT-01 DAB Digital Radio is available for **£79.99**. Call Nevada on **02392 313090** or visit: **www.nevada-radios.co.uk** for more information.

The KT-01, also available in charcoal.

Former Intelligence Officer Returns

Here at the SWM Newsdesk we received an interesting story from **Jon Cleaver GOSPR** who met a former Intelligence Officer with the Y Intercept Group from Chicksands. Take it away Jon...

Stopping halfway up the flight of stairs a smartly dressed lady appeared in the doorway, smiling. She asked me if I was Jon, in Morse Code; calling out the syllables fluently. **Phyllis Henderson**, now 85, a former Intelligence Officer with Y Intercept Group from Chicksands, waited for a reply; needless to say my response was slow and stilted.

The James Bond film *You Only Live Twice* could have been penned with Phyllis in mind. The former Intelligence Officer at Chicksands from 1941-44 had been invited to visit the establishment, part of which is now a museum dedicated to the Intelligence Service, put together by another former Intelligence Officer there, Archivist, **Major Alan Edwards OBE** (Retd.).

Phyllis was born at Poulton-le-Fylde near Blackpool in 1919. At the outbreak of war she wanted to join the forces and support the war effort. Her brother Norman was a wireless telegrapher in the Navy, he suggested Phyllis learn the Morse Code and set about teaching her.

She eventually joined the WAAF as a wireless operator. After training at Nottingham and Harrow with the GPO, she was transferred to Chicksands being attached to Y Service. Chicksands Military Base is home to the joint

Armed Services Intelligence Departments.

"It was very cloak and dagger", Phyllis recalled, "we were told we were monitoring the weather, but we knew by the nature of what was being received, of military in tone and coded, it was not weather information. We spent eight hours per day with headphones on taking down hundreds of messages, which were transcribed and taken by motorcycle courier to Bletchley Park to be decoded on the famous Enigma Machine.

We arrived at Chicksands in pouring rain, as we approached the main entrance, a soldier with a gun across his chest, stepped in front of the vehicle and checked our pass. Then just like in the movies, a man with pure white hair wearing a raincoat, stepped from the shadows, got into our car. "Straight on", he barked, pointing us in the intended direction. "Edwards, Major, pleased to meet you" speaking with authority, his eyes darting to each of us in turn, visually inspecting us as if to satisfy his curiosity".

The museum is housed in a single story building set well away from the main part of the high security establishment. The main room contains a complete history of communications and intelligence dating from the earliest form of spying; when a man was sent to the top of a hill to see what was on the other side!

Once inside the museum, Phyllis was beckoned to a smaller room where the old receivers used by Y Intercept were displayed. Sitting down she placed the headphones on; her left hand moving adroitly across the tuning

dial. Picking up a pencil with her right hand, notepad at the ready, she said. "This is how we used to do it". Phyllis may have been coming back on duty after a weekend off, rather than returning after sixty years.

Written on a brass plaque above the door is the third verse from Robert Herrick's poem, *Litany to the Holy Spirit*; 'When the house doth sigh and weep and the world is drowned in sleep. Yet mine eyes the watch doth keep, sweet spirit comfort me'.

Although the name 'Enigma' had been used frequently at Chicksands, Phyllis had never seen one; The Major asked if she would like to, and invited her into another room where, since one was stolen and returned, the remaining ones are kept under tight security.

Explaining how the incoming information was used, The Major told Phyllis how the messages collected by Y Intercept, the Intelligence Service was able to study future planning of the German war effort.

Phyllis had one last request, she told the story of how she had met her future husband at Chicksands in 'The Old Priory' which serves as offices. The Major obliged.

On leaving I asked Phyllis what she thought of the 'listeners' of Chicksands and Bletchley - she smiled and quoted Sir Winston Churchill's commemoration to the intelligence service, "...they were the geese that laid the golden eggs, but never cackled".

As we left I thought I saw a tear drop on Phyllis's cheek. What was she thinking, only she knows?



Phyllis Henderson could have been returning after a weekend off.



Phyllis with the 'Enigma' Machine.



Phyllis with Major Edwards looking at a picture of a Y Intercept hut.

Chelmsford ScARF at Essex International Jamboree GB2EIJ

Every four years in Essex there is an International Jamboree (a large Scout camp) where Scouts from around the world come together in a spirit of friendship and fun. This year, as in the past two years, the Jamboree was held at Devrox Farm in Kirby-Le-Soken near Walton on the Naze. With over 8000 Scouts/Guides and 1000 Activity Leaders mainly from the Scouts, Guides Leader and Scout Fellowship background all camping, you can imagine the camp site is quite large!

There is a lot of background work that has to be done on this scale of event. Just for the Radio Shack there were plenty of meetings to arrange all the equipment, and also where it would all come from. Fortunately one of the team members was in contact with Icom (UK) and managed to use one of their IC-7400 that is used for such an event, which the group were very grateful for.

On arriving at the camp site, the first job was to get the camping kit set-up, allowing plenty of time to then set up the activities, consisting of the shack, radio build and hands-on section. The shack was actually set in a portacabin, suitably alarmed with what is only described at best as an antenna farm enclosure at the rear. Located in a field, the only power source was a large Diesel generator that was on 24 hours a day!

On the Monday Carlos brought fresh from the AMSAT Convention GB4FUN that the group had asked to use for the week. This made a nice compliment to the usual h.f., v.h.f. and u.h.f. shack GB2EIJ has. This also allowed the group to use satellites - a first for ScARF. Having all the necessary antennas and rotators to track satellites, the *International Space Station* was also tracked, although they never got to speak to them.

The radio build was a well attended activity. This was where if any Scout/Guide wanted and had the time (bearing in mind there was lots for them to do - quad biking, abseiling, archery, rifle shooting, the list goes on!) he or she could construct a m.w. radio from a kit of parts (from Rapid Electronics) under one to one direct supervision from one of the team members. Taking around 15 to 20 minutes each to build, and with an aim of 1000 in the week, the team managed a respectable 750, all working and as many smiles on the Scouts/Guides faces!

Members of the Chelmsford ScARF would like to thank Icom (UK) for the loan of the IC-4700, the RSGB for the loan of GB4FUN, the Colchester Radio Club for the loan of their mast and assistance in putting it up and also thanks to all the members of the Chelmsford Scout Amateur Radio Fellowship and Komodo Explorer Unit for a wonderful Jamboree week.



Setprotectors UK

Shaun Rennalls M35NR has been a radio enthusiast since 1979 but has always had an interest in electronics. Apprenticed and trained as a plater welder and sheet metal worker and a pupil of his late grandfather who was the most inventive and creative man he ever knew!

Shaun progressed from this field into another field and joined the police force as a

constable in the Thames Valley District and then his life after a period of time changed paths again as he went into bodybuilding and opened his own fitness centres and went on to compete in Mr Britain, Mr United Kingdom and appeared on *You bet!* For London Weekend Television lifting a tank of all things!

Now Shaun has gone full circle and chosen the combination of his engineering, inventiveness and radio background to move to what he now does, only minus the lifting tanks!

Shaun's company - **Setprotectors UK** - are designers, manufacturers and world-wide distributors of protective covers and cases for amateur and CB radio equipment. Setprotectors UK supply covers and cases for home-base and mobile h.f. radios as well as catering for CB radio equipment too! They are the designers/inventors and sole manufacturers of the bikini cover for the Icom 703/706/MkIIIG - now sold world-wide - a revolutionary design that they thought could not be achieved!



rallies

September 26: The Worthing & District Amateur Radio Club are holding a mini rally at Newhaven Fort Museum from 1030 till 1600. The main purpose of this rally is to raise funds for the Museum by selling excess equipment which has been donated to the club, but is not suitable for display. Tables are provided at £10 for individuals or £15 to traders - a number of whom have already agreed to attend. The charge includes admission to the Fort, with all its usual attractions, including the display of vintage radio equipment, etc. For more information or to book a table, call (01903) 753893.

September 26: The Suffolk Data Group - SDG Radio & Computer Rally is taking place on the raceway centre green at the Foxhall Stadium, Foxhall Road, Ipswich, Suffolk IP4 5TL. Traders and booters admission from 0800 where there will be plenty of boot pitches, pay on the day and only £5. Doors open at 0930 and the entrance fee is just £1 - accompanied under 14s go free. There will be a large free car park adjoining the stadium and hot refreshments will also be available. Talk-in on S22. Everybody welcome! Telephone Peter on (01473) 631313 or E-mail: peter@sdgrally.org

***October 1/2:** The Leicester Amateur Radio Show is to be held at Donington Park International Exhibition Centre, near junction 23A M1. Doors open at 0930 to 1730 on Friday 1st and 0930 to 1630 on Saturday 2 October. More information from Geoff G4AFJ on (01455) 823344 or E-mail: g4afj@argonet.co.uk

October 10: The Great Lumley Amateur Radio & Electronics Society are holding their rally at the Great Lumley Community Centre, Front Street, Great Lumley, near Chester-le-Street, County Durham. There will be free parking, plus easy access, good, inexpensive food and drink, a Bring & Buy and lots more. Doors open at 1030 for all, including disabled visitors. Admission is just £2, free of charge to under 14s accompanied by an adult. More details from the Rally Organiser Nancy Bone on 0191-477 0036 (home) or (07990) 760920 (mobile) or E-mail: nancybone2001@yahoo.co.uk

October 17: The Northampton Radio Rally. Tables for exhibitors free of charge (one table per exhibitor). More information from Gary, E-mail: g6nyh@aol.com or call Andy on (07780) 842602.

October 17: The Blackwood & DARS Rally is to be held at Newport Centre, Newport. Doors open 1030 for disabled visitors, 1045 for all others (traders from 0800). Entrance fee is just £1.50 and parking is free. The centre is 1.6km from J25A on the M4 or J26 travelling eastwards. Refreshments and bar facilities will be available. There will be the usual attractions, traders and a Bring & Buy, etc. More information from George 2W1JLK on (01495) 724942 or Dave GW4HBK on (01495) 228516.

October 24: The Galashiels & District Amateur Radio Society are holding their annual rally at The Volunteer Hall, St. Johns Street, Galashiels, Scottish Borders. Doors open from 1100. There will be traders, a Bring & Buy and refreshments. More details from Jim GM7LUN on (01896) 850245 or gm7lun@qsl.net

* PW Publishing Ltd. will be in attendance.

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

In the future, Setprotectors UK will be adding many more new products to their range, so please visit www.setprotectors.com and see what catches your eye or, if you have any suggestions for new products please get in touch with them. Please also note that **Waters & Stanton** are their authorised dealer, and they can be contacted via E-mail at sales@wspic.com or by calling (01702) 206835.

Setprotectors UK can be contacted at **68 Bradley View, Holywell Green, Halifax, West Yorkshire HX4 9DN, Tel: (01422) 373105 or (07891) 135521, FAX: (01422) 373105, E-mail: info@setprotectors.com**

LM&S

Long, Medium & Short Wave Bands

● **Martin Peters** 11 Jilbert Drive, Reading RG31 5DZ
 ● **E-mail:** lms@pwpublishing.ltd.uk

Dxers:-
 A Simon Hockenhill, Bristol
 B Bernard Curtis, Stalbridge
 C Rhoderick Illman, Dxted
 D Vic Prier, Seaton
 E Peter Pollard, Rugby
 F Jim Edwards, Wigan

Readers' Lives

I'm delighted to say that we have several new contributors on-board this time around.

Francis Byrne E-mailed me from Dublin. He bought a Sangean ATS-909, which he then sent off to a company called **RadioLabs**, in California, where they 'supercharged' it. The radio is now very sensitive on long and medium wave and as if to prove the point, Francis logged VoA out of Sao Tome on 1530kHz. Perfectly possible, Francis, given that 1530kHz is otherwise clear for you there. The sea-path between you and the transmitter site would be another factor.

Harry Richards writes from Barton-Upon-Humber to correct my use of the Junglinster site when referring to the 234kHz outlet for Luxembourg. Curiously, **WRTH** (which I use as my reference) has it as Junglinster but that site now serves as a back-up to the primary site, which is Beidweiler.

Mr R Frost submitted some logs from Felixstowe. Apart from medium and long wave, he looks forward to the continental DX coming in during the summer months. None forthcoming at the time of his writing but my guess would be that this is no longer the case. The RDS facility on his Roberts radio will make identification a breeze.

Listeners:-
 A Phil Townsend, London
 B Simon Hockenhill, Bristol
 C Thomas Williams, Truro
 D Sheila Hughes, Morden

Long Wave Table

kHz	Service	TX Location	Country	Power (kW)	Listener
153	Deutschlandfunk	Donebach	D	500/250	A B D*
153	Radio Romania	Brasov	ROU	1200	B* D*
162	France Inter	Allouis	F	2000/1000	A C* D
171	Medi 1	Nador	MRC	2000	C*
171	Radio Rossii	Bolsakovo	RUS	600	B D*
177	Deutschlandradio Berlin	Zehlendorf	D	500	A B*
183	Europe 1	Saarlouis	D	2000	A C*
189	Rikisutvarpid	Gufuskalar	ISL	150	B* D*
198	BBC Radio 4	Droitwich	G	500	A D
207	Deutschlandfunk	Aholmring	D	500	A B C*
207	RTM A	Azizal	MRC	400	B*
207	Rikisutvarpid	Eidar	ISL	100	B*
216	Radio Monte Carlo	Roumoules	F	1400	A B C*
225	Polish Radio 1	Solec Kujawski	POL	1000	B* D*
234	RTL	Buidweiler	LUX	2000	A C*
243	Denmark Radio 1	Kalundborg	DNK	300	A B C* D
252	RTE Radio 1	Clarkstown	IRL	500/150	A B D
252	Algiers Radio 3	Tipaza	ALG	1500/750	B* C* D*
261	Radio Rossii	Taldom	RUS	2500	B*
270	Czech Radio 1	Uherske-Hradiste	CZE	650	B* D*
279	Belarusian Radio 1	Sasnovy	BLR	500	B* D*

* = dark

Tropical Bands Table

MHz	UTC	Service	Country	Listener
2.325	2043	Tennant Creek	AUS	C
3.200	0405	Trans World Radio	MCO/SWZ	F
3.210	0430	WWCR, Nashville	USA	D F
3.215	0135	All India Radio, Bhopal	IND	F
3.215	0350	Adventist World Radio	USA/MDG	F
3.240	0335	Trans World Radio	MCO/SWZ	D F
3.255	2100	BBC World Service	G/AFS	D F
3.279	0345	La Vo Del Napo	VEN	F
3.306	0205	Zimbabwe Broadcasting, Gweru	ZWE	F
3.320	0345	SABC Meyerton	AFS	D F
3.345	2115	Channel Africa	AFS	D F
3.350	0400	Radio Exterior Espana	E/CTR	D F
3.915	2320	BBC World Service	G/SNG	A D F
3.927	2053	Radio Korak (pirate)	HOL	C
3.955	2109	Radio Korea International	KOR/G	A C
3.955	0440	WYFR	USA/G	D
3.965	1840	Radio Taiwan	TWN/F	A B E
3.965	0330	Channel Africa	AFS	E
3.975	1902	Radio Budapest	HNG	A C
3.995	2155	Deutsche Welle	D	A C
4.005	1952	Vatican Radio	CVA	A D
4.755	0245	Radio Educacao Rural	B	F
4.760	0155	All India Radio, Port Blair	IND	F
4.765	0145	Radio Emissora Rural	B	F
4.770	2103	FRCN Kaduna	NIG	C D F
4.775	0415	Trans World Radio	MCO/SWZ	D
4.783	2240	RTM Bamoko	MLI	F
4.800	2120	CNR1 Shijiazhuang	CHN	D
4.800	2300	CPBS 2 Beijing	CHN	F
4.800	0155	All India Radio, Hyderabad	IND	F
4.805	0045	Radio Dif Do Amazonas	B	F
4.815	0235	Radio Difusora Londrina	B	F
4.820	2109	Xizang Lhasa	CHN	C D F
4.835	2135	RTM Bamoko	MLI	D F
4.840	0105	All India Radio, Mumbai	IND	F
4.845	2111	ORTM Nouakchott	MTN	C D F

Scott McMurray in Chippenham sent his first submission. A newly acquired Realistic DX-394 and wire (to be improved) comprise his listening post.

Scott, 20, asks if there are many similarly aged people engaged in the hobby. The truth is, Scott, that most of your peers are, at this moment, down the pub, getting high at some rave somewhere or engaged in some activity I can't possibly describe in any detail here, leaving the genteel art of short wave listening to (mostly) our more senior citizens.

Seriously, I would say that the average age of the s.w.l. fraternity has crept inexorably up over time (what did our last reader survey tell us?) so the likelihood of 'hooking-up' with someone your own age will be diminished. Perhaps if you popped along to your local amateur radio club you may get lucky?

Welcome also to **Pete Hodgkinson**. You don't say where you are, Pete, but maybe somewhere near Gatwick, as per the postmark. Your logs most excellently presented - thanks!

Finally, hello to **Phil Townsend** of London E17 and thanks for your contribution. Phil runs an AOR AR7030 fed by a home-made frame antenna, which certainly seems to work well at long wave. As for a 'biog' from you, Phil, one hundred or so

MHz	UTC	Service	Country	Listener
4.845	0145	Radio Cultura Dndas Tropicais	B	F
4.855	0150	Radio La Hora Cusco	PRU	F
4.860	0015	All India Radio, Delhi	IND	F
4.875	0240	Radio Dif Roraima	B	F
4.885	0040	Radio Dif Acreana	B	F
4.885	0435	Radio Clube Do Para	B	D F
4.890	0430	Radio France Int'l	F/GAB	D F
4.905	2155	Xizang Lhasa	CHN	D F
4.910	1951	ZNBC Radio 1	ZMB	C D F
4.910	0105	All India Radio, Jaipur	IND	F
4.915	2000	GBC 1 Accra	GHA	C D F
4.915	0035	Radio Anhanguera	B	F
4.915	0035	Radio Difusora, Macapa	B	F
4.920	2155	Xizang Lhasa	CHN	D F
4.920	0115	All India Radio, Chennai	IND	F
4.925	2255	RRI Jambi	INS	F
4.930	2140	Turkmen Radio	TKM	D
4.930	2140	All India Radio, Shimla	IND	D
4.935	0205	Radio Capabiva	B	F
4.950	2002	Voice of America	USA/STP	C F
4.950	0130	All India Radio, Srinigar	IND	F
4.955	0025	Radio Cultural Amatua	PRU	F
4.960	0435	Voice of America	USA/STP	D
4.965	2115	Christian Voice Radio	ZMB	F
4.975	1955	Radio Uganda, Kampala	UGA	F
4.985	0445	Radio Brasil Central	B	D F
5.005	0020	Radio Nepal	NPL	F
5.010	0100	All India Radio, Thiru'puram	IND	F
5.015	2105	All India Radio, Thiru'puram	IND	D
5.025	2145	Radio Uganda, Kampala	UGA	D
5.025	0430	Radio Rebelde	CUB	D F
5.030	2006	Radio Burkina	BFA	C F
5.030	0430	University Network	USA	D
5.040	2135	All India Radio, Jaipur	IND	D
5.050	0430	WWRB, Manchester	USA	D F
5.070	0445	WVCR, Nashville	USA	D F
5.085	0435	WWRB, Manchester	USA	D F
5.105	0244	WBCC, Maine	USA	F
5.240	2130	Xizang Lhasa	CHN	D

words in any style, any format, would be most welcome.

Bernard Curtis (Stalbridge) encountered strange conditions on the afternoon of 16 July. At around 1500, virtually all short wave signals disappeared except for some ground wave from Rampisham on 15.565MHz. Even the powerful 5.955MHz out of Holland vanished. All this was almost certainly owing to a Sudden Ionospheric Disturbance (SID), when a solar flare on the sun causes the D and E layers to become highly absorptive. This results in a total blackout of all signals, otherwise usually heard via skywave, from the top end of medium wave through the lower short wave bands.

These fadeouts last for a few minutes to a few hours, with affected signals fading back in over time. Most impressive.

Bernard reminds us that the Irish RTE transmitter, usually on 567kHz, was switched off for four months (on 19 July) for essential maintenance work. Your chance to see what you hear in its absence, then.

Something else to listen for is a new outlet for Radio Orient, a Beirut-based Arabic-language station, now broadcasting on 1350kHz with 300kW out of Nice, France (also 1602kHz with 1kW from Nimes). The main transmission is well heard here in the UK.

Thomas Williams logged a mystery station - 11.520MHz at 2045. The station played continuous oriental music until it closed. Heard once only. Any ideas?

Good news from Vic Prier, who, after

Medium Wave Table

kHz	Service	Location	Country	kW	Listener
531	RTA 1	Ain-Ei-Beida	ALG	600/300	C*
531	RNE 5	Many	E	10-25	C*
531	Swiss Radio (German)	Basel	SUI	600	C*
540	Radio Twee	Wavre	BEL	150	B C E
549	RTA 1	Les Trembles	ALG	600/300	C*
549	Deutschlandfunk (DLF)	Nordkirchen	D	100	B
549	Deutschlandfunk (DLF)	Thurnau	D	100	E*
549	UCB Europe	Dundalk	IRL	70	C
567	RTE Radio 1	Tullamore	IRL	500	B
567	RNE 5	Murcia	E	50	C*
576	Sudwestrundfunk (SWR)	Muhlacker	D	100	C* E*
576	RNE 5	Barcelona	E	100	C*
585	RNE 1	Madrid	E	600	C* E*
585	FIP	Paris	F	8	C*
594	HR Skyline	Frankfurt	D	250	C* E*
594	RTM A	Dujda	MRC	100	C*
603	France Info	Lyon	F	300	C* E*
612	RNE 1	Victoria	E	10	C*
621	RTBF 1	Wavre	BEL	300	B C E
639	RNE 1	Many	E	10-300	C*
639	Czech Radio 2	Prague	TCH	1500	C* E*
648	BBC World Service	Orfordness	G	500	A B C E
657	RNE 5	Madrid	E	50	E*
657	BBC Radio Wales	Wrexham	G	2	C* E*
675	Arrow Classic Rock	Lopik	HDL	120	A B C E
684	RNE 1	Seville	E	600	C* E*
693	BBC Radio 5 Live	Many	G	1-150	A B E
711	Radio Bleu	Rennes	F	300	B C E*
720	BBC Radio 4	London	G	0.75	A C E
729	RNE 1	Many	E	10-100	E*
729	RTE Radio 1	Cork	IRL	10	C*
738	RNE 1	Barcelona	E	500	C* E*
747	Radio 747	Flevoiland	HDL	400	A B C E
756	Deutschlandfunk (DLF)	Braunschweig	D	200	C* E*
756	Radio Euskadi	Bilbao	E	25	C*
765	Dption Musique	Sottens	SUI	600	C*
783	MDR Info	Leipzig	D	100	C* E*
792	France Info	Limoges	F	300	A C* E*
801	RNE 1	Many	E	10-20	C*
810	Radio Scotland	Westerglen	G	100	C* D* E*
810	Radio Madrid	Madrid	E	50	C* D*
819	ERTU1	Batra	EGY	1000	C*
819	Sud Radio	Toulouse	F	20	C*
819	Radio Euskadi	San Sebastian	E	10	C*
837	France Info	Nancy	F	200	A C
855	RNE 1	Murcia	E	300	C* E*
864	La City Radio	Paris	F	300	A B C E*
873	American Forces Network	Frankfurt	D	150	A C* E*
873	SER	Zaragoza	E	25	E*
882	BBC Radio Wales	Washford	G	100	B D E
891	RTA 1	Algiers	ALG	600/300	C*
900	RAI Uno	Milan	I	600	C* E*
909	BBC Radio 5 Live	Many	G	0.25-200	A E
918	Radio Slovenia	Domzale	SVN	600/100	C* E*
927	Radio Een/927 Live	Wolvertem	BEL	300	A B C* E
945	France Bleu	Toulouse	F	300	A C E*
954	CRo2	Brno	CZE	200	C* E*
954	Dnda Cera Radio	Madrid	E	20	C*
963	YLE Radio	Pori	FIN	600	C*
972	Nord Deutscher Rundfunk (NDR)	Hamburg	D	100	C* E*
981	RTA 2	Algiers	ALG	600/300	C*
990	Deutschlandfunk (DLF)	Berlin	D	100	C* E*
990	Radio Bilbao	Bilbao	E	10	C*
999	CDPE	Madrid	E	50	C* E*

kHz	Service	Location	Country	kW	Listener
1008	Radio 10 Gold	Flevoiland	HDL	400	A B C
1017	Sudwestrundfunk (SWR)	Wolfsheim	D	100	C
1044	MDR Info	Dresden	D	20	C*
1044	Radio San Sebastian	San Sebastian	E	10	C* E*
1053	Talksport	Droitwich	G	500	A E
1062	Denmark Radio P3	Kalunborg	DNK	250	C
1071	Euskadi Irratia	Bilbao	E	50	C* E*
1071	Talksport	Clipstone	G	1	E
1080	SER	Many	E	5-10	E*
1089	Talksport	Brookmans Park	G	400	A E
1098	RNE5	Almaria	E	10-25	C*
1098	Radio Slovensko	Nitra	SVK	50	E*
1107	Talksport	Lydd	G	0.5-2	A E
1107	American Forces Network	Bavaria	D	10	A C*
1116	Radio Pontevedra	Pontevedra	E	5	E*
1125	Croatian Radio HR1	Deanovic	HRV	100	C*
1125	Radio 21	Houdeng	BEL	10	C D
1125	BBC Radio Wales	Llandrindod Wells	G	1	C D
1134	Croatian Radio HR1	Zadar	HRV	600	C* E*
1143	American Forces Network	Many	D	0.3-10	C*
1179	Swedish Radio 1	Soivesborg	S	600/300	C*
1179	SER	Valencia	E	50	C*
1188	VDA/RFE	Marcali	USA/HNG	500	E*
1188	Radio Twee	Kuurne	BEL	5	C*
1197	VDA/RFE	Munich	USA/D	300/150	C* E*
1197	Virgin Radio	Many	G	0.2-2	A B E
1206	France Info	Bordeaux	F	300	A C* E*
1215	Virgin Radio	Many	G	0.32-200	E
1224	Radio Horizont	Vidin	BUL	500	C*
1233	Virgin Radio	Many	G	0.1-0.5	E
1242	France Info	Marseille	F	150	C*
1251	Radio 747	Hulsberg	HDL	10	C*
1269	Deutschlandfunk (DLF)	Neumunster	D	300	A C*
1278	France Bleu	Strasbourg	F	300	C* E*
1287	Radio Leida	Leida	E	10	E*
1296	BBC World Service	Drifordness	G	500	A
1314	NRK Europakanalen	Kvitsoy	NDR	1200	A C* E
1323	Voice of Russia	Wachenbrunn	RUS/D	800/150	E*
1341	BBC Radio Ulster	Lisnagavey	G	100	C* E*
1359	RNE 3	Madrid	E	600	C* E*
1368	Manx Radio	Douglas, IDM	G	20	C*
1377	France Info	Lille	F	300	A B C* E*
1395	Radio 10 FM	Trintelhaven	HDL	120	B C* E*
1404	France Info	Brest	F	20	C* E*
1413	RNE 5	Many	E	5-10	E*
1422	Deutschlandfunk (DLF)	Heusweiler	D	1200/600	C* E*
1440	China Radio International/RTL	Marnach	CHN/LUX	1200/300	A C*
1449	RAI Due	Squinzano	I	50	C*
1467	TransWorld Radio	Romoules	F	1000	D* E*
1476	Radio 1476	Vienna	AUT	60	C* E*
1485	SER	Many	E	2-5	E*
1484	France Info	Clermont-Ferrand	F	20	C E
1512	Radio Nederland	Wolvertem	BEL/HDL	300/25	A
1512	Radio Een/Vlaanderen	Wolvertem	BEL	300/25	E*
1521	BBC Slovak	Kosice	G/SVK	?	E*
1530	Vatican Radio	Vatican City	CVA	150/450	C* E*
1530	Voice of America	Sao Tome	USA/STP	600	F*
1539	Evangeliums Rundfunk	Mainflingen	D	700/120	C* E*
1557	France Info	Nice	F	300	C*
1575	RAI Uno	Genova	I	50	C*
1575	SER	Many	E	5	E*
1593	Voice of America	Kuwait	USA/KWT	150	C*
1602	Radio Vitoria	Vitoria	E	25	C* E*

* = dark

Listeners:-
 A R Frost, Felixstowe
 B Phil Townsend, London
 C Simon Hockenhull, Bristol
 D Sheila Hughes, Morden
 E Fred Wilmshurst, Northampton
 F Francis Byrne, Co. Dublin

reading 'LM&S', swapped his computer's conventional c.r.t. screen for an l.c.d. design. Vic reports a 90% reduction in computer-related interference. Success! Elsewhere, Vic has gone to great lengths to reduce all manner of sources of interference, from

careful selection, siting, orientation and feeding of his antennas, to filtered mains and

Listeners:-
 A R Frost, Felixstowe
 B Phil Townsend, London
 C Simon Hockenhull, Bristol
 D Sheila Hughes, Morden

Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	A B C
603	Capital Gold	Littlebourne	0.1	A B C
630	BBC 3CR	Luton	0.2	B C D
666	Classic Gold	Exeter	0.34	C
729	BBC Essex	Manningtree	0.2	A B
738	BBC Hereford & Worcester	Worcester	0.037	C
756	Magic Maldwyn	Newtown	0.63	C
765	BBC Essex	Chelmsford	0.5	A B C
774	BBC Radio Kent	Littlebourne	0.7	A B
792	Classic Gold	Bedford	0.275	B
801	BBC Radio Devon	Barnstaple	2	C
828	Classic Gold	Bournemouth	0.27	C
828	Classic Gold	Luton	0.2	B C
828	BBC Asian Network	Wolverhampton	0.2	C
837	BBC Asian Network	Leicester	0.5	B C
855	BBC Radio Norfolk	Norwich	1.5	A B
855	Sunshine 855	Ludlow	0.15	C
873	BBC Radio Norfolk	West Lynn	0.3	B
945	Capital Gold	Bexhill	0.7	A B
954	Classic Gold	Torbay	0.4	C
954	Classic Gold	Hereford	0.16	C
963	Asian Club	Hackney	0.95	B
963	Asian Club	Haslingden	0.2	B C
972	Asian Club	Southall	1	C
990	BBC Radio Devon	Exeter	1	C
990	Classic Gold	Wolverhampton	0.09	C
999	BBC Radio Solent	Fareham	1	B C D
999	Valleys Radio	Ebbw Vale	0.3	C
1017	Classic Gold	Shropshire	0.63	C
1026	BBC Radio Jersey	Trinity	1	C
1026	BBC Radio Cambridgeshire	Cambridge	0.5	A B C
1035	Easy Radio London	Crystal Palace	1	B C
1116	Valleys Radio	Ebbw Vale	1	C

kHz	Service	Svc area/TX site	kW	SWL
1116	BBC Radio Guernsey	Rohais	0.5	C
1152	Capital Gold	Birmingham	3	C
1152	Classic Gold Amber	Norwich	0.83	C*
1161	BBC Southern Counties Radio	Bexhill	1	D
1161	BBC 3CR	Bedford	0.1	B
1170	Classic Gold Amber	Ipswich	?	A B C*
1242	Capital Gold	Maidstone	?	B
1251	Classic Gold Amber	Bury St Edmunds	0.76	A B C*
1296	Radio XL	Birmingham	10	C
1305	Premier	London	0.5	D
1323	Capital Gold	Brighton	0.5	C*
1332	Premier	London	?	D
1359	Classic Gold	Chelmsford	0.28	B D
1368	BBC Southern Counties Radio	Duxhurst	0.5	B
1413	Premier	London	0.5	D
1431	Classic Gold Breeze	Southend	0.35	A B C* D
1431	Classic Gold	Reading	0.14	C
1449	URB Bath University RSL	Bath	0.001	C
1458	Sunrise	London	125	A B C
1458	BBC Asian Network	Birmingham	5	C
1485	BBC Southern Counties Radio	Brighton	1	B
1485	Classic Gold	Newbury	1	C*
1503	BBC Radio Stoke	Staffordshire	1	C
1503	Sound Radio	London	?	B
1521	Classic Gold	Reigate	0.64	B
1521	Forest of Dean Community Radio	Coleford	0.1	C
1530	Capital Gold	Worcester	0.52	C
1530	BBC Radio Essex	Southend	0.15	B D
1566	County Sound	Guildford	0.8	B C*
1566	BBC Somerset Sound	Taunton	0.6	C
1584	BBC Hereford & Worcester	Woofterton	0.3	C
1584	Turkish Radio	London	0.2	B D
1602	BBC Radio Kent	Rustall	0.25	B C*
1602	Desi Radio	Southall	0.07	B

* = dark

an isolated d.c. supply. Living in a block of flats, Vic's battle against man-made noise has been a protracted one but I'm sure all that effort is paying off.

Club News

This month's look at radio clubs embraces the International Short Wave League (ISWL). The League was formed in 1946 and is unusual in as much as it represents members from both the Amateur Radio and Short Wave Listener communities.

The monthly journal, *Monitor*, is issued free to members and sections include Amateur Bands Review; Broadcast Bands and Logs; Broadcast Matters; news from around the world; Contests and Awards; DX news; forthcoming rallies and Transmitting Topics

and more. Finally, there's the Soapbox and, free of charge, Members Ads.

Club contests are organised throughout the year with certificates awarded to the winners of each event, a trophy awarded to the overall leader.

The ISWL operates its own QSL Bureau, recognised throughout the world, with both incoming and outgoing cards cleared weekly.

Although a surcharge is levied for its use, the bureau is unique, in that members are not required to lodge envelopes or stamps with their manager.

For licensed members there are regular nets (mostly voice) on the amateur bands from 160 to 2 metres.

UK membership costs £18 a year and you can get further details from **Bill Mackie, 23**

College Park, Horncastle, Lincolnshire LN9 6RE. Or visit their website at www.iswl.org

The surrounding listings refer to stations logged during July. As always, grateful thanks to everyone who has taken the time and trouble to contribute. Please keep them coming.

Regarding your logs for October: much of what you would normally submit will have changed time and/or frequency by the time your entries get into print due to the time change at the end of the month. With this in mind, please indicate on your submission, which stations were heard after the change.

That'll do until next time. Have a good month.

Short Wave Table

MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL
0000-0100							5.985	0705	Radio Vlaanderen Int.	BEL	Eng	44444	PP
5.890	0032	Radio Thailand	THA	Eng	55454	EM	5.985	0720	Radio Vlaanderen Int.	BEL	Eng	55243	EM
5.975	0054	BBC World Service	G/ATG	Eng	34433	SH	6.030	0759	Sudwestrundfunk	D	Ger	34343	RI
6.140	0040	China Radio Int.	CHN	Eng	33433	SM	7.355	0730	WYFR, Okeechobee, FL	USA	Eng	45554	EM
7.535	0000	WSHB, Boston MA	USA	Eng	43344	BC	7.580	0735	WEWN, Birmingham, AL	USA	Eng	45344	EM
7.580	0038	WHRI, Noblesville, IN	USA	Eng	43344	SM	9.440	0725	Radio Slovakia Int.	SVK	Eng	55354	EM
9.580	0010	Int. R of Serbia & Montenegro	YUG	Eng	44544	SH	9.545	0745	Deutsche Welle	D	Ger	55455	VP
11.690	0050	Radio Vilnius	LTU	Eng	45254	EM	9.575	0750	RTM	MRC	Fre	44434	VP
11.700	0034	Radio Bulgaria	BUL	Eng	54545	SM	9.815	0710	RDP Portugal	POR	Por	44444	RI
15.385	0000	Radio Exterior de Espana	E	Eng	43333	BC	9.880	0700	Radio Prague	CZE	Eng	44444	ShH
0100-0200							9.930	0729	WYFR, Okeechobee, FL	USA	Eng	24212	EM
5.930	0100	Radio Slovakia Int.	SVK	Eng	45534	SH	11.600	0721	Radio Prague	CZE	Eng	55455	EM
6.000	0102	Radio Havana Cuba	CUB	Eng	34433	SH	11.730	0710	WHRA, Greenbush, ME	USA	Eng	35555	FW
6.200	0104	Radio Prague	CZE	Eng	45544	SH	11.750	0734	WHRA, Greenbush, ME	USA	Eng	45222	EM
9.440	0105	Radio Slovakia Int.	SVK	Eng	34433	SH	11.765	0735	BBC World Service	G/ASC	Eng	42232	VP
9.650	0150	Vatican Radio	CVA	Eng	35533	SH	11.810	0701	Radio Jordan	JOR	Ara	34322	RI
0200-0300							11.830	0704	Radio Romania Int.	ROU	Eng	44322	RI
7.345	0218	Radio Prague	SVK	Eng	55545	SM	11.850	0710	RDP Portugal	POR	Por	44434	RI
7.580	0223	WHRA, Greenbush, ME	USA	Eng	53344	SM	11.865	0730	Trans World Radio	MCO	Eng	34433	VP
0300-0400							11.935	0720	Radio Nederland	HOL	Dut	24332	RI
5.975	0336	BBC World Service	G	Eng	44222	PH	11.955	0727	Voice of Turkey	TUR	Tur	24432	RI
6.000	0332	Radio Havana Cuba	CUB	Eng	55333	PH	13.720	0740	Radio Exterior de Espana	E	Spa	55555	VP
6.140	0325	Voice of Turkey	TUR	Eng	44444	PP	13.780	0745	Deutsche Welle	D/RRW	Ger	34423	VP
7.125	0342	Voice of Russia	RUS	Rus	55544	PH	15.150	0700	Radio Romania Int.	ROU	Eng	55545	VP
7.305	0330	Vatican Radio	CVA	Spa	55555	PP	15.350	0727	Voice of Turkey	TUR	Tur	34322	RI
7.490	0335	WJIE, Louisville, KY	USA	Eng	34233	PP	15.350	0730	Voice of Turkey	TUR	Tur	44434	VP
7.535	0339	herald r	USA	Eng	44344	PP	15.415	0729	Radio Australia	AUS	Eng	24122	EM
7.580	0345	WEWN, Birmingham, AL	USA	Eng	55555	PP	15.460	0725	Radio Slovakia Int.	SVK	Eng	45243	EM
9.665	0310	Voice of Russia	RUS	Eng	55555	SM	15.565	0730	BBC World Service	G	Eng	34543	VP
9.695	0328	Voice of America	USA	Eng	55555	PH	17.490	0745	China Radio Int.	CHN	Eng	45534	VP
9.785	0305	YLE Radio Finland	FIN	Fin	55455	SM	17.535	0745	Kol Israel	ISR	Heb	44444	VP
9.885	0300	Voice of America	USA	Eng	32122	SM	17.630	0755	Africa No. 1	GAB	Fre	25433	VP
0400-0500							17.750	0725	Radio Australia	AUS	Eng	35312	EM
5.890	0410	Vatican Radio	CVA	Ita	43444	VP	17.770	0730	Radio Exterior de Espana	E	Spa	45534	VP
6.030	0450	Sudwestrundfunk	D	Ger	33223	PP	21.495	0715	China Radio Int.	CHN	Eng	23222	ShH
6.085	0450	germany	D	Ger	44344	PP	21.770	0720	Swiss Radio Int.	SUI	Eng	55534	VP
6.100	0455	Deutsche Welle	D	Ger	55555	PP	0800-0900						
6.155	0455	ORF Radio Austria	AUT	Ger	55445	PP	6.085	0802	Bayerischer Rundfunk	D	Ger	24333	RI
7.275	0410	Tunisian Radio	TUN	Ara	55444	PH	6.140	0804	Deutsche Welle	D	Eng	34343	RI
9.575	0400	Voice of America	USA	Eng	43323	VP	6.155	0806	ORF Radio Austria	AUT	Ger	44333	RI
9.665	0430	Voice of Russia	RUS	Eng	43333	SH	6.190	0811	Deutschlandfunk	D	Ger	34332	RI
15.170	0414	Saudi Quran channel	ARS	Ara	45333	PH	7.190	0815	Deutsche Welle	D	Ger	44434	RI
15.505	0427	Radio Kuwait	KWT	Ara	55444	PH	7.265	0818	Sudwestrundfunk	D	Ger	44434	RI
0500-0600							7.345	0820	Radio Prague	CZE	Eng	44434	RI
5.825	0557	WEWN, Birmingham, AL	USA	Eng	45245	EM	9.370	0810	WTJC	USA	Eng	35444	FW
5.890	0555	Vatican Radio	CVA	Lat	45444	FW	9.545	0826	Deutsche Welle	D	Ger	54444	RI
5.975	0550	Radio Japan	J	Eng	35343	FW	9.575	0827	Medi 1	MRC	Fre	44433	RI
6.110	0535	Radio Japan	J	Eng	34232	EM	9.710	0852	Radio Vilnius	LTU	Eng	55555	EM
6.855	0555	WYFR, Okeechobee, FL	USA	Eng	45543	EM	9.870	0810	Trans World Radio	MCO	Eng	35444	FW
7.230	0551	Radio Japan	J	Eng	44255	EM	11.730	0845	WHRA, Greenbush, ME	USA	Eng	55444	BC
7.250	0505	Vatican Radio	CVA	Eng	55545	PP	13.840	0826	IRRS	I	Eng	45243	EM
7.315	0538	WHRI, Noblesville, IN	USA	Eng	34132	EM	15.270	0810	Radio Armenia	ARM	Eng	42332	EM
7.325	0550	BBC World Service	G	Ara	55545	BC	15.295	0821	Voice of Malaysia	MLA	Eng	35343	FW
7.415	0556	WBCQ, Monticello, ME	USA	Eng	25121	EM	17.835	0802	Radio Pakistan	PAK	Eng	22222	EM
9.355	0500	WYFR, Okeechobee, FL	USA	Eng	44444	SHH	21.605	0845	UAE Radio	UAE	Ara	45334	BC
9.630	0550	Deutsche Welle	D	Ger	33233	PP	21.790	0815	Voice of Russia	RUS	Eng	45443	BC
9.660	0524	Vatican Radio	CVA	Eng	45445	EM	0900-1000						
9.770	0525	Channel Africa	AFS	Eng	44252	EM	11.730	0934	WHRA, Greenbush, ME	USA	Eng	44444	TW
11.625	0525	Vatican Radio	CVA	Eng	44543	EM	11.740	0936	Vatican Radio	CVA	Eng	44444	TW
13.765	0525	Vatican Radio	CVA	Eng	55454	EM	11.880	0910	Radio Australia	AUS	Eng	25343	FW
15.120	0557	Voice of Nigeria	NIG	Eng	33333	PP	12.020	0924	RDP Portugal	POR	Por	44434	TW
17.535	0558	Kol Israel	ISR	Heb	55555	PP	13.640	0942	RDP Portugal	POR	Por	44333	TW
21.795	0539	Tadio Thailand	THA	Eng	24122	EM	13.685	0918	Voice Int.	AUS	Eng	22222	TW
0600-0700							13.700	0928	Radio Nederland	HOL	Dut	33333	TW
6.035	0600	Voice of America	USA	Eng	44333	ShH	13.720	0920	Radio Exterior de Espana	E	Spa	44444	TW
6.110	0621	The Overcomer Ministry	USA	Eng	55444	PH	13.730	0938	ORF Radio Austria	AUT	Ger	44444	TW
6.180	0629	Voice of America	USA	Eng	25343	FW	13.740	0922	Voice of Vietnam	VTN	?	22222	TW
7.580	0602	WEWN, Birmingham, AL	USA	Eng	44333	PH	13.780	0930	Deutsche Welle	D	Ger	44444	TW
9.645	0642	Vatican Radio	CVA	Eng	45555	FW	13.830	0937	Croatian Radio	HRV	?	34333	TW
9.820	0600	Radio Havana Cuba	CUB	Eng	44444	ShH	13.840	0948	IRRS	I	Eng	44333	TW
9.870	0648	Trans World Radio	MCO	Eng	55555	EM	15.120	0900	Voice of Nigeria	NIG	Eng	43434	GG
11.580	0642	WYFR, Okeechobee, FL	USA	Eng	45243	EM	15.595	0935	Vatican Radio	CVA	Eng	55555	TW
11.600	0645	Radio Bulgaria	BUL	Eng	44243	EM	15.630	0930	Voice of Greece	GRC	Eng	45344	EM
11.665	0603	Radio France Int.	F/ASC	Eng	45343	FW	15.760	0955	Kol Israel	ISR	Heb	44434	TW
11.740	0657	BBC World Service	G/CYP	Ara	44444	RI	17.490	0940	China Radio Int.	CHN	Eng	44444	TW
11.755	0659	YLE Radio Finland	FIN	Fin	44422	RI	17.510	0938	All India Radio	IND	Eng	33333	TW
11.865	0647	Trans World Radio	MCO	Eng	55555	EM	17.515	0932	Vatican Radio	CVA	Eng	44444	TW
15.215	0627	Channel Africa	AFS	Eng	44132	PP	17.535	0915	Kol Israel	ISR	Heb	34434	GG
15.485	0600	Radio Exterior de Espana	E	Spa	44444	PP	17.690	0905	China Radio Int.	CHN	Eng	31232	EM
15.570	0633	Vatican Radio	CVA	Eng	45555	FW	19.010	0930	Voice of America	USA	?	22222	TW
15.600	0646	Radio Bulgaria	BUL	Eng	55554	EM	21.465	0957	Radio Pakistan	PAK	Eng	32222	TW
17.490	0611	China Radio Int.	CHN	Eng	45544	FW	21.470	0915	BBC World Service	G/ASC	Eng	24322	VP
21.790	0620	Voice of Russia	RUS	Eng	25444	FW	21.540	0959	Radio Exterior de Espana	E	Spa	44444	VP
0700-0800							21.605	0945	UAE Radio	UAE	Ara	43423	VP
5.955	0700	Radio Nederland	HOL	Dut	55455	PP	21.745	0955	Radio Prague	CZE	Ger	44444	PH
							21.790	0909	UN Mission in Ethiopia & Eritrea/USA/UAE	Eng	Eng	24122	EM</

MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL
9.670	1054	RAI Int.	I	Ita	55434	PH	1500-1600						
9.785	1008	Radio Nederland	HOL	Eng	24152	EM	9.715	1500	Radio Budapest	HNG	Eng	54222	EM
9.850	1012	WHRI, Noblesville, IN	USA	Eng	55245	EM	9.910	1540	All India Radio	IND	Eng	33232	BC
11.615	1040	Radio Prague	CZE	Eng	55544	FW	11.660	1515	Radio Australia	AUS	Eng	43333	BC
11.755	1015	YLE Radio Finland	FIN	Fin	33333	TW	11.710	1503	Voice of Korea	KRE	Eng	22212	EM
12.020	1000	RDP Portugal	POR	Por	44444	TW	15.225	1530	Adventist World Radio	USA	Eng	22222	ShH
12.065	1007	Radio Nederland	HOL	Eng	14121	EM	15.745	1505	SLBC, Sri Lanka	CLN	Eng	33323	BC
12.085	1003	Radio Ulan Bator	MNG	Eng	21111	TW	15.825	1505	WWCR, Nashville, TN	USA	Eng	44444	ShH
13.685	1008	Voice Int.	AUS	Eng	21111	TW	17.490	1505	China Radio Int.	CHN	Eng	54444	ShH
13.700	1010	Radio Nederland	HOL	Dut	33333	TW	21.830	1530	RDP Portugal	POR	Por	45444	SH
13.720	1020	Radio Exterior de Espana	E	Spa	44344	PP	1600-1700						
13.730	1006	ORF Radio Austria	AUT	Ger	44444	TW	5.930	1605	Radio Prague	CZE	Eng	34333	EM
13.780	1008	Deutsche Welle	D	Ger	44444	TW	9.420	1615	Voice of Greece	GRC	Eng	55455	GeG
13.820	1006	Radio Nederland	HOL	Eng	24122	EM	9.700	1600	Voice of America	USA	Eng	55444	GeG
13.830	1016	Croatian Radio	HRV	Eng	44444	TW	9.730	1605	Voice of Vietnam	VTN	Eng	54255	EM
13.840	1008	IRRS	I	Eng	42333	TW	11.570	1600	Radio Pakistan	PAK	Eng	24222	EM
15.600	1050		IRN	Eng	22112	SHH	11.660	1608	Radio Australia	AUS	Eng	24222	EM
17.510	1025	All India Radio	IND	Eng	44333	BC	11.940	1620	China Radio Int.	CHN	Eng	44444	PP
17.620	1052	Radio France Int.	F	Fre	45444	SH	11.980	1605	China Radio Int.	CHN	Eng	44444	PP
18.960	1048	Radio Sweden	S	Swe?	55545	SH	12.010	1610	Voice of Russia	RUS	Fre	34343	PP
21.570	1044	Radio Exterior de Espana	E	Spa	45544	SH	13.600	1615	Voice of America	USA	Eng	33333	PP
21.610	1042	Radio Exterior de Espana	E	Spa	45544	SH	13.640	1635	China Radio Int.	CHN	Eng	53444	GeG
21.680	1002	BBC World Service	G	Eng	44444	TW	13.740	1658	Voice of Vietnam	VTN	Eng	45444	SM
21.705	1031	Saudi Radio	ARS	Ara	34233	PP	15.605	1606	Radio France Int.	F	Eng	45554	EM
21.770	1015	Swiss Radio Int.	SUI	Fre	25122	PH	15.630	1613	Voice of Greece	GRC	Eng	45434	GeG
21.780	1020	Deutsche Welle	D	Fre	25122	PH	17.485	1602	Radio Prague	CZE	Eng	34332	EM
21.800	1025	YLE Radio Finland	FIN	Fin	33333	PH	17.560	1648	Saudi Quran channel	ARS	Ara	55433	PH
21.810	1002	Radio Sweden	S	Swe	33333	TW	17.620	1655	Radio France Int.	F	Fre	24212	PH
21.830	1000	RDP Portugal	POR	Por	44444	TW	1700-1800						
21.830	1004	RDP Portugal	POR	Por	44444	TW	5.930	1714	Radio Prague	CZE	Eng	32233	SM
21.850	1005	Vatican Radio	CVA	?	34333	TW	6.065	1756	Radio Sweden	S	Eng	45534	SH
6.175	1105	Radio France Int.	F	Fre	55445	BC	7.265	1727	Radio Polonia	POL	Eng	32532	EM
9.880	1100	Radio Prague	CZE	Ger	44333	PH	7.285	1750	Radio Polonia	POL	Eng	33433	SH
13.635	1100	Voice Int.	AUS	Eng	44333	SHH	9.475	1758	Radio Australia	AUS	Eng	43333	GeG
13.780	1100	Deutsche Welle	D	Ger	44444	GG	9.480	1719	Voice of Russia	RUS	Eng	33433	SH
15.610	1150	Voice of Africa	LBY	Eng	55454	EM	9.645	1717	Vatican Radio	CVA	Eng	43233	SM
15.700	1141	Radio Bulgaria	BUL	Eng	45344	EM	9.700	1727	Voice of America	USA	Eng	33233	SM
17.640	1100	BBC World Service	G	Eng	44444	GG	9.725	1705	Voice of Vietnam	VTN	Eng	54555	EM
17.695	1149	Voice of Africa	LBY	Eng	35233	EM	9.855	1714	Radio Cairo	EGY	Eng	24212	EM
21.675	1143	Voice of Africa	LBY	Eng	24122	EM	9.890	1726	Voice of Russia	RUS	Eng	55555	EM
21.695	1147	Voice of Africa	LBY	Eng	44132	EM	11.500	1740	Radio Bulgaria	BUL	Eng	54444	ShH
21.700	1145	Radio Exterior de Espana	E	Spa	33233	PP	11.510	1725	Voice of Russia	RUS	Eng	45444	EM
21.745	1140	Radio Prague	CZE	Cze?	34233	PP	11.640	1730	Radio Vlaanderen Int.	BEL	Eng	44444	EM
1200-1300							11.900	1717	China Radio Int.	CHN	Eng	34232	EM
5.800	1221	Radio Bulgaria	BUL	Eng	45434	SH	12.050	1710	Radio Cairo	EGY	Ara	55545	VP
9.525	1226	Radio Polonia	POL	Eng	45343	EM	15.235	1718	Bible Voice Network	G	Eng	23222	EM
9.970	1211	RTBF	BEL	Fre	45223	PH	15.255	1720	Voice of America	USA	Eng	45233	EM
11.760	1214	BBC World Service	G	Eng	22222	EM	15.265	1716	Channel Africa	AFS	Eng	45554	EM
11.820	1225	Radio Polonia	POL	Eng	34443	EM	15.355	1723	Radio Japan	J	Eng	44343	EM
11.880	1210	Radio Australia	AUS	Eng	22222	EM	15.555	1735	RDP Portugal	POR	Por	45334	VP
12.095	1220	BBC World Service	G	Eng	51322	EM	15.570	1745	Vatican Radio	CVA	Eng	44444	SHH
13.580	1235	Radio Sweden	S	Eng	45343	EM	17.485	1715	Radio Prague	CZE	Eng	25422	SH
13.685	1250	Voice Int.	AUS	Eng	44334	BC	17.570	1758	Radio Vlaanderen Int.	BEL	Fre	44444	PP
15.240	1234	Radio Sweden	S	Eng	53453	EM	17.605	1717	Radio France Int.	F	Eng	25533	SH
15.400	1203	YLE Radio Finland	FIN	Fin	33333	TW	17.650	1700	WHRA, Greenbush, ME	USA	Eng	35222	PH
15.485	1219	BBC World Service	G	Eng	45243	EM	17.680	1710	RDP Portugal	POR	Por	44324	PH
15.535	1238	Voice of Turkey	TUR	Eng	24122	EM	17.715	1715	Radio Exterior de Espana	E	Spa	45323	PP
15.565	1217	BBC World Service	G	Eng	45343	EM	17.745	1758	Deutsche Welle	D	Fre	44344	PH
15.735	1233	Radio Sweden	S	Eng	55554	EM	17.760	1720	WYFR, Okeechobee, FL	USA	Spa	45434	PH
15.825	1229	WWCR, Nashville, TN	USA	Eng	44235	EM	17.830	1733	BBC World Service	G/ASC	Fre	44423	PH
17.640	1222	BBC World Service	G	Eng	24122	EM	18.930	1725	WYFR, Okeechobee, FL	USA	?	44323	BC
17.715	1243	ORF Radio Austria	AUT	Eng	44122	EM	21.680	1728	WYFR, Okeechobee, FL	USA	Eng	15221	EM
17.775	1215	Radio Tashkent	UZB	Eng	23432	EM	1800-1900						
17.830	1223	BBC World Service	G	Eng	34122	EM	5.890	1805	Vatican Radio	CVA	?	34233	PP
17.835	1200	Radio Pakistan	PAK	Eng	55243	EM	5.920	1846	Radio Slovakia Int.	SVK	Eng	45444	EM
17.895	1251	Saudi Quran channel	ARS	Ara	43333	PH	5.930	1845	Radio Prague	CZE	Fre	54445	BC
19.010	1200	Voice of America	USA	Eng	25222	EM	5.980	1833	ORF Radio Austria	AUT	Ger	45434	SH
19.010	1255	Radio Free Afghanistan?	USA/CLN	Pas?	45433	PH	6.040	1850	Voice of Turkey	TUR	Tur	54322	PH
21.460	1257	Radio Pakistan	PAK	Urd	43333	PH	6.055	1833	Voice of America	USA/GRC	Eng	24422	SH
21.620	1208	Radio France Int.	F	Eng	55344	EM	6.065	1848	Radio Slovakia Int.	SVK	Eng	34433	SH
21.620	1215	Radio France Int.	F	Eng	23323	SHH	6.075	1840	Radio Sweden	S	Eng	43344	SM
1300-1400							6.085	1807	Deutsche Welle	D	Ger	55444	PH
6.110	1339	The Overcomer Ministry	USA/D	Eng	44223	PH	6.105	1834	Ismaning	D	Ger	44444	SH
6.140	1335	Deutsche Welle	D	Eng	55333	PH	6.185	1810	Int. R of Serbia & Montenegro	YUG	Eng	32421	SH
9.325	1303	Voice of Korea	KRE	Eng	25112	EM	7.170	1812	Vatican Radio	CVA	Ita	44444	PP
11.530	1338	Voice of Mesopotamia	MDA	Kur	34333	RI	7.210	1847	China Radio Int.	CHN	Ger	44444	PP
11.615	1352	Trans World Radio	USA	Rus	44333	RI	7.265	1807	Radio Tirana	ALB	Eng	43543	EM
11.645	1313	Voice of Greece	GRC	Gre	24322	RI	7.410	1830	Sudwestrundfunk	D	Ger	44334	PP
11.690	1358	Radio Jordan	JOR	Eng	32333	SM	7.910	1808	All India Radio	IND	Eng	54434	VP
11.830	1320	Radio Romania Int.	ROU	Eng	44434	SH	9.420	1844	BBC World Service	G/CYP	Eng	45544	FW
13.665	1335	Radio Rossia	RUS	Rus	55445	BC	9.445	1810	Voice of Greece	GRC	Gre	53443	PH
15.105	1314	Radio Romania Int.	ROU	Eng	34232	EM	9.460	1846	All India Radio	IND	Eng	43333	BC
15.630	1330	Voice of Greece	GRC	Gre	24331	RI	9.475	1843	Voice of Turkey	TUR	Tur	54323	PH
15.735	1335	Radio Sweden	S	Eng	25422	SH	9.475	1843	Radio Australia	AUS	Eng	23422	SH
17.490	1302	China Radio Int.	CHN	Eng	55444	PH	9.480	1801	Voice of Russia	RUS	Eng	44444	GeG
17.535	1304	Kof Israel	ISR	Heb	45444	PH	9.520	1848	Radio Tirana	ALB	Eng	42222	EM
17.560	1308	Voice of America	USA	Eng	44444	PH	9.530	1839	Radio Canada Int.	CAN/D	Eng	33433	SH
17.560	1350	WHRA, Greenbush, ME	USA	Eng	55445	BC	9.760	1820	Voice of America	USA/GRC	Eng	43333	BC
17.650	1310	China Radio Int.	CHN	Fre	55445	BC	9.785	1830	Voice of Turkey	TUR	Eng	55455	GeG
17.670	1311	Radio Cairo	EGY	Eng	24222	EM	9.890	1853	Voice of Russia	RUS	Eng	43533	SH
17.775	1330	Radio Tashkent	UZB	Eng	44333	SHH	9.950	1815	All India Radio	IND	Eng	44334	PP
21.470	1302	BBC World Service	G	Eng	24212	EM	9.960	1825	Radio Armenia	ARM	Eng	44444	EM
21.505	1303	Saudi Radio	ARS	Ara	45444	PH	11.570	1830	Radio Pakistan	PAK	Urd	53333</	

MHz	UTC	Service	Country	Lang	SINPO	SWL	MHz	UTC	Service	Country	Lang	SINPO	SWL
1900-2000													
5.775	1907	IRRS	I	Eng	54222	EM	15.400	2030	BBC World Service	G/ASC	Eng	54445	BC
5.800	1905	Radio Bulgaria	BUL	Ger	34344	PP	15.455	2022	Voice of Russia	RUS	Eng	44444	TW
5.840	1933	Radio Sweden	S	Rus	44212	PH	15.630	2044	Voice of Greece	GRC	Eng	33333	TW
5.890	1939	Vatican Radio	I	Fre	55333	PH	15.760	2002	Kol Israel	ISR	Heb	22222	TW
5.920	1945	Radio Slovakia Int.	SVK	Fre	55423	PH	17.745	2040	Voice of America	USA/ASC	Eng	44434	SH
5.945	1911	ORF Radio Austria	AUT	Ger	44444	PP	17.810	2042	Radio Nederland	HOL/ATN	Eng	45433	SH
5.970	1935	RAI Int.	I	Eng	25422	EM	17.830	2044	BBC World Service	G/ASC	Eng	45434	SH
6.005	1911	Deutschland Radio, Berlin	D	Ger	33333	PP	21.500	2034	Radio Marti	USA	Spa	44434	RI
6.025	1902	Radio Budapest	HNG	Eng	43433	SH	21.500	2051	Voz Cristiana	CHL	Spa	22222	TW
6.055	1945	Radio Slovakia Int.	SVK	Eng	55544	EM	21.700	2032	Radio Exterior de Espana	E	Spa	34433	RI
7.105	1950	Radio Minsk	BLR	Eng	45444	FW	2100-2200						
7.115	1910	Tadio Thailand	THA	Eng	33423	PP	5.800	2131	Radio Bulgaria	BUL	Eng	55454	EM
7.120	1906	Radio Nederland	HOL	Eng	23522	EM	6.005	2102	Deutschlandfunk	D	Ger	43333	RI
7.150	1905	Tadio Thailand	THA	Eng	45544	FW	6.065	2146	Radio Sweden	S	Eng	44444	FH
7.155	1940	Tadio Thailand	THA	Eng	21222	TW	6.175	2107	Radio France Int.	F	Fre	54434	PH
7.265	1930	Sudwestrundfunk	D	Ger	55534	VP	6.180	2112	Radio Japan	J/G	Eng	42222	PH
7.295	1915	China Radio Int.	CHN	Eng	54434	VP	6.195	2145	BBC World Service	G	Eng	55555	VP
7.410	1908	All India Radio	IND	Eng	45432	SH	6.973	2120	Gatei Zahal	ISR	Heb	44223	PH
7.440	1905	Voice of Russia	RUS	Eng	54445	BC	7.130	2130	Radio Tirana	ALB	Eng	43333	GeG
7.450	1945	ERT 3	GRC	Gre	55545	VP	7.190	2140	China Radio Int.	CHN	Eng	52323	PH
7.475	1945	Voice of Greece	GRC	Gre	55534	VP	7.285	2130	Radio Romania Int.	ROU	Eng	55545	GeG
7.500	1945	Radio Bulgaria	BUL	Ger	54444	VP	7.420	2125	Radio Ukraine Int.	UKR	Eng	45455	EM
9.325	1915	Voice of Korea	KRE	Eng	25332	SH	7.500	2115	Radio Bulgaria	BUL	Eng	45444	SH
9.420	1910	Voice of Greece	GRC	Gre	35333	SH	7.590	2115	AFRTS (u.s.b.)	USA	Eng	55534	VP
9.500	1904	Radio Australia	AUS	Eng	35453	EM	9.280	2110	WYFR, Okeechobee, FL	USA	Man	22322	VP
9.500	1945	Radio Australia	AUS	Eng	44212	PH	9.410	2135	BBC World Service	G	Eng	55555	EM
9.585	1949	China Radio Int.	CHN	Eng	43323	PH	9.440	2110	Deutsche Welle	D	Eng	44444	SH
9.605	1945	RAI Int.	I	Eng	55534	VP	9.445	2142	All India Radio	IND	Eng	44444	EM
9.645	1955	Vatican Radio	CVA	Eng	55555	VP	9.470	2135	All India Radio	IND	Eng	25222	EM
9.670	1925	Voice of America	USA	Eng	35544	FW	9.570	2147	Radio Exterior de Espana	E	Eng	44344	SM
9.785	1913	Voice of Turkey	TUR	Eng	55544	FW	9.600	2108	China Radio Int.	CHN	Eng	55444	FW
9.800	1930	V of Islamic Rep of Iran	IRN	Eng	23222	EM	9.605	2149	China Radio Int.	CHN	Eng	55334	SM
9.840	1900	Voice of Russia	RUS	Eng	44344	GG	9.840	2127	Radio Exterior de Espana	E	Eng	44444	EM
9.895	1957	Radio Nederland	HOL	Eng	35222	EM	9.880	2130	Radio Sweden	S	Eng	55555	VP
9.925	1953	Radio Vlaanderen Int.	BEL	Eng	44344	EM	9.950	2141	All India Radio	IND	Eng	44343	EM
9.950	1925	All India Radio	IND	Eng	54434	VP	9.990	2138	Radio Cairo	EGY	Eng	44344	GeG
9.960	1940	Voice of America	USA	Eng	55445	GeG	11.715	2140	All India Radio	IND	Eng	44252	EM
9.970	1933	RTBF	BEL	Fre	44222	PH	11.825	2109	Deutsche Welle	D	Eng	44444	FH
9.990	1915	Radio Cairo	EGY	Ger	55545	VP	11.855	2154	Radio Japan	J	Eng	45443	EM
11.720	1927	Radio Budapest	HNG	Eng	54434	PH	11.865	2110	Deutsche Welle	D/RRW	Eng	45444	FW
11.755	1910	YLE Radio Finland	FIN	Fin	55555	VP	11.905	2130	Radio Tashkent	UZB	Eng	44344	EM
12.050	1940	Radio Cairo	EGY	Ara	54344	PH	12.160	2100	WWCR, Nashville, TN	USA	Eng	34333	TW
12.070	1942	Voice of Russia	RUS	Eng	33333	TW	13.610	2130	Radio Damascus	SYR	Eng	33333	SH
13.605	1930	All India Radio	IND	Eng	45544	FW	15.130	2130	Adventist World Radio	USA	Eng	43333	SH
13.675	1953	UAE Radio	UAE	Ara	54333	PH	15.375	2140	Radio Cairo	EGY	Eng	44243	EM
13.740	1905	Voice of Vietnam	VTN	Eng	33433	SH	15.445	2120	Voice of America	USA	Eng	45434	GeG
13.760	1900	Voice of Korea	KRE	Eng	32333	GG	17.595	2100	WEWN, Birmingham, AL	USA	Eng	44444	SH
15.120	1915	Voice of Nigeria	NIG	Eng	35322	SH	17.650	2154	WHRA, Greenbush, ME	USA	Eng	22222	TW
15.400	1932	BBC World Service	G	Eng	22222	TW	17.800	2155	Voice of Nigeria	NIG	Eng	45444	GeG
15.460	1913	Kol Israel	ISR	Eng	55444	FW	2200-2300						
15.495	1900	Radio Kuwait	KWT	Ara	55434	VP	5.975	2221	BBC World Service	G	Eng	24122	EM
15.505	1900	Radio Kuwait	KWT	Ara	55555	VP	6.195	2246	BBC World Service	G	Eng	42522	EM
15.630	1918	Voice of Greece	GRC	Gre	44122	PH	7.105	2245	BBC World Service	G	Eng	45252	EM
15.640	1920	Kol Israel	ISR	Eng	54322	PH	7.230	2219	Int. R of Serbia & Mont	YUG	Eng	34232	EM
15.735	1902	Kol Israel	ISR	Eng	33223	TW	7.345	2239	Radio Prague	CZE	Eng	44444	FH
17.670	1910	All India Radio	IND	Eng	25221	SH	7.410	2214	All India Radio	IND	Eng	44545	EM
17.810	1909	Radio Nederland	HOL	Eng	44112	PH	9.415	2254	Radio Prague	CZE	Eng	33443	SH
17.810	1935	Radio Nederland	HOL	Eng	25122	EM	9.720	2221	Deutsche Welle	O	Eng	55554	EM
18.980	1907	WYFR, Okeechobee, FL	USA	Eng	33112	PH	9.880	2220	China Radio Int.	CHN	Eng	44343	EM
2000-2100													
5.775	2012	IRRS	I	Eng	44434	RI	9.910	2216	All India Radio	IND	Eng	43443	EM
5.800	2019	Radio Bulgaria	BUL	Fre	44434	RI	9.950	2206	All India Radio	IND	Eng	33333	FH
5.850	2038	Radio Canada Int.	CAN	Eng	33333	FH	11.620	2212	All India Radio	IND	Eng	24112	EM
5.890	2030	Vatican Radio	CVA	Ita	44434	RI	12.095	2207	BBC World Service	G/ASC	Eng	35433	SH
5.900	2034	Radio Bulgaria	BUL	Alb	44433	RI	13.620	2202	Radio Australia	AUS	Eng	45344	GeG
5.915	2042	Kol Israel	ISR	Ara	44333	RI	13.785	2213	Radio Canada Int.	CAN	Eng	34233	EM
5.930	2010	Radio Prague	CZE	Eng	44344	PP	15.170	2212	Radio Canada Int.	CAN	Eng	24122	EM
5.945	2047	ORF Radio Austria	AUT	Ger	44444	RI	15.290	2211	Voice of America	USA/PHL	Eng	25422	SH
5.970	2058	Radio Free Europe	USA/D	?	43232	RI	15.400	2248	BBC World Service	G	Eng	45243	EM
6.005	2050	Oeutschlandfunk	D	Ger	55545	VP	15.600	2230	Radio Taiwan Int.	TWN	Eng	54444	SH
6.040	2005	Voice of America	USA/MRC	Eng	54445	BC	17.740	2212	Voice of America	USA/PHL	Eng	45433	SH
6.065	2045	Radio Sweden	S	Eng	54444	SM	17.820	2217	Voice of America	USA	Eng	44444	FH
6.075	2008	Deutsche Welle	D	Ger	55333	PH	21.740	2218	Radio Australia	AUS	Eng	15521	SH
6.085	2011	Bayrischer Rundfunk	D	Ger	55334	PH	2300-0000						
6.120	2015	YLE Radio Finland	FIN	Fin	44322	PH	7.280	2306	Radio Romania Int.	ROU	Eng	44232	SH
6.145	2018	Voice of Russia	RUS	Rus	55433	PH	7.580	2311	WHRA, Greenbush, ME	USA	Eng	45344	EM
6.155	2021	ORF Radio Austria	AUT	Ger	55343	PH	9.415	2330	Radio Prague	CZE	Eng	55344	SM
6.185	2027	RAI Int.	I	Eng	44454	EM	9.475	2306	WWCR, Nashville, TN	USA	Eng	45243	EM
6.195	2047	BBC World Service	G	Eng	55555	SM	9.520	2332	WINB, Red Lion, PA	USA	Eng	25222	EM
7.105	2030	Radio Minsk	BLR	Eng	34232	EM	9.550	2304	Radio Hayana Cuba	CUB	Eng	22421	SH
7.210	2050	Radio Minsk	BLR	Eng	34353	EM	9.590	2300	Radio Romania Int.	ROU	Eng	44444	SH
7.235	2030	Radio Canada Int.	CAN	Eng	44434	VP	9.645	2302	Radio Romania Int.	ROU	Eng	35333	SH
7.250	2000	Vatican Radio	CVA	Eng	55545	VP	9.680	2325	Int. Radio of Serbia & Mont.	YUG	Spa	45444	SH
7.350	2010	WYFR, Okeechobee, FL	USA/RUS?	Eng	43444	BC	9.700	2327	Radio Bulgaria	BUL	Eng	55444	SH
7.500	2020	Radio Bulgaria	BUL	Fre	44444	RI	9.830	2320	Voice of Turkey	TUR	Eng	55555	SM
7.935	2045	CNR1 Beijing	CHN	Chi	45233	VP	9.850	2300	Voice of Turkey	TUR	Eng	55555	EM
9.420	2015	Voice of Greece	GRC	Gre	55534	VP	9.875	2332	Radio Vilnius	LTU	Eng	42443	EM
9.440	2002	China Radio Int.	CHN	Eng	44444	FH	9.880	2322	China Radio Int.	CHN	Eng	55455	SM
9.570	2005	Radio Exterior de Espana	E	Eng	53252	EM	9.990	2325	Radio Cairo	EGY	Eng	44444	SM
9.600	2000	China Radio Int.	CHN	Eng	44444	GG	11.940	2303	Radio Romania Int.	ROU	Eng	35222	SH
9.630	2035	BBC World Service	G/SEY	Eng	35444	FW	12.160	2304	WWCR, Nashville, TN	USA	Eng	45344	EM
9.680	2040	Tadio Thailand	THA	Eng	45444	FW	15.720	2307	Radio New Zealand Int.	NZL	Eng	24232	EM
9.760	2026	Voice of America	USA	Eng	44444	FH	DXers:-						
9.770	2034	Voice of America	USA	Eng	44444	FH	BC	Bernard Curtis					
9.930	2040	Radio Vlaanderen Int.	BEL	Eng	42133</								

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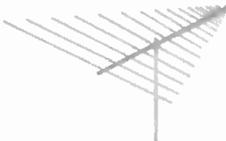


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Off^{the} Record

- Oscar c/o SWM Editorial offices
- E-mail off.the.record@pwpublishing.ltd.uk

Response to this column is always welcome, so thanks to **Andy** who wrote from Cheshire to say that he was amused by my comments about the 'Urban Herbets' on the f.m. stations. I feel sure that any anthropologist worth his salt would agree with me that what we are witnessing with much of today's youth is some kind of evolutionary regression.

The linguistics, musical styles, posturing and gesticulating, along with the apparent compulsion to closely imitate one another is clearly symptomatic of some form of developmental degeneration, and in a way it is a pity that it has become linked with the concept of free radio. Having said that, anyone who believes that the broadcast radio establishment needs to be shaken up has to face the fact that at least these youngsters have the guts to get on air in substantial numbers and have a go at something different. We must also accept that they are having an influence on today's music scene, as well as giving the regulators something to think about.

Interference

I feel I must make it clear at this point that it is my opinion that free radio stations must, as priority number one, avoid causing interference to anyone. In the past the authorities used this as an excuse for seeking to silence pirates. More recently it has become apparent that a number (not all) of the f.m. stations are in fact causing problems. This lends validity to the position of the authorities and jeopardises the position of all free radio stations (though of course there should always be a distinction between guilty and innocent parties).

Any radio station should have equipment of a satisfactory technical standard, and it should only be operated by personnel with the knowledge and ability to do so properly. On the radio, as in any other aspect of life, everyone should behave responsibly and show due consideration for others. It is right that swift and stern action be taken against anyone who does otherwise.

Past And Present

Returning to **Andy's** E-mail, he goes on to say that there are a few of these urban youth type f.m. stations currently operating in the Manchester area, though he (like me) does not find their programme output appealing to the ear. He contrasts this with "The fun, fresh sound of 60s offshore", and also mentions

land-based stations Radio Aquarius from the 1970s and Andromeda Radio from the 1980s as stations which he remembers with fondness. He also makes interesting reference to some aspects of the way in which many land-based stations operated (some still do), involving transporting of cumbersome equipment to an outdoor field or woods location in order to put out a broadcast.

One of the primary reasons for doing this is that the station is actively taking steps to ensure that the risk of causing interference is minimised. The raiders and regulators would have you believe otherwise, but the truth is that the vast majority of free radio folk have sincere intentions. This often means that they take on additional risks and difficulties.

Heavy car or truck batteries are often used as a power source, and since valve equipment requires h.t. voltages, rotary dynamotor converters have been known to be used on site to provide this from the 12V source (though solid state invertors would be more normal nowadays). Stations would have teams of look-outs, and if the raiding authorities were seen approaching the site, staff would scatter, running off across fields carrying any bits of equipment they could manage.

Million Pound Sound

One very notable feature about many of the land-based pirates is how they have developed the ability to create a professional sounding programme output whilst using remarkably inexpensive and simple equipment. I can recall stations that were able to create the illusion of live programming from plush studios, with time-checks and news bulletins, whereas the reality was that it was all pre-recorded and played out from two basic portable cassette recorders nestled in amongst some bramble bushes.

Meanwhile, the 'QUANGO' regulators continue to display a lack of understanding of the medium and of the industry by awarding licences to stations with obviously unrealistic business plans. How many have collapsed and/or been assimilated by the 'Borg' radio groups? The appointed overseers are still not getting it right, and yet they continue to bleat about how those nasty pirates just won't go away. The latest plan is to try to persuade them to switch to a flea power community radio licence, but I suspect many stations will not be tempted.

Offshore

Richard from The Netherlands sent me an E-mail saying that he has a website about

offshore radio, and asks if I can supply him with any information for it. The answer is that I reveal what I know here in this column, but I would be interested to know what people regard the definition of offshore radio as being?

If the term can only refer to a pirate in international waters then I know of none that are operating or planned (honest!). If you mean an unlicensed station from a boat or marine structure, but within national territorial boundaries, then still nothing current springs to mind.

There are a few things on the go with previous free radio and watery connections, but they are all licensed in some form. There is the Aland Islands (Finland) project featuring the MV *St Paul* and the colourful character Mike Spencer. There is the MV *Communicator* and the Orkney Islands. The Isle of Man Long Wave project will broadcast from an offshore platform of course and the *Ross Revenge* is still kicking about somewhere I believe. These are the sort of things which anoraks keep a watchful eye on these days.

Mood Swing

It was fascinating to observe what happened recently when a land-based pirate (not in the UK) began circulating rumours that it was operating from a boat in the North Sea on short wave only. Even **Glen Hauser** in the USA was reporting the story of Friend Ship Radio for a while, though there were always aspects of it which looked questionable. He later reported having traced the source of the station's E-mails to a certain country.

A few people noticed similarities to a certain other station, and although the station was heard by s.w. listeners, the frequencies used were far too high (13 and 17MHz) to give signals into the UK from the North Sea. There have been several cases throughout the years of land-based pirates claiming to be broadcasting from ships for various reasons, including trying to make it sound more fun and attention-grabbing. I reckon this had been the plan, but it backfired this time.

The anoraks reacted with anger and hostility when it became clear that the offshore claims were false. I am sure the station manager was taken aback by this reaction to his publicity stunt/joke or whatever it was, but there have been so many false rumours about offshore projects lately, and it seems it will be tolerated no longer. In 2004 mister, if you say you have a boat, you had jolly well better make sure you do really have a boat, or else!

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International Broadcasting - Past, Present and Future

Welcome to this year's Broadcast Special. Over the next few pages Martin Peters will be travelling back to the dawn of radio, looking at how international broadcasting was conceived, how it developed and what the future is likely to hold.

Even some of the earliest broadcasts, intended only for a limited, domestic audience, have, by radio's very nature, been monitored outside their countries of origin. This article concentrates on the so-called external or overseas broadcasts, put there for the sole purpose of spanning international boundaries.

Whether it be for ex-patriots, thousands of kilometres from home; to perpetrate countries' ideologies to a wider audience; spread the word of God or simply to make money, international broadcasting has played an important role in millions of people's lives - and in thousands of cases, their deaths - over the ninety or so years since it came into being.

Limited to only a few thousand words, it is impossible to produce an exhaustive piece on the subject, but I hope that by reading this, some of you will be spurred on to research your areas of interest a little further.

Pre-History First

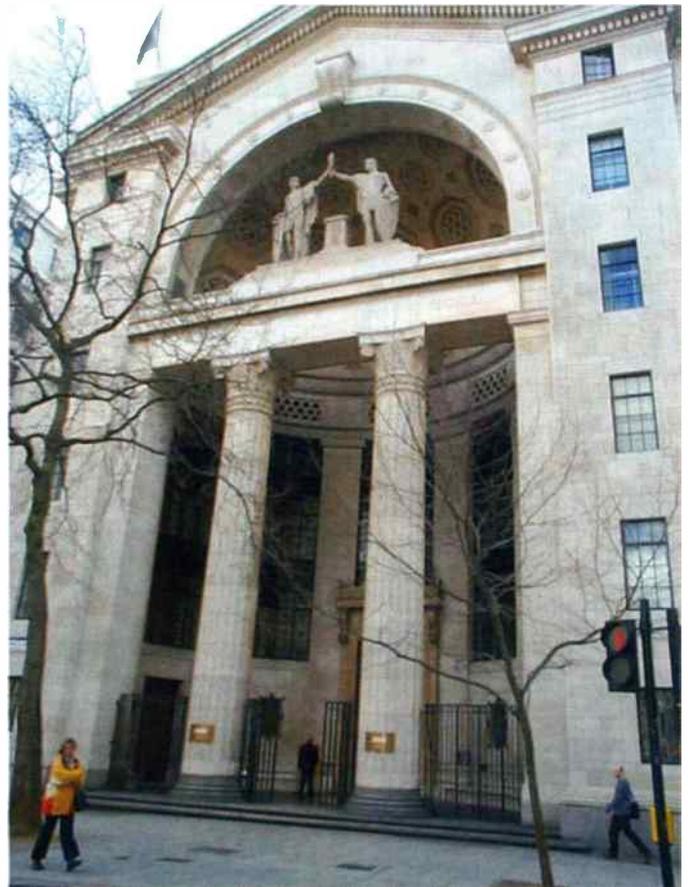
The story of radio began with a Cambridge professor, one James Clerk Maxwell. He forecast many of the laws that govern radio wave propagation, calculating their speed and noting their resemblance to light waves.

At the time, Maxwell's hypotheses were met with almost universal incredulity. However, his theories were later proven, and, in Germany, in 1886, Heinrich Hertz determined that an electric current swinging very rapidly back and forth in a conducting wire would radiate electromagnetic waves into the surrounding space.

Using such a system, Hertz detected his own spark transmissions across his laboratory. Radio was born. Hertzian waves became what we now call radio waves, and to this day, frequency is measured in terms of Hertz (Hz).

Later, the British scientist (and father of twelve children) Oliver Lodge and his team greatly improved sensitivity in the detection of radio waves by introducing the coherer into the receiver's circuitry. Lodge demonstrated his device before the Royal Institute in 1894, and his coherer went on to become the standard detector in early wireless telegraph receivers.

In 1898, Lodge applied for a patent which described an adjustable coil in the antenna circuit of a wireless transmitter and receiver, thereby tuning both devices in with one another and permitting more than one simultaneous transmission over the ether without causing mutual interference.



● *Bush House, home of the BBC World Service.*

Meanwhile, Marconi was fast becoming the leading light in radio experimentation, and in 1896 demonstrated his system in London, on Salisbury Plain and across the Bristol Channel. The distances that were achievable became greater with the passing of time with successful tests in



● Cards like these were distributed throughout Germany during WW2.

Italy and between England and France.

December 1901 saw the famous transatlantic test between Poldhu, Cornwall, and St. John's, Newfoundland, a distance of 3360km. Early radio transmissions were used solely for the communication of messages and information using Morse code, as the method of transmitting sound was not viable at the time.

Experiments in sound broadcasting had taken place as early as 1900, when the Canadian-American physicist Professor Reginald Aubrey Fessenden transmitted speech using a spark-gap transmitter. He spoke the words, "One, two, three, and four. Is it snowing where you are Mr. Thiessen? If it is, would you telegraph back to me?" Thiessen, 1.6km away, heard the transmission. His voice is believed to be the first ever to be transmitted by radio waves and heard by another person.

Six years later, Fessenden broadcast a programme from Brant Rock, Massachusetts, using a 1kW Alexanderson alternator on a wavelength of 7000m (42kHz): CQ, a Christmas carol, a violin solo, a speech including an invitation to report on reception and a phonograph recording.

It was not until 1916 that regular broadcasting began, first in Philadelphia, USA. Other cities followed suit, and by 1922 there were around 220 radio stations broadcasting regular programmes; there were a total of 530 by 1924.

Here in Britain, the locals had waited impatiently until 1922, when station 2LO broadcast for one hour a day from the top of Marconi House in The Strand, London.

The first recorded incident of radio being used with the intention of broadcasting internationally would appear to have been in 1915 when Germany sent out daily news reports in Morse Code. By 1917 the Russians were doing the same. Lenin, realising the potential of radio to spread his ideology beyond his country's borders, is known to have urged Stalin to make funds available for the furtherance of radio research.

It was during the 1920s that domestic broadcasters, realising that - especially at night - their transmissions could be heard beyond their borders, began to cater for overseas listeners by including limited, foreign-language programmes within their schedules.

Radio ownership was very much a novelty and enthusiasts would regularly tune the dial to listen to radio from afar. This was such a popular pastime that the British Broadcasting Company, as it was called at the time, carried details in the *Radio Times*. Later, a separate publication, *The Radio Supplement* (which then became *World Radio*) was widely read until the outbreak of the Second World War.

The magazine carried a spirited debate on which language should be adopted for international broadcasts. English, French and Chinese were the front-runners. Even Latin was suggested. In the end, designer language, Esperanto, won the day and by 1926, a total of 25 European stations included lessons in the language as part of their regular output.

All broadcasts up to this point had been conducted on long and medium wave. Wavelengths below 200m (1500kHz) were thought to be

unsuitable for broadcasting and were allocated to Radio Amateurs for experimentation. It was these same Amateurs that were to lead the way in short wave communication and go on to prove the authorities wrong.

Back in the United States, one of the pioneers of domestic broadcasting, Pittsburgh's KDKA, started daily programming via a short wave repeater station, callsign 8XS. This was in July 1923. The following month, reception was reported in England. At the end of the year, once it had been established that the quality of reception was reliable, the BBC relayed a New Year's Eve message from KDKA by means of a rebroadcast station in Manchester.



● Fessenden's 130m tower at Brant Rock, Massachusetts.

These early broadcasts had huge novelty status with their small but enthusiastic band of loyal listeners - but were decidedly experimental in their nature with programme content generally only of interest to the domestic market.

It was the Dutch that really set the ball rolling with their Philips-built transmitter located in Eindhoven. In 1927, the facility was used to communicate an address by Queen Wilhemina to the East and West Indies. Bizarrely, the same transmitter, callsign PCJ, was the first to carry the sound of the chimes of London's Big Ben.

Building on their success, a high-powered station was built near Hilversum, which opened in 1929. By the following year, regular broadcasts in twenty languages were being regularly aired.

At around about the same time, Radio Moscow inaugurated its first short wave transmitter, near the capital. Programmes were in German, quickly followed by French and English, much to the disgust of the Parisian press, who asked the question, "What right had a country to broadcast in a language that was not its own?"

Other countries started services designed to communicate with their

“It was not until 1916 that regular broadcasting began, first in Philadelphia, USA”



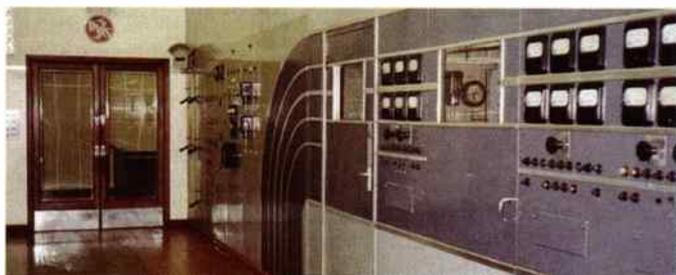
● Fessenden's Radio Telephone installation at Brant Rock.

nationals living abroad. These included Austria (1929) and Belgium (1934). British expatriates living out their lives throughout the Empire were ever more upset that no broadcasts from their beloved homeland were being provided, and complaints were made to high places.

In 1931, the Vatican joined the fray with its religious service for Catholics the world over, in particular "the lonely, missionaries in the jungle, sailors on the high seas, lighthouse keepers and to European pioneers in all parts of the world to which the faith has not penetrated".



● The Jamming centre near St. Petersburg, Russia, used 1971-88.



● The main transmitter at Radio Aspidistra. ©www.seftondelme/

Programme content was confined to news, messages for missionaries and relays of services from St. Peter's.

Another unusual venture was Radio Nations, mouthpiece of the Geneva-based League of Nations. Having no transmitter of their own, the station relied on the co-operation of those countries possessing transmission facilities with spare capacity. The Dutch and the Swiss provided Radio Nations with transmitter time in what was probably the first regular rebroadcast arrangement, until 1932, when the League built its own short wave station near Nyon.

The government encouraged the BBC to investigate the possibility of launching a world-wide service and in 1927, experimental short wave tests were made from the Marconi works in Chelmsford, Essex.

However, financing for the new scheme was not forthcoming. In 1930 the BBC estimated that it would cost £40000 to build a short wave transmitting station at Daventry, and £7000 a year to maintain. Programming would cost another £34000 a year.

Whilst the government did not wish to foot the bill, the BBC, for its part, did not think it fair that licence payers' money should contribute to a service directed overseas. The economic crisis of 1931 saw the BBC rethink its strategy, and it agreed to finance the project, citing 'national interests' as the rationale.

And so the Daventry short wave transmitter site came to be. Capable of operating on eight short wave bands, the station broadcast five transmissions a day, designed to reach their target audiences at peak listening times, wherever in the world they were.

The Empire Service, as it was known, formally launched on 19 December 1932 with a speech by the Chairman of the BBC governors, J.H. Whitley, followed by Sir John Reith, the Director General. Less than a week later came the first royal broadcast to the Empire when King George V delivered a Christmas message to his subjects, a tradition that survives to this day.

The Empire Service was an English-only affair and the bulk of programming consisted of selected items from the BBC's domestic services. This could be anything from light music, variety shows or sporting commentary. A limited number of programmes were produced especially for the new service, even from the start, and a dedicated news department was assigned in 1934.

Whereas most external services were run and financed by state

broadcasters, in the United States it was commercial concerns that ran short wave stations, all of them English only. General Electric set up a transmitter network, mainly to promote their own products. Later, the domestic networks - NBC and CBS - followed suit. Meanwhile, the USA government showed little interest in launching a service of its own.

Elsewhere, developments in short wave radio were altogether slower. In Australia, commercial Amalgamated Wireless opened their Voice of Australia in 1931, with programming from Sydney and Melbourne. In Africa, Kenya started its service in 1929, primarily broadcasting to neighbouring Tanganyika - now Tanzania.

The 1930s saw a mushrooming of the number of countries sporting an international service. Those with systems already in place increased the number of hours and/or languages within their schedules. The short waves were fast becoming a busy highway for international and intercontinental entertainment, and increasingly, news and political commentary.

Germany made huge efforts to broadcast abroad. Hitler and his propaganda minister, Goebbels, were committed to their belief that radio was an all-powerful weapon.

From a mere 200 hours of German programming per year in 1929, the short wave station at Zeesen was reconstructed and expanded so that by 1938, output exceeded 5000 hours annually. In 1934, Italy opened an impressive short wave outlet, callsign 2RO, near Rome. The site included three antennas: one omni-directional, the other two aimed at North and South America.

Initially, programmes were those from the domestic service but by 1935, propaganda, cunningly interleaved with entertainment strands, spread the word of the Fascist regime. The regularly broadcast Italian language lessons would often include passages from Mussolini's speeches. Listeners could mail their work to the station, where it would be marked and returned, along with station paraphernalia and Fascist material.

A plethora of nations quickly joined the international broadcasting community: Japan to Denmark, Hong Kong to Spain, where the civil war saw each side attempting to interfere with the other's radio transmissions; perhaps the first case of deliberate jamming, of which more later.

Here at home, foreign-language broadcasts were being actively considered. The BBC itself was not particularly keen, fearing that the credibility of the Empire Service might be compromised. The Foreign Office, impatient at the BBC's reticence, considered building its own medium wave transmitter on Cyprus to broadcast Arabic to the Middle East; a move that was abandoned owing to cost and lack of technical know-how.

Finally, in 1938, the BBC broadcast its first foreign-language programming: Arabic to the Middle East, and Portuguese and Spanish to South America. In the decades that followed the station's schedule grew and the Empire Service became BBC World Service, going on to broadcast in 45 languages to well over 100 million people throughout the globe.

Other broadcasters saw a very similar rapid growth in output with the Voice of America, Radio France International, Deutsche Welle, Radio Moscow and many others considered the major players.

It soon became clear that for an external service to broadcast reliably across the world, a way would have to be found to broadcast from nearer the target area. Those nations with empires or colonies built transmitter

sites there, shipping out tapes or discs for local re-broadcast. OK for *Family Favourites* - not ideal for breaking news. Later, programmes were land-lined out to the transmitter sites from the studio centre.

A system of s.s.b. feeders was later used to send programming to distant sites. With the advent of satellite, feeding the outlying sites with programme streams became far easier. In the early days, though, the technology was leading-edge, not as reliable as today and expensive to repair or replace.



● Radio Nations QSL card.



● Studio 1 at Savoy Hill, home of the original BBC studios.

“By 1922 there were around 220 radio stations broadcasting regular programmes; 530 by 1924”

The s.s.b. feeders were retained for some years as back-up in the event of a satellite failure. They were phased out in the nineties but a couple of the frequencies remain active, and now carry messages from the ‘Lincolnshire Poacher’ number station. Feeders are now almost exclusively via satellite or Internet.

Reciprocal agreements sprang up between broadcasters. Typical, was the agreement between the BBC and Radio Canada. Where mutual rebroadcast was not an option, a deal could be done with cash.

Where permitted, f.m. rebroadcasts are sought, enabling the local population to listen to BBC, VOA, RFI and others on their f.m. radio whilst driving around town - quite splendid.

During the 1950s, 60s and 70s, international broadcasting on short wave grew at an impressive rate. Hardly a spot on the dial was vacant, and the International Telecommunications Union (ITU) had its work cut out, co-ordinating frequency allocations.

More recently, however, with the easier availability of satellite television throughout most of the world, interest in short wave radio has steadily declined. There was a slight resurgence following the terrorist attacks on New York and Washington DC but this is considered a temporary blip.

Satellite radio (conventional, WorldSpace and XM/Sirius), Internet radio and local f.m. rebroadcasts have all had their part to play in short wave’s downfall.

This, and budgetary constraints, has meant that many stations have reduced their output whilst others have closed altogether. As I write, the future of Radio Slovakia International hangs by a thread.

Jamming

Almost from the moment that nations began broadcasting their news and views across each other’s borders, there have been those who have wished to silence them. The history of broadcasting is littered with countless examples of jamming; from the days of the Spanish civil war, mentioned earlier, to the present-day obliteration of digital satellite transponders.

By far the most sustained use of jamming was by the Soviet Union, during a substantial period over the Cold War, from around 1950 to 1988. It was said that the Soviet authorities channelled more resources into jamming signals from the West than for providing their own external service. Whatever the truth, a huge amount of effort went into ensuring Russian and other Eastern-Bloc-language transmissions never found their intended target.

Soviet jamming installations comprised several monitoring stations, used to track undesirable incoming transmissions. Once the target frequencies had been ascertained, these would be communicated through to the transmitter halls where the jamming operation would be set into motion. High-powered transmitters would be tuned in, tuned up and brought up to the power thought necessary to thwart the offending broadcaster.

These operations were super-efficient. If a Russian-language broadcast from the West came up on an additional or alternative frequency, it would usually only be a matter of minutes before the signal was tracked and jammed; a reason the major broadcasters unceremoniously almost rushed into the news immediately after coming on air.

For their part, the BBC, Voice of America, Radio Free Europe, Deutsche Welle, and others, co-ordinated their efforts to simultaneously bring on as many same-language transmissions, on as many frequencies as possible in order to stretch the Soviet’s jamming capability to the limit.

In the Seventies and Eighties, the short wave bands became increasingly congested. Satellite radio was not for the common man; Internet broadcasting was yet to be invented. But here were all these broadcasters, each transmitting its programming on many more frequencies and much more often, up and down the dial, in order to dodge the interference from the Soviets.

In addition, the nature of the wideband jamming transmissions meant that not only the target transmission was affected but at least one channel either side was rendered unusable.

The financial burden to the Soviets must have been enormous. To protect, for instance, Moscow, from short wave signals coming in from Western Europe, an entire network of local jamming stations would be required. Alternatively, remote, strategically-placed installations could beam their jamming into the city via skywave.

Soviet jamming had a characteristic noise, never forgotten by those who have had to listen through it, or even listen to it, during the annual ITU-organised monitoring observations. The noise was created by the Generator Meshajushtshego Deitsvija (GMD), or, in direct translation, the Interference Activity Generator. Each jamming station possessed one, with a back-up at the local monitoring station. After each minute of producing noise, each generator would then transmit its call sign in Morse Code - usually a one or two-letter affair.

In 1976, the Soviets introduced a type of jamming that resembled speech. It consisted of a male and

female voice, mixed together, and then distorted. Yet another example was the so-called Mayak jammer. This was a distorted version of the domestic Mayak service would be broadcast, co-channel, with the target transmission.

If you’d like to hear these, and other examples of jamming, then go to the page of links I’ve left for you at <http://tinyurl.com/7xed6> where you’ll also find a fascinating account of day-to-day life working as a technician at an Estonian jamming station during the 1950s.

Incidentally, portable short wave receivers on sale in Russia to the public were generally incapable of reception above 12MHz, the bands most suitable for broadcasting long distances during the day. No coincidence, here.

Despite this gargantuan effort on the part of the authorities, it is thought that those people determined enough to keep tuning around for viable signals were rewarded with at least a little news from the West.

Apart from the Soviets, Cuba continue to jam the USA-backed Radio Marti, China directs efforts against a number of broadcasters with ‘sensitive’ language streams, and a number of Middle Eastern countries press their ‘wobble jammers’ into service against each other and the West.

Even the British authorities have turned to jamming in the not so distant past. In April 1970, the Labour government set about jamming Radio North Sea International, a hugely popular offshore radio station which was ruffling the feathers of the then Postmaster General, John Stonehouse,



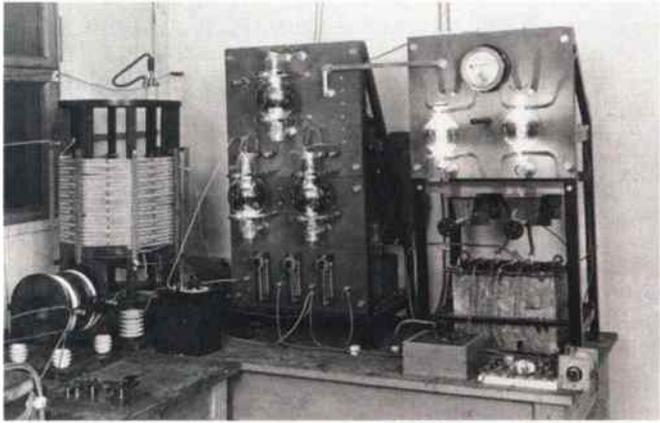
● The 2LO transmitter at Marconi House, the Strand.

defying, as it was, the British *Marine Offences Act*.

The Royal Navy's radio station at Rochester in Kent began jamming RNI's medium wave transmissions by broadcasting an 800Hz tone on the same frequency, rendering the station unmonitorable to much of its audience.

RNI's programming became overtly anti Labour. This, in the belief that a Conservative win in the forthcoming elections would be good for the station. Result? An intensification of the jamming.

The station changed frequencies several times. Always the jamming would follow. By the end of May, RNI had resorted to alternating between two frequencies every 15 minutes but the jamming was never far behind. The election came and went, Labour lost but the jamming continued until July. Tail between legs, and feeling betrayed, the *Mebo II* upped anchor and sailed back to its old home off the Dutch coast.



● The experimental transmitter 2MT at Writtle, Essex.

New technology brings new challenges to those who would wish to suppress the word of others who do not wish to fall into line. Websites have been hacked, whilst transmissions by satellite present a surprisingly easy target for the jammers.

In the latest example, a USA-based Iranian television network, broadcasting via satellite, began hearing reports that its signal was not being well received. Initially, mobile jamming units in Tehran were to blame for the lack of signal. Later, the station became unwatchable throughout the satellite's entire footprint. Investigations revealed that the uplink to the craft was being jammed, knocking out the entire transponder.

Examination of the interfering signal showed the jammer to be located in Cuba. When the net drew in, the jamming ceased. But the episode highlighted the sheer vulnerability of transmission by satellite.

Clandestine

Often hand-in-glove with deliberate interference goes the shadowy world of the so-called clandestine broadcasters. Frequently, these stations are openly anti-government in the country they are targeting. They can be used to spread the truth to a country where the state media is tightly

controlled. They may just as easily be used to spread disinformation to a confused, unsophisticated audience. Some are backed by exiled dissidents and their opposition parties; others by the machinery of state, not wishing to show their hand.

Unless their broadcasts are extremist, most clandestine stations are able to hire transmitter time from anyone with spare capacity. Many, well-established transmitter sites that will be familiar to you by name, lease airtime to third party broadcasters, some of which fall into the category of clandestine.

Concrete information relating to who is broadcasting what is not necessarily easy to come by, the operators citing commercial sensitivity. There is also the question of maintaining diplomatic relations with countries against which some of these transmissions are made.

With the dawn of Internet broadcasting, of course anyone can now spread the word on their take of the world, virtually for free, to a world-wide audience. It is generally considered that clandestine broadcasting's birth was during World War II, with the warring nations directing programmes toward each other.

For the British, the most famous case is that of the series of broadcasts made by William Joyce (alias Lord Haw-Haw, as he was nicknamed), which ran for much of the war. Joyce, born in New York and brought up in Ireland, fled to Berlin in 1939 after receiving a tip-off that he may be interned for his political beliefs.

Just three weeks later, he was appointed editor and speaker for the German transmitters for Europe at Charlottenburg, Berlin. His broadcasts had a huge following here, beginning always with the words "Germany calling. Germany calling".

Much of what he had to say was taken with a pinch of salt, but certain elements of his broadcasts included reports of bomb damage to small buildings, known only to the locals, often in great detail. These, and references to, for instance, a town hall clock having stopped, led listeners to wonder who among them was reporting back to the enemy.

Joyce's final broadcast, on 30 April 1945, had him signing off with a final defiant "Heil Hitler". Following the war, Joyce was captured and flown back to Britain where he was tried and hung for treason in January 1946.

Meanwhile, broadcasting in the other direction was Britain's black clandestine station,

codenamed 'Aspidistra'. The 600kW medium wave facility at Crowborough, Sussex included a specially designed transmitter, capable of the quick frequency changes, not only to avoid the German's jamming activities, but also to make possible Aspidistra's secret weapon.

Originally, the station broadcast on its own frequency. Later during the war, an ingenious mechanism was devised for hijacking the channels of the various German networks, and broadcasting as if from the German authorities themselves.

This is how it worked. Depending on where British bombing raids were directed to on a particular night, the Germans could be expected to close down the transmitter serving that area as soon as they knew that enemy craft were incoming, so the allies would not use the German transmissions to home in on.

The plan was for Aspidistra to lie in wait and take over the frequency at



● Vatican Radio studio.

“During the 1950s, 60s and 70s, international broadcasting on short wave grew at an impressive rate...”

the very moment that a German transmitter was shut down. A specially designed monitoring and control device enabled Aspidistra to occupy the target frequency within one two-hundredth of a second of the German station closing.

On the newly commandeered frequency, the station then relayed the German's programming, sourced from another of the enemy transmitters that had not ceased broadcasting. To the casual listener there was no break in continuity.

The enemy broadcasts were relayed for a short time before locally produced, bogus announcements interrupted the programming, scattering disinformation to the German troops and to the public alike. The announcement finished, the relay would carry on for a short time before Aspidistra, too, would fade out as the 'enemy approached'. A broadcaster operating in this fashion is known as a black propaganda station.

More recently, during the Falklands War, the British government requisitioned part of the BBC's short wave facility on Ascension Island allowing the Ministry of Defence to broadcast Radio Atlántico del Sur (Radio South Atlantic) in Spanish to the Argentine troops on the islands. The station launched in May 1982 on 9.710MHz and was subject to (mostly) ineffectual jamming by Buenos Aires. It was slammed by the British press for using non-native announcers and for not playing the kind of music that would have been popular with the target audience.

More recent still, preceding the second Gulf War, a certain Radio Tikrit was observed on 1584kHz. Tikrit was the birthplace of Saddam Hussein so a station bearing its name would be expected to be pro-regime. And so it seemed. Initial broadcasts appeared to heap praise on the former leader and his Ba'ath Party. Within a few days of opening, though, the content had changed noticeably. Reports highlighting Iraq's poverty and containing criticism of the Republican Guards made for a noteworthy deviation in a country where all media is tightly controlled.

Broadcasts became ever more strident, with the Guard being advised to leave their positions, and public security officers warned to refuse the "orders of the tyrant" and "be brave before it is too late".

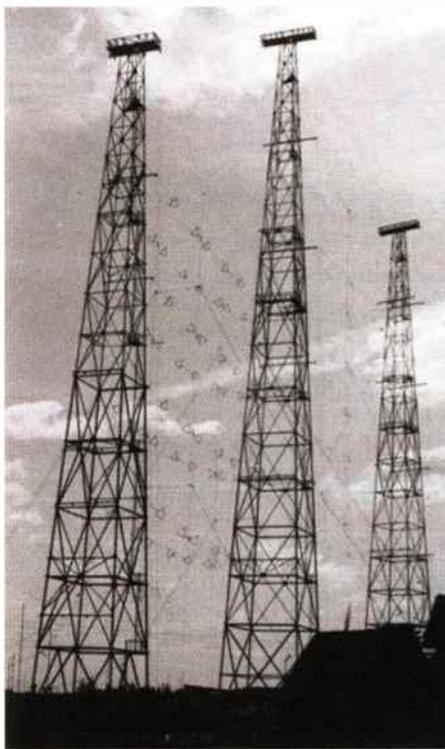
This is a not untypical move for a black station to execute. By imitating enemy broadcasts then shifting direction later, they hope to unsettle their opponent and create the impression that former loyalists have changed sides.

The station turned out to be operated by CIA-funded, London-based exile group, the Iraqi National Accord. How effective the station was with its listeners is unclear. Most suspected that the Americans were behind Radio Tikrit, from the start.

More extravagant, and well documented elsewhere, both during the Iraq and Afghanistan conflicts, the USA broadcast Information Radio - part of their psychological operations - from a fleet of specially converted EC-130 cargo planes.

Elsewhere, there has been a recent case of a clandestine TV station jamming, and then hijacking a satellite transponder. In China, on more than one occasion, the outlawed Falun Gong broadcast propaganda material over the top of the official Chinese programming, sparking a top-level investigation.

Clandestine radio is alive and well, making use of all mainstream broadcast technologies. Many stations now regularly broadcast from beyond their target countries' borders: Radio Free Syria and the Voice of



● Vertical curtain array SW antennas, used for the long distance transmissions



● William Joyce (alias Lord Haw-Haw, as he was nicknamed).

Mesopotamia, to mention just two relatively recent additions.

Hate Radio

Even darker than clandestine radio is a breed of stations, collectively known as hate radio. Probably the best-known example of this occurred in Rwanda in 1994.

The murder of up to 800,000 Rwandans was fuelled, in part, by broadcasts carried by Radio Television des Mille Collines (RTLM) which openly incited Hutus to kill Tutsis. Other regions have seen similar operations spring up, with the aim of spreading discord and heightening tension; Indonesia, the Philippines, and the Democratic Republic of Congo amongst them.

Denmark's Copenhagen-based, extreme right-wing Radio Oasen has only recently had its state funding withdrawn. Meanwhile, in South Africa, Radio Pretoria continues to broadcast its pro-apartheid message.

Religious Radio

The very first religious broadcast is believed to have been from pioneering KDKA in Pittsburgh, on 2 January 1921. The local Calvary Episcopal Church was chosen because one of the station's engineers happened to be a member of the choir. Regular Sunday evening services soon followed and continued right through to 1962.

The United States has embraced religious broadcasting like no other country, and today, radio is universally recognised by the church as a powerful means of reaching people, especially those in nations where preaching the gospel is not allowed.

Apart from the many USA stations that can be easily heard throughout the spectrum, other networks include Vatican Radio, Bible Voice Broadcasting and the Far East Broadcasting Association.

The Future

So what now, for international broadcasters? Certainly, the technology for the delivery of their programmes has changed beyond recognition.

Traditional, analogue short wave broadcasting may still be with us for a generation but the huge expense of maintaining its infrastructure, especially in the face of continued budget cuts, means that for many broadcasters, their days will be numbered, certainly on short wave a.m.

Just look at the alternatives: Digital Radio Mondiale, local f.m. rebroadcasts, satellite and Internet delivery; even radio via your mobile 'phone.

These are reliable technologies, and, with the exception of DRM, not at all dependent on the vagaries of the ether.

And all this against a backdrop of falling audiences and ever less interest for international radio from the man (and woman) in the street. Those who do maintain an interest in world events as broadcast by other countries, are not concerned with its method of delivery. All they demand is reception of the highest fidelity for the least effort. DRM may fill that gap, a.m. radio certainly does not.

Whether it is to influence the internal affairs of another country, promote the national interest, keep in touch with nationals abroad or merely for prestige purposes, international broadcasting looks set to continue.

This presupposes that realistic budgets are made available to manage the stations' operations and that there are sufficient numbers of people willing to listen to what others have to say. As for a.m. of the short waves, it is only enthusiasts who, in the main, make use of this technology purely for a love of the medium itself...so listen in while you can.

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GARMIN GPS-III+



Compact handheld GPS with cartographic capabilities. Offers flip-flop display, vertical for handheld or horizontal for installation in vehicle. Many optional accessories available. Includes Atlantic International database & basemap with up to 1.44MB downloadable from optional Roads & Recreation MapSource CD-ROM.

PAY 2005

£299.95 B

WDF-30 Short Wave Dipole



8.5m long!

£49.95 B

This new design from Watson gives you dipole performance across the entire short-wave bands. Unlike random wires, it reduces the background noise and pulls in the signals. And its small size means it will fit most gardens. Absolutely no adjustment required. 10m coax feeder included

WATSON HP-200 & HP-100



HP-200

Superb headphones with tailored response for radio comms. Excellent sound proofing, can pull in the weak DX.

- * Mono 8 Ohm 200-10,000Hz
- * Padded ear pieces
- * 3.5mm stereo plug
- * 1/4" stereo adaptor

£22.95 B



HP-100

Excellent lightweight comm headphones with tailored response for the modern transceiver or receiver.

- * 8 Ohms 200-9,000Hz
- * Adjustable headband
- * 3.5mm stereo plug
- * 1/4" stereo adaptor

£19.95 B

JRC

NEW NRD-545G DSP RECEIVER IN STOCK



- Frequency Range: 0.1 to 29.999MHz
- Modes: USB, LSB, CW, RTTY, AM, FM
- Memories: 1,000 channels
- Tuning steps: 10Hz, 100Hz, 1, 5, 6.25, 9, 10, 12.5, 20, 25, 30, 50, 100kHz
- Notch filter attenuation: 40dB or more
- Notch variable range ± 2.5 kHz (in 10Hz steps)
- Notch tracking range ± 10 kHz
- Ant impedance: 50 Ohms (Lo-Z), 600 Ohms (Hi-Z)
- AF output: Speaker 1W (4 Ohm load),
Line/recorder 1mW (600 Ohm load)
- RS-232C: 4800 baud
- Supply: 12 to 16V DC
- Size: 330 x 130 x 285mm
- Weight: 7.5kg (approx)

RECEIVER:	
SENSITIVITY:	
SSB	5 μ V (100 - 499kHz) 2 μ V (0.5 - 1.6MHz) 0.32 μ V (1.6 - 29.99MHz)
AM	5.8 μ V (100 - 499kHz) 6.3 μ V (0.5 - 1.6MHz) 2 μ V (1.6 - 29.99MHz)
FM	0.5 μ V (1.6 - 29.99MHz)

The NRD-545 DSP receiver has all the quality expected from JRC. As well as a fine front-end performance it is further enhanced by integral DSP functions. The digital processing is performed by a special DSP microprocessor which performs signal detection in all the modes. Other features include an RTTY demodulator, Exalted Carrier Selectable Sideband and remote control by PC. The digital IF filter, one of the DSP features, provides sharper characteristics than a crystal filter, thus allowing continuous bandwidth adjustment. All traditional crystal and mechanical filters that have previously determined the selectivity characteristics of receivers have been eliminated from this DSP receiver.

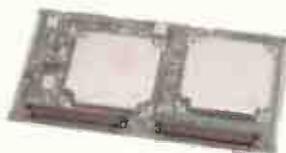
ACCESSORIES



NVA-319 External Speaker



ST-3 Headphones



CHE-199 Wide-band
converter unit



CGD-197 TCXO

PC-545 PC control software on CD-ROM	£9.95 A
NVA-319 Ext. Speaker 8 Ohms	£199.00 C
CHE-199W VHF/UHF converter adds FM	£299.00 B
ST-3 Matching Communications headphones	£79.95 B
CGD-197TCXO high stability crystal	£89.95 B
6ZC-JD00350 RS-232 cable	£64.95 B

£1399.95 C

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Midland Store: W&S @ Lowe, Chesterfield Road, Matlock, Derbyshire, DE4 5LE.
Tel:01629 832375, Fax:01629 580020, E-mail:info@lowe.co.uk, Web:www.lowe.co.uk
Scottish Store: 20 Woodside Way, Glenrothes, Fife, KY7 5DF. Tel:01592 756962,
Fax:01592 610451, E-mail:jayceecom@aol.com, Web:www.jayceecom.com

Bandscan

Europe

- **Martin Peters** c/o SWM Editorial Offices, Arrowsmith Court, Broadstone, Dorset BH18 8PW
- **E-mail:** martin.peters@pwwpublishing.ltd.uk

We start, this month, with confirmation of Swiss Radio International's decision to cease all radio broadcasts, including

satellite, by the end of October. Since the beginning of August, SRI have been airing a series of special programmes looking back at key events that have shaped the station, and Switzerland, since 1935, when the station began broadcasting.

The first in the series, entitled 'From Steam Radio to SRI', examines how the station evolved from the Swiss Shortwave Service - which went on air for the first time on 1 August 1935 - into swissinfo, which went on-line in 1999. It's currently available on-line for you to listen to via their website, a pointer to which is included on the links page I've left for you at

www.pwwpublishing.ltd.uk/swm/bandscan/

The final programme in the series will look at how Swiss views of their own country have changed over the past half-century. Come November, the station will look to its web platform to distribute its programming. Truly, a sign of the times.

So, if you're a collector of QSL cards, it'll soon be your last chance to bag SRI. English goes out 0730-0800 on 13.650, 15.445 and **21.770MHz**; 0830-0900U on **21.770MHz**; 1730-1800 on 13.750, 15.515 and **17.870MHz**; 1930-2030 on 11.815, 13.645, **13.795** and 15.220. Finally, 2330-0000 on **9.885** and 11.905MHz. Those frequencies in bold are broadcast from Switzerland itself.

There's better news from Radio Slovakia International though. The station has been granted a reprieve until the end of the year, at which time their funding will be reviewed once more.

Change Of Tack

A slight change of tack now. It seems that UK regulator Ofcom is to permit use of the 27MHz citizens' band for the broadcasting of church services to those unable to attend in person.

CB's intended occupants have dwindled in numbers, from hundreds of thousands in its heyday, to a mere 20,000 or so, today. In response to continued requests from religious organisations to broadcast their services, Ofcom have decided that the CB frequencies are suitable.

Leeds, Bradford and Northern Ireland will trial the proposed system for a year, which will be rolled out nationwide, if successful.

Whether this will mean the demise of religious broadcasts within 454-455MHz part of the spectrum remains to be seen.

The system is open to other community-based organisations and is to be called Community Audio Distribution Systems (CADS). More from Ofcom at the end of the column.



● **WorldSpace Control Centre.**

Testing Technology

To television now, and the BBC is testing technology to allow consumers to download and watch programmes on their PCs. Called interactive Media Player (iMP), the technology will enable viewers to view programmes through a media player for up to a week after

broadcast. Users can also programme the player to record shows up to a week before they are aired.

The question of rights issues poses many challenges when material is made available to a world-wide audience. However, by using rights management software to give users only a two-week window in which to view downloaded programmes, the BBC believes it can avoid potential copyright and piracy issues. The right to watch a programme is activated once it is broadcast, and deactivated seven days later.

The BBC expects 1000 people to trial the iMP over three months. If successful, iMP will become part of the Corporation's strategy to digitise production, shut down analogue broadcasting signal in 2010 and encourage more digital viewers.

WorldSpace News

Bad news for owners of WorldSpace radios. After much dithering, the operator has finally carried out its threat to encrypt much of the satellite's output. A month's subscription, costing just over six pounds, will permit access to the clutch of WorldSpace-branded channels, Radio Caroline, TalkSport, Virgin Radio and a few others. I wonder how many listeners will buy into this or cut their losses and sit back and wait for the next concept in mobile/portable satellite radio.

Over in the US, lucky listeners can choose between Sirius Satellite Radio and XM radio, both offering around 120 channels of stuff

you'd actually want to listen to, for between 10 and \$13 dollars a month. A European system is in the pipeline but is some years away yet.

An independent Burmese radio station is considering relocating its broadcasting base from one European country to another. The Democratic Voice of Burma, which broadcasts to people inside Burma and to Burmese exiles throughout the world, has been based in Norway since its establishment in 1992. The director of the station has been in Dublin recently to discuss the possibility of relocating their base to Ireland.

DVB's current schedule, according to their website, is 2330-0030 on 9.435MHz and 1430-1530 on 17.495 and 5.905MHz. Transmitters are hired facilities in Jeulich, Germany and Madagascar.

Ofcom

Finally, another cluster of community radio stations took one step closer following Ofcom's publication of its approach to licensing and regulation of the system. According to Ofcom's press release, "Community Radio is a new type of low-cost local radio licence for groups interested in broadcasting to one or more communities on a not-for-profit basis for local social gain".

Following the success of four pilot community stations, which have been on the air since 2002, Ofcom's public consultation solicited 139 responses. Applications will be invited once a year; the first batch must be submitted between 1 September and 23 November. Ofcom will not specify which areas require serving. Instead, the applicants themselves will identify a need for their vicinity.

Funding is to be by advertising and sponsorship, with upper limits set on each. Other fundraising opportunities, such as grants, subscriptions and donations are also permitted.

Ofcom aims to allocate f.m. frequencies, which could not support economically viable commercial radio services, to allow for the introduction of Community Radio. Additionally a.m. frequencies will be considered.

The maximum coverage in urban areas will generally be a 5km radius. However, it may be possible for stations in some rural areas to cover a larger area, particularly if they wish to broadcast on a.m., the press release continues. Ofcom hopes that on-air

talent, hitherto attracted to illegal, pirate operations, will instead opt for working within the framework. In addition, equipment seized during station raids by the authorities and subsequently demolished could instead be donated to the new stations.

Well that's it for this time. Only three months to Christmas - hurrah!

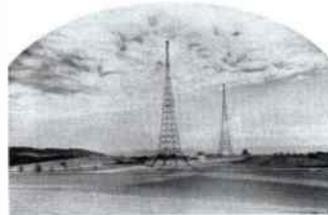


Abb. 1: Sottensmodell des Sottensradio-Sollens. Fig. 1: The globe of the Sottens radio.



Abb. 2: Sottensmodell. Fig. 2: Sottens radio.

● **SRI Sottens site, many years ago.**

Scanner

SCAN... MONITOR... RECORD

THE IC-R20 RECEIVER IS HERE!

The IC-R20 handheld receiver contains a host of advanced features that will appeal to scanner hobbyists and professional users. Check out this pro-grade scanner's amazing features..



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- 0.150 to 3304.999MHz wideband coverage in SSB,CW,AM,FM,WFM modes
- Built-in 260 minute digital (audio) recorder
- High speed scanning = 100ch/sec (VFO scan)
- Total of 1250 memory channels
- Standard Lithium-Ion battery gives 11 hours of continuous receive capability (FM mode, single receive)
- Operation and charging from an external power source
- Built-in ferrite bar antenna for AM and earphone cord antenna for FM broadcasts
- VSC,CTCSS and DTCSS tone squelch
- Optional CI-17, CI-V controller for PC remote control
- PC programming capability
- Dial speed-up function... when rotating the tuning knob rapidly, the tuning speed automatically speeds up
- Scan pause setting (2-20 seconds and hold) and scan resume (0-5 seconds and hold) setting
- Auto power off (30-120 minutes and busy)...Busy setting turns off the IC-R20 when signal is received for 3 minutes
- Various key lock functions...All, No SQL, No VOL and Normal lock settings
- Rotary selector and up/down buttons are reversible
- Useful bandscope
- and much, much more!

AUTHORISED DEALERS THROUGHOUT THE UK

DISTRIBUTION NEWS

Finding Short Wave Magazine

We've received a few enquiries about the new arrangements at WH Smith so, to clarify what's going on, here's a brief explanation.

The WH Smith chain have decided to concentrate less on minority interest magazines and more on mass market titles. That means a lot of their branches will no longer be obliged to carry magazines such as *Short Wave Magazine*, *Practical Wireless* and *Radio Active*. In fact, about half their outlets will no longer automatically have our magazines on their shelves.

The good news, of course, is that over half will still stock them. Below you'll find a list of all the 275 WH Smith stores where *Short Wave Magazine* is still mandatory - they will definitely continue to stock it.

Aberdeen	408-412 Union Street, Aberdeen AB10 1TQ Unit E5, St. Nicholas Centre, Aberdeen AB10 1HW	Chesterfield	4 Middle Pavements, The Pavements, Chesterfield S40 1PA
Accrington	14 Cornhill, Arndale Centre, Accrington, Lancashire BB5 1EX	Chichester	16 North Street, Chichester, West Sussex PO19 1LF
Airdrie	60-64 Graham Street, Airdrie, Lanarkshire ML6 6DB	Chipping Norton	10 High Street, Chipping Norton, Oxon OX7 5AD
Aldridge	44 The Square, Walsall, West Midlands WS9 8QS	Chorley	New Market Street, Chorley, Lancashire PR7 1DB
Altrincham	12 George Street, Altrincham, Cheshire WA14 1SF	Cirencester	19-21 Castle Street, Cirencester, Gloucestershire GL7 1QD
Andover	31 High Street, Andover, Hants SP10 1LJ	Colchester	19 Culver Walk, Colchester, Essex CO1 1LX
Arbroath	196 High Street, Arbroath DD11 1HY	Coventry	3-5 West Orchard Shop Cen, Smithfield Way, Coventry, West Midlands CV1 1QX
Ashton Under Lyne	Unit 30, Arcades Shopping Centre, Ashton-Under-Lyne, Lancs OL6 7JE	Crawley	Unit 23, County Mall, Crawley, Sussex RH10 1FF
Aylesbury	27-29 High Street, Aylesbury, Bucks HP20 1SH	Croydon	34 North End, Croydon, Surrey CR0 1UB
Ayr	198-200 High Street, Ayr, Ayrshire KA7 1RH	Cwmbran	11 The Mall, Cwmbran, Gwent NP44 1PX
Banbury	23-24 Castle Centre, Banbury, Oxon OX16 5UE	Darlington	37 Cornmill Centre, Darlington DL1 1NH
Barnstaple	76 High Street, Barnstaple, Devon EX31 1HX	Derby	2 Devonshire Walk, Eagle Centre, Derby DE1 2NN
Basildon	29/31 Town Square, Basildon, Essex SS14 1BA	Didcot	188 The Broadway, Didcot, Oxon OX11 8RN
Basingstoke	5 Old Basing Mall, Town Centre, Basingstoke, Hants RG21 7AW	Doncaster	14-16 West Mall, Frenchtgate Centre, Doncaster DN1 1ST
Bath	2 Merchants Passage, Bath, Avon BA1 1TA 6-10 Union Street, Bath, Avon BA1 1RW	Dorchester	8 South Street, Dorchester, Dorset DT1 1BL
Batley	Holden Ing Way Birstall, Batley WF17 9AE	Dumfries	129-133 High Street, Dumfries DG1 2QT
Bedford	1414 Harpur Centre, Midland Road, Bedford MK40 1TG	Dundee	Unit 18 26, Overgate Centre, Dundee, Angus DD1 1UF
Beeston	25 High Road, Beeston, Nottingham NG9 2JQ	Dunfermline	111-113 High Street, Dunfermline, Fife KY12 7DR
Belfast	Donegal Place, Belfast Co. Antrim BT01 5BB	Dunstable	24 Broadwalk, The Quadrant, Dunstable, Bedfordshire LU5 4RH
Berwick	75 Marygate, Berwick TD15 1BA	East Kilbride	49 The Plaza Town Centre, East Kilbride G74 1LW
Bexleyheath	89 The Broadway, Bexleyheath, Kent DA6 7JN	Eastbourne	110 Terminus Road, Eastbourne, East Sussex BN21 3AL
Birkenhead	10-14 St. Johns Pavement, Birkenhead, Wirral, Merseyside CH41 2YB	Edinburgh	33 Gyle Avenue, Syth Gyle, Edinburgh EH12 9JT Cameron Toll, Edinburgh EH16 5PE
Birmingham	29 Union Street, Birmingham, West Midlands B2 4LR Fort Shopping Park, Fort Parkway, Birmingham B24 9FP Unit 29, Union Street, Birmingham B2 4LR	Elgin	St. Giles Centre, Elgin IV30 1EA
Blackburn	50 Lord Square, Blackburn, Lancashire BB1 7JR	Enfield	Palace Garden Precinct, Enfield, Middlesex EN2 6SN
Blackpool	Bank Hey Street, Blackpool, Lancashire FY1 4RT	Epsom	36 Ashley Centre, Epsom, Surrey KT18 5DB
Bluewater	3 Rose Gallery, Bluewater Park, Greenhithe, Kent DA9 9SH	Exeter	34-36 The Guildhall Shopping Centre, Exeter EX4 3NJ
Bognor Regis	45 London Road, Bognor Regis, West Sussex PO21 1PQ	Falkirk	123-127 High Street, Falkirk, Stirlingshire FK1 1ED
Bolton	5-7 Victoria Square, Bolton BL1 1RJ	Falmouth	17-18 Market Street, Falmouth, Cornwall TR11 3AF
Borehamwood	Unit 11, Boulevard Park, Borehamwood, Herts WD6 4PL	Fareham	4 Savoy Buildings, West Street, Fareham, Hampshire PO16 0AG
Boston	27 Strait Bargate, Boston, Lincolnshire PE21 6EG	Farnborough	Unit 17 Princes Mead Shop Centre, Farnborough, Hampshire GU14 6YB
Bournemouth	9-13 Old Christchurch Road, The Square, Bournemouth, Dorset BH1 1DY	Farnham	14 The Borough, Farnham, Surrey GU9 7NF
Bracknell	10 Princess Square, Bracknell, Berks RG12 1XW	Folkestone	57/59 Sandgate Road, Folkestone, Kent CT20 1TU
Bradford	10/11 Darley Mall, Bradford, W. Yorks BD1 1TG	Fort William	Unit 5, 4 Tweedale, Fort William, Highland PH33 6EU
Brecon	Units 2 & 3 Bethel Square, Brecon, Powys LD3 7JP	Fosse Park	Unit 10, Fosse Park, Leicester LE19 1HJ
Brent Cross	Brent Cross Shopping Centre, London NW 4 3FB	Galashiels	29 Channel Street, Galashiels TD1 1BJ
Bridgend	7 The Rhiv, Bridgend, Mid Glamorgan CF31 3BL	Garston	New Mersey Park, Speke Road, Merseyside L24 8QB
Brierley Hill	Merryhill Centre, Brierley Hill, West Midlands DY5 1SY	Gateshead	56a Metro Centre, Gateshead, Tyne And Wear NE11 9YT
Brighton	69 Churchill Square, Brighton, East Sussex BN1 2TB	Glasgow	53-55 Argyle Street City Centre, Glasgow G2 8AH 177 Sauchiehall Street, City Centre, Glasgow G2 3ER Braehead, Glasgow G51 4BN
Bristol	The Galleries, Bristol BS1 3XA Unit 49, The Mall, Cribbs Causeway, Patchway, Bristol BS34 5GG	Glenrothes	21 Unicorn Way, Kingdom Centre, Glenrothes, Fife KY7 5NU
Bromley	132-138 High Street, Bromley, Kent BR1 3EZ	Gloucester	41-45 Eastgate Street, Gloucester, Glos GL1 1NZ
Burnley	15/16 Market Square, Burnley, Lancashire BB11 1AX	Godalming	82 High Street, Godalming, Surrey GU7 1DU
Burton On Trent	13-17 Underhill Walk, Burton On Trent, Staffs DE14 1DE	Grantham	49-51 High Street, Grantham, Lincolnshire NG31 6PH
Bury St. Edmunds	15 Cornhill, Bury St. Edmunds, Suffolk IP33 1DY	Grays	12/14 Town Centre, Grays, Essex RM17 6TG
Caerphilly	Unit 4, Castle Shopping Centre, Caerphilly, Mid Glamorgan CF83 1NU	Greenock	42 Hamilton Way, Greenock, Inverclyde PA15 1RH
Camberley	51-53 High Street, Camberley, Surrey GU15 3RB	Grimsbly	5 Freshney Place, Grimsby, Lincolnshire DN31 1QQ
Cambridge	Market Street, Cambridge, CB 2 3PE	Guildford	56 High Street Guildford Surrey GU1 3ES
Canterbury	19 St. Georges Street, Canterbury, Kent CT1 2LB	Halifax	5 Market Street, Halifax, W. Yorks HX1 1PB
Cardiff	83/5 Queen Street, Cardiff, South Glamorgan CF10 2BE	Hamilton	46 Regent Way, Town Centre, Hamilton ML3 7DZ
Carlisle	51-53 English Street, Carlisle CA3 8JY	Hanley	Unit 213 Potteries Centre, Hanley, Stoke On Trent, Staffordshire ST1 1PS
Chatham	The Pentagon, Chatham, Kent ME4 4DP	Harlequin	Harlequin Centre, Watford, Herts WD17 2TB
Chelmsford	73-75 High Street, Chelmsford, Essex CM1 1EJ	Harlow	Broadwalk, The High Street, Harlow, Essex CM20 1JD
Cheltenham	192-194 High Street, Cheltenham, Glos GL50 1EP	Harrogate	Victoria Shopping Centre, Cambridge Street, Harrogate HG1 1TU
Chester	Foregate Street, Chester, Cheshire CH1 1HH Unit 4, Broughton Industrial Est, Broughton Mills Road, Broughton, Chester CH4 0BY	Harrow	Unit 14, St. Annes Shopping Centre, St. Annes Road, Harrow HA1 1AS
		Hartlepool	186 Middleton Grange, Hartlepool, Cleveland TS24 7RR
		Hastings	Priority Meadow, Hastings, East Sussex TN34 1PH
		Havant	14-15 Meridian Centre, Havant PO9 1PG

continued on page 36

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- Slot machine game!
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Bearcat 220XLT	Handheld Scanning Receiver	99.00
Bearcat UBC3000XL	Handheld Scanning Receiver	130.00
Bearcat UBC7800XL	Trunk Tracker Base Scanning Receiver	229.00
Icom R2	Wideband AM/FM/WFM H/held Scanner	95.00
Icom R2	Wideband AM/FM/WFM H/held Scanner	95.00
Maycom FR100	Handheld AM/FM Compact Scanning RX	50.00
Realistic PR2005	Wideband Scanning Receiver	120.00
Yaesu VR1200	Handheld Scanning Receiver	120.00
Yupiteru MVT7300	Handheld Scanning Receiver	189.00
Yupiteru MVT9000 MkII	All mode Scanning Receiver with case	275.00
Grundig YB500	Receiver	99.00
Icom R75	Base Receiver c/w Filters & OSP	599.00
Icom R75	Base Receiver	499.00
Icom R8500	W/Band All Mode RX w/PSU. As New!	999.00
Joyce WS2000	Portable Worldspace Receiver	79.00
NRD JRC545DSP	Base Receiver	849.00
Palstar R30	Receiver	325.00
Roberts 9914	FM/MW/LW/SW Receiver	65.00
Sony ICF5W07	All mode s/w RX & Active Loop Antenna	159.00
Yaesu FRG8800	General Coverage Receiver	299.00
Yaesu FRG8800V	HF Receiver + VHF Converter	325.00
Yaesu VR5000	All Mode 100kHz-2600MHz Base RX	469.00
Icom 7400	HF/2m/6m Base TX w/Autotuner/DSB	1049.00
Perstel Bluenote	Personal DAB Radio	59.00
Videologic DRX601ES	DAB Tuner	159.00

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NEW ICOM R20 Ultra Wideband Scanning receiver

- "Twin Band" receive
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- RF gain control
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Active Antenna and/or Matcher for Receiver use only. A low loss antenna tuner suitable for random long wire, dipoles, Beveridges, Delta loops, inverted V's, Verticals, G5RV and most receiving antennas. Or use as a standalone active antenna.

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- SSB reception (both USB/LSB)
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- Receives continuous SW frequency coverage from 3.2 - 22 MHz including 13, 16, 19, 22, 25, 31, 41, 49, 60, 75, 90 m bands.
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 - from the built-in rechargeable battery that takes charge from the dynamo crank
 - from 3 x AA Batteries
 - from the dynamo crank alone, even with no battery pack installed.
- Includes built-in emergency flashlight.
- Plays quality audio from the internal 2.5" speaker.
- Incorporates all built-in antennas: telescopic antenna for FM and SW, and an internal ferrite bar for AM.
- Size: 171w x 145h x 52d mm
- Weight: 600g

£24.95

ETON S350
Shortwave World Receiver

- AM/FM Shortwave World Receiver
- RF Gain Control/Bass/Treble Controls
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- Alarm and Sleep Timer Functions
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- +18dBm 3rd order intercept
- 455kHz IF output
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RD-1 GEMINI 1

- DAB and FM wavebands
- PausePlus and rewind functions
- Timed recording function
- Digital optical output socket (Toslink)
- Listen to a station whilst recording another via external recording device
- Large easy to read multi-function LCD display
- Digital record/playback using built in memory or via external SD card slot (Card inc)
- 2 station presets
- Search/manual tuning
- Clock/alarm functions
- Sleep/snooze functions
- Rotary control for station/menu selection
- Rotary vol, bass, treble controls
- External DAB aerial socket
- Analogue audio 1 and 2 output sockets
- Headphone socket
- Uses 4xLR20 (D size) batt (not inc) or via mains adaptor (inc)
- Size 190w x 260h x 130d mm
- Weight 1.74Kg

£199.00 ~~£10~~ **3 CHEQUES OF £53.33**

RD-3 GEMINI 3

- Easy to read multi-function LCD display
- 20 station presets
- Menu display/selection of all major functions
- Search/Manual tuning
- Rotary controls
- External DAB aerial socket
- AC mains socket
- 6 x LR14 (C size) batteries
- Size mm 260w x 160h x 76d

£139.00 ~~£10~~ **3 CHEQUES OF £49.66**

RD-4 GEMINI 4
Sports Portable Personal DAB Digital Radio

- Joystick control of tuning/volume
- Select stations by name
- 10 Station Pre-sets
- Search/Manual tuning
- External DAB aerial socket
- Clock/Date display
- 6 Preset tone settings
- 20 hour battery life
- 6x AA size - supplied
- External Power Adaptor
- AC Adaptor included
- 65(w) x 110(h) x 20(d) mm

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RD-5 GEMINI 5
Match Quality World DAB+ FM radio with RDS

- Large multi-function LCD display
- RDS system on FM
- Menu display/selection
- Search/Manual tuning Rotary control for station selection
- 10 station presets - 5 DAB+ 5 FM
- Rotary volume & tone controls
- External DAB aerial socket
- Uses 4 x (D size) batteries
- 200(w) x 200(h) x 125(d)mm
- Weight: Approx 1.68kg

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RD-6 GEMINI 6
DAB+ FM Stereo radio with RDS display

- Long throw speaker
- 5 W power output
- 10 presets
- Full remote control
- Clock (which remains on)
- Digital Optical Output
- Tone control
- Headphone Socket

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RD-10 REVIVAL

- FM/DAB wavebands
- FM RDS station name display
- Easy to read 16 x 2 character LCD display
- Auto tune
- Amber display backlight
- Menu display/selection of all major functions
- Rotary tuning and volume controls
- Stereo headphone socket
- Stereo line output socket
- DC input socket
- Battery or mains operation via AC adaptor (included)
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Helensburgh	17/21 Sinclair Street, Helensburgh, Argyll	G84 8LS
Hemel Hempstead	181-183 The Marlowes, Hemel Hempstead, Herts	HP1 1BD
Hereford	25-26 High Town, Hereford	HR1 2DJ
Hertford	Unit C, Green Street, Hertford, Herts	SG14 1BN
High Wycombe	36 High Street, High Wycombe, Bucks	HP11 2AR
Hinckley	29-31 Castle Street, Hinckley	LE10 1DA
Hounslow	205 High Street, Hounslow, Middlesex	TW3 1BL
Huddersfield	1-3 The Shambles, Huddersfield, W. Yorks	HD1 2QJ
Hull	10-20 Prospect Centre, Hull, Yorks	HU2 8PN
Huntingdon	122-123 High Street, Huntingdon, Cambs	PE29 3LG
Ilford	50 The Exchange, Ilford, Essex	IG1 1DG
Inverness	High Street, Inverness	IV1 1HT
Ipswich	12-14 Westgate Street, Ipswich	IP1 3EG
Keighley	27 Cooke Lane, Keighley, N Yorks	BD21 3PF
Kidderminster	Vicar Street, Kidderminster, Worcs	DY10 1DD
Kilmarnock	38-40 King Street, Kilmarnock, Ayrshire	KA1 1NP
Kings Lynn	7 Norfolk Street, Kings Lynn, Norfolk	PE30 1BU
Kington Upon Thames	Unit G13-G14, Bentalls Centre, Kingston-Upon-Thames	KT1 1TR
Kirkcaldy	183-187 High Street, Kirkcaldy, Fife	KY1 1JA
Lancaster	Market Street, Lancaster, Lancashire	LA1 1HZ
Leamington	54-56 The Parade, Leamington Spa, Warwickshire	CV32 4DD
Leatherhead	18 Swan Court Leatherhead Surrey	KT22 8AH
Leeds	3/7 Lands Lane, Leeds	LS1 6AW
	Unit 58, South Mall, White Rose Centre, Leeds	LS11 8LL
Leicester	39 Gallowtree Gate, Leicester	LE1 5GD
	Shires, 35 Shires Walk, Shires Centre, Leicester	LE1 4FQ
Lichfield	26 Bakers Lane, Lichfield, Staffs	WS13 6NF
Lincoln	The Cornhill, Lincoln	LN5 7HE
Liverpool	News Church Street, Liverpool	L1 3EG
Livingston	33/35 Almondvale Centre, Livingston W. Lothian	EH54 6NB
Llanelli	11-13 Vaughan Street, Llanelli, Dyfed	SA15 3YT
London	7-11 Kingsway, London	WC2B 6YA
	16 Kings Mall, Kings Street, Northside Hammersmith, London	W6 0PZ
	21-23 The Broadway, Ealing, London	W5 2NH
	41/42 The Mall, Stratford, London	E15 1XE
	59 Riverdale, Lewisham London	SE13 7EP
	68-72 Powis Street, Woolwich, London	SE18 6LQ
	92-94 High Street, Eltham, London	SE9 1BW
	110 High Road, Wood Green, London	N22 6HE
	124 Holborn Circus, London	EC1N 2TD
	125 High Street North, East Ham, London	E6 1HZ
	132-136 Kensington High Street, South Kensington, London	W8 7RT
	Elephant & Castle Shopping Centre, Elephant & Castle, London	SE1 6SZ
	High Street, Unit 8, Bugsbys Way, Charlton	SE7 7SR
	Leadenhall Mar, 15 Lime Street, London	EC3M 7AQ
	The Plaza On Oxford Street, 120 Oxford Street, London	W1D 1LT
	Unit 7, Gallions Reach Park, Beckton, London	E6 7FB
Long Eaton	55 High Street, Long Eaton, Nottingham	NG10 1HZ
Luton	61-63 Arndale Centre, Luton, Beds	LU1 2TF
Maidenhead	51 Nicholson Walk, Maidenhead, Berkshire	SL6 1LL
Maidstone	38/42 Week Street, Maidstone, Kent	ME14 1RP
Manchester	91-92 Arndale Centre, Stretford, Manchester	M32 9BD
	Arndale Centre, Middleton, Manchester	M24 4EL
	The Arndale Centre, Manchester	M4 3AD
	Trafford Centre, 34 Peel Avenue, Trafford Park, Manchester	M17 8BA
Mansfield	The Four Seasons Shopping Centre, Mansfield	NG18 1SN
Merthyr Tydfil	66 Market Square, Merthyr Tydfil, Mid Glamorgan	CF47 BBY
Middlesbrough	17/19 Centre Mall, Cleveland Centre, Middlesbrough	TS1 2NR
Milton Keynes	Midsummer Boulevard, Milton Keynes, Bucks	MK9 3BA
Newark	40 Market Place, Newark, Notts	NG24 1EG
Newcastle	Northumberland Street, Newcastle, Tyne And Wear	NE1 7DE
Newcastle UI	76 High Street, Newcastle, Staffs	ST5 1QQ
Newport	166/167 Commercial Street, Newport, Gwent	NP20 1JW
Newport low	55-56 High Street, Newport, Isle Of Wight	PO30 1SB
Newton Abbot	30 Courtenay St. Newton Abbot South Devon	TQ12 2QL
Newtown	24 High Street, Newtown, Powys	SY16 2NP
Northampton	21 The Mall, Newlands Centre, Kettering, Northampton,	
	Northamptonshire	NN16 8JL
	32 Queens Square, Corby, Northampton, Northamptonshire	NN17 1PO
	Grosvenor Centre, 8 Newlands Walk, Northampton,	
	Northamptonshire	NN1 2EW
Norwich	27-29 Gentlemens Walk, Norwich, Norfolk	NR2 1NA
	31-33 St. Stephens Street, Norwich, Norfolk	NR1 3QP
Nottingham	14-16 Listergate, Nottingham, Notts	NG1 7DD
	124 Victoria Centre, Nottingham, Notts	NG1 3OD
Oban	42 George Street, Oban, Argyll	PA34 5SD
Oldham	2 Town Square, Oldham, Lancs	OL1 1XF
Orpington	189-193 High Street, Orpington, Orpington Kent	BR6 0PF
Oxford	Commarket Street, Oxford Oxon	OX1 3HE
Paisley	14/16 High Street, Paisley, Renfrewshire	PA1 2BS
Penzance	96 Market Jew Street, Penzance, Cornwall	TR18 2LE
Perth	97 High Street, Perth, Perthshire	PH1 5TJ
Peterborough	32-36 Bridge Street, Peterborough	PE1 1DP
Plymouth	73-75 New George Street, Plymouth, Devon	PL1 1RP
Pontefract	31 Market Place, Pontefract, W. Yorks	WF8 1AG
Poole	Towngate Shopping Centre, 1-4 Falkland Square, Poole, Dorset	BH15 1ER
Portsmouth	154 Commercial Rd, Portsmouth, Hants	PO1 1EX
Preston	Deepdale Shopping Park, Preston, Lancashire	PR1 6QY
	Fishergate, St. Georges Centre, Preston	PR1 2AE
Putney	111-115 Putney High Street, Putney, London	SW15 1SS
Reading	39 Broad Street, Reading, Berkshire	RG1 2AD
Redditch	3-5 New Walk, Kingfisher Centre, Redditch, Worcs	B97 4YP
Redhill	The Belfry, Unit 5, Station Road, Redhill, Surrey	RH1 1PH
Richmond	16/17 George Street, Richmond, Surrey	TW9 1JS
Rochdale	18/19 Market Way, Rochdale	OL16 1EB
Romford	8 The Liberty, Romford, Essex	RM1 3RLN
Rotherham	4a Stadium Park, Parkgate, Rotherham	S60 1TG
Runcorn	88 Forest Walk, Halton Lea Centre, Runcorn, Cheshire	WA7 2GX
Sale	15 Town Square, Sale, Cheshire	M33 7WZ
Salisbury	4-6 Old George Mall, Salisbury, Wiltshire	SP1 2AG
Scarborough	106-107 Westborough, Scarborough, N. Yorkshire	YO11 1LD
Scunthorpe	49/51 High Street, Scunthorpe	DN15 6SB
Sheffield	38-40 Fargate, Town Centre, Sheffield	S1 2HE
	Unit 45, High Street, Meadowhall, Tinsley, Sheffield	S9 1EN
Shrewsbury	Charles Darwin Centre, Pride Hill, Shrewsbury, Shropshire	SY1 1BN
Slough	High Street, Slough, Berkshire	SL1 1JN
Solihull	5 Mell Square, Solihull, West Midlands	B91 3AZ
Southampton	32/34 Above Bar Street, Southampton, Hampshire	SO14 7LE
Southend	207 High Street, Southend-On-Sea, Essex	SS1 1LN
Southport	Chapel Street, Southport, Merseyside	PR8 1AF
St. Helens	13/17 Church Street, St. Helens, Merseyside	WA10 1BA
Stafford	3 Greengate Street, Stafford, Staffordshire	ST16 2HN
Staines	49 51 High Street, Staines, Middlesex	TW18 4QR
Stevenage	89-95 Queensway, Stevenage, Herts	SG1 1EA
Stirling	44 Thistle Centre, Stirling, Stirlingshire	FK8 2EE
Stockport	35 Merseyway, Stockport, Cheshire	SK1 1PW
Stratford Upon Avon	4-5 High Street, Stratford Upon Avon, Warwickshire	CV37 6AU
	Unit C, Maybird Centre, Birmingham Road, Stratford Upon Avon,	Warwickshire CV37 0HZ
Sunderland	Market Square, Sunderland, Tyne And Wear	SR1 3HW
Sutton	118 High Street, Sutton, Surrey	SM1 1LZ
Sutton Coldfield	140 The Parade, Sutton Coldfield, West Midlands	B72 1PH
Swansea	37 The Quadrant, Swansea, W. Glamorgan	SA1 3QW
Swindon	10-12 Regent Street, Swindon, Wilts	SN1 1JQ
Tunbridge Wells	120/122 Royal Victoria Place, Tunbridge Wells, Kent	TN1 2SR
Taunton	47-50 Fore Street, Taunton, Somerset	TA1 1NE
Telford	17 Mall, No 1 Telford Centre, Telford, Salop	TF3 4AF
Thurrock	109 Lakeside Shopping Centre, West Thurrock, Essex	RM20 1ZG
Torquay	7-13 Union Street, Torquay, Devon	TQ1 1ES
	62 Fleet Walk Torquay Devon	Devon TQ2 5ED
Truro	Pydar Street, Truro, Cornwall	TR1 2AX
Uxbridge	148-154 High Street, Uxbridge, Middlesex	UB8 1JY
Wakefield	Bishopgate Walk, Ridings Centre, Wakefield	WF1 1YB
Wallasey	13-15 Liscard Way, Liscard, Wallasey, Wirral	CH44 5TL
Walsall	Park Street, Walsall, West Midlands	WS1 1NL
Waltham Cross	Unit 71, Shop Pavillion, Waltham Cross, Herts	EN8 7BZ
Walton On Thames	13 High Street, Walton On Thames, Surrey	KT12 1BZ
Wandsworth	69 Centre Mall, Arndale Centre, Wandsworth, London	SW18 1TGN
Wantage	15 Wallingford Street, Wantage, Oxon	OX12 8ax
Warrington	9 The Mall, Golden Square, Warrington, Cheshire	WA1 1QE
Wellington	Wellington Market Square, Wellington, Shropshire	TF1 1HQ
Welwyn Garden City	30 Howard Centre, Welwyn Garden City, Herts	ALB 6HA
West Bromwich	243-247 High Street, West Bromwich, West Midlands	B70 7LX
Weston-Super-Mare	High Street, Weston-Super-Mare, North Somerset	BS23 1HD
Weymouth	87-89 St. Marys Street, Weymouth, Dorset	DT4 8NY
Wickford	45/47 High Street, Wickford, Essex	SS12 9AE
Wigan	1 Standisgate, Wigan	WN1 1UG
Wimbledon	16 Wimbledon Bridge, Wimbledon, London	SW19 7NW
Winchester	110 High Street, Winchester, Hampshire	SO23 9AH
Windsor	Thames Street, Windsor, Berkshire	SL4 1PW
Wisbech	36 Market Place, Wisbech, Cambs	PE13 1DL
Woking	41-43 Commercial Way, Woking, Surrey	GU21 6XX
Wolverhampton	17-23 Mander Centre, Central Arcade, Wolverhampton	WV1 3EP
Worcester	45 High Street, Worcester, Worces	WR1 2QB
Worthing	15 South Street, Worthing, West Sussex	BN11 3AP
	Tesco Centre, New Road, Durrington, Worthing	BN13 3PB
Wrexham	56-58 Hope Street, Wrexham	LL11 1BE
Yeovil	10 Middle Street, Yeovil, Somerset	BA20 1LZ
York	39/41 Coney Street, York	YO1 9QL
	Unit 11, Monks Cross, York	YO32 9GX

If your local WH Smith is not on this list, **that doesn't mean you can no longer buy SWM there.** It just means you'll have to ask them to stock it. They will order it at the manager's discretion and **the only way they'll know that there's a demand is if you ask them to get it for you.**

Only WH Smith stores will be affected so if you normally buy from somewhere other than one of their shops, you will still find *Short Wave Magazine* in its usual place.

If you still have trouble finding any of our magazines, don't forget you can order a current issue direct from our mail order department Tel: **0870 224 7830.** We'll be happy to send it to you post free - you pay exactly the same as if you'd bought it over the counter because we pay the postage!

Details correct at time of going to press (September 2004)

Number Stations

a beginners guide

Part
3

Welcome back to the world of number stations! Number stations have been around for a long time, their origins come from the First World War. Paul Beaumont, front man of Enigma 2000, concludes his explanation.

Now let's have a look at the non-voice/Morse polytone data systems. Polytone transmissions are an interesting and different number transmission system. To date we are aware of five different systems, one of which appears to have stopped.

The most common polytone is XP and until recently had two morning transmissions, on Tuesday and Friday along with three evening schedules, a combination of which were to be found on Tuesdays, Thursdays and Fridays. All were monitored regularly. Now much depleted apart from the morning slot, only schedule 1 on Tuesday and Thursday evenings now appears.

As the polytone name suggests their message is sent by a series of fast tones. XP was discovered to have tones that could act as the nominal value for which tones of other polytone systems could be compared. The XP Tones, in Hz, and their values are shown in **Table 3.1**.

The XP polytone can be heard on the morning sendings Tue/Fri in winter 0700/0720/0740 and for British Summertime at 0600/0620/0640. Transmission timings also change as the clocks vary for winter and summertime. Tues/Thurs evenings 2100/2120/2140 for winter and after the clocks go forward for summer 2000/2020/2040.

Although we have shown just two schedules, the XP operation is a widely used one. A Polytone transmission was intercepted by **PLondon** at 0500, with the second sending at 0520 but was unable to catch the third as it was never sent. The 0500 frequency used was 12.173MHz heard on 04/06/02 and again on the 18/06/02.

Never Found

The ident was 148 but the third frequency used at 0540 was never found. The second frequency, 13.473MHz, was also found on the 04/06 but not heard on 18/06. RRGB discovered an early evening network that had two sendings at 1700 and 1730, on 10.643 and 7.432MHz respectively on Wednesday 14 April 2004. Despite the wide difference of frequency the two messages were compared and found to be the same.

A similar evening transmission series is recorded in **E2k's** records for March 2001 at 1700, 1720 and 1740 on 12.217, 10.589 and 9.344MHz. These unexpected and accidental discoveries are common with most Number Station activity and do much to prove that their activity is far from being on the decline.

Morse station M78 is believed to be XP's Morse

equivalent. And despite the apparent complex nature of the XP signal the tones can be converted to numerical values with ease. An example of a converted message is shown in **Fig. 3.1**.

The title shows the time, its ident and the dk/gc. The ident is generated by taking the 100kHz value of each frequency used for the three sendings of the particular schedule; in this case 9.452, 10.852 and 12.152MHz. (Idents for other number stations are also generated in this manner).

Whilst it is not fully understood who the recipients are for these messages, the ident would only be a useful pointer to the frequency used rather than to any particular operative. It is worth noting that the ident can be wrong as it was in February 2004. The morning frequencies were 10.831, 12.131 and 13.831MHz, therefore the ident should have been 818 and not the 833 that appeared at the message header.

The polytone sequence XP can be converted to its numerical values using *xperta*, a program developed and written by **Valeriano Martin** and which can be downloaded from his website along with a description of XP if you are fluent in Spanish.

Another Polytone sequence station, XPH, although one that's not recently heard, uses high tones is shown in **Table 3.2**, while XPL, uses a set of low frequency tones. On XPL, the tones are generated as the product of the mixing of two non-harmonically related tones. The tones measured so far are: 55, 65, 75,80 and 90Hz, giving a sound like an organ being played. Morse equivalents are believed to exist within the M12 family for both XPH and XPL.

The mid-band range tones between 450 and 1177Hz are those used by XPM. And finally we have XPA, a new one to ENIGMA 2000 which is undergoing analysis at the time of writing. The XPA system is believed to be a polytone system involved in the automatic transcription of the message for unattended operation. Twenty four tones have been discovered and so far analysis has allotted provable numerical values to ten tones and five signal 'administrative' tones.

XPA was discovered by ENIGMA 2000 monitor RRGB on 6.913MHz 1750 03/12/03. RRGB looked at the tonal functions and suggested values that were proved by E2k when compared with later messages. The original message, discovered and partially analysed by RRGB read:

03209 00279 32579 74608 55314

74252 82286 16327 44979 87283

... there were another 271 groups.

It is obvious that 03209 is a decode key or perhaps a recipient indicator, 00279 is definitely the group count, albeit that the message blocks were of 64 groups long. There were four blocks plus 25 separate groups. That gives 281 in total and less the dk/gc gives a total of 279, as seen in the second group at the start of the message. Other messages were intercepted by RRGB, **JoA**, **PLondon** and passed forward for analysis. In each case the group count worked although there is some variation in tones used and as yet the mode has not really been decided. The numerical values originally derived by RRGB were used independently and the results compared favourably.

Decoding DRM Part 1

Kevin Ryan shares a personal account of getting converted to Digital Radio Mondiale reception. Read how Kevin overcame the obstacles and began to enjoy the fruits of his labours.

Kevin decided that the only way to make an informed decision was to become an 'early adopter' of the technology.

Digital Radio Mondiale (DRM) is being hailed as the future, if not the saviour, of the 'a.m.' bands. This is a bold claim given that these bands have served us well for many decades and provided predictable reception on readily available and cheap receivers. To be fair, DRM does look to be clever stuff. It has pulled together a mix of technologies developed mainly for other uses that in theory provides stereo sound, text and multimedia information in a 10 or 20kHz bandwidth on the current l.w., m.w. and s.w. bands. Add in the capability of transmitting up to four simultaneous programmes, efficient use of spectrum using single frequency networks, automatic frequency switching and the ability to re-use existing a.m. transmitters and you begin to appreciate why the technology is very attractive for the broadcasters. But why would the ordinary listener, or even the enthusiast, want to invest in yet another new receiver? After all, we have had WorldSpace and now T-DAB. So, is there a place for yet another digital form of broadcasting?

Pros & Cons

Let us have a quick look at some of the pros and cons of DRM. The idea of stereo on short wave looks good but there have been other a.m. stereo ideas that have never really taken off. You can also think of several reasons why DRM just won't cut it in the crowded a.m. bands. DRM uses the transmission technology that has been mainly deployed for line-of-sight reception at v.h.f. and u.h.f. frequencies, which works fairly well in what is a highly planned part of the spectrum. You can even imagine it working on l.w. and m.w. (during the day anyway!) but how will it cope with the vagaries of s.w. propagation and powerhouse co-channel or

adjacent channel signals? Analogue signals are often poor, but it is amazing how much information the human ears and brain can extract from a weak signal with co-channel interference.

Many of us are aware that digital signals have a 'cliff' effect where they just disappear if too much information is lost rather than degrade in the way analogue signals do. Plenty of reasons not to bother with it! However, several major broadcasters (BBC WS, DW, RN, RCI and Radio Luxembourg) have thrown their weight behind the DRM project so there must be a belief that the technology can succeed. Is it possible that the DRM can overcome the F-layer and co-channel interference? I decided that the only way to make an informed decision was to become an 'early adopter' of the technology. However, I decided to stick within a budget and would use existing equipment that could be upgraded or easily modified to decode the signals.

First Steps

Before jumping ahead with any project, I'm sure that we all agree that it is important to carry out some planning and research, otherwise you are likely to be disappointed! I quickly discovered that dedicated DRM receivers, at an affordable price anyway, are some way off. Until they are mass produced the only way to decode the a DRM transmission is to use the power of the PC. The basic receiving set-up that I came up with was as follows:

A radio receiver capable of receiving the m.w. and s.w. bands and providing an i.f. of 12kHz. There are no test transmissions on l.w. yet.

- A PC with a soundcard able to process the 12kHz signal. There is also a minimum specifications for the PC and not all soundcards are suitable. More on this later.
- DRM decoding software - basically only two choices are available.
- Internet connection to download the software.

Some technical skills are required together with the confidence to wield a soldering iron inside what might be your most prized possession! Do remember that modifications can go wrong and you could end up with a broken receiver.

PC Requirements

It may seem a bit strange to put the PC requirements at the top of this article but unless you have a fairly recent PC then it is unlikely that you will be able to decode the DRM signal. The minimum system requirements are published as:

- Windows 98, Windows2000 or WindowsXP
- AT-Compatible PC with 500MHz Pentium Processor or equivalent from AMD
- 64MB RAM

Fig. 1.1: Schedule information copied from the RTL transmission.

RTL Multilingual Service

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Monday/Tuesday:	RTL Radio Luxembourg
Wednesday:	Bel RTL
Thursday:	RTL2
Friday:	FUN Radio
Saturday/Sunday:	RTL Radio die besten Hits mit Gefühl

Automatic Mode Change:

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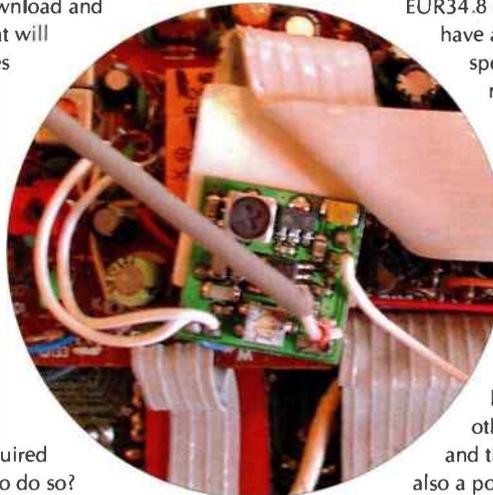


Fig. 1.2: Tatum TMR7602 still going strong after nearly 20 years of use!

- 50MB free disk space
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You can find much more on this by downloading the DRM Software Radio manual from the DRM site. The manual is free to download and lists a lot of PC equipment that will work with DRM and also gives warning about the use of laptops where the soundcard input a.g.c. cannot be disabled. There is also some evidence that the drive circuitry for TFT screens used on laptops can be a source of interference to the DRM signal.

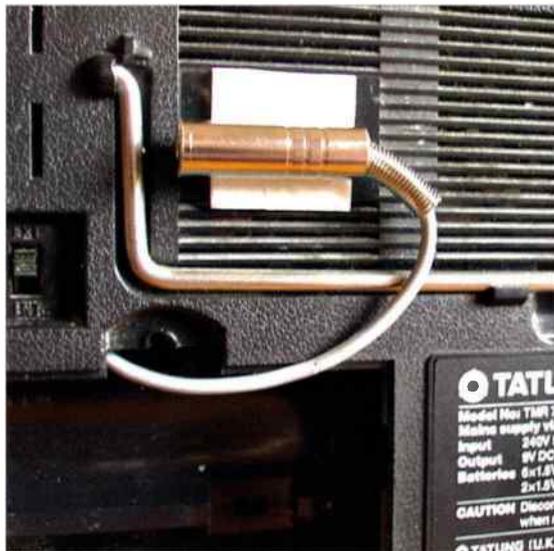
Fig. 1.3: The 12kHz i.f. board mounted inside the receiver.



The Radio Receiver

The next question is can your radio receiver provide the required output signal or be modified to do so? There is a very helpful website that lists the receivers that enthusiasts have attempted to modify for DRM reception. Point your browser at www.drmtx.org/receiver_mods.html and you will find articles on receivers such as the Sangean ATS-803A, Icom IC-756, Yaesu FRG-100, AKD Target HF3, AOR AR7030

Fig. 1.4: The 12kHz output taken outside the receiver via a 3.5mm shielded stereo in-line socket.



and the Sony ICF-SW77 to name but a few.

I was excited to find that the Sangean ATS-803A had been upgraded to produce the magical 12kHz signal. I actually own a clone of this popular receiver from Tatum designated the TMR7602. It also appeared as the Matsui 4099, the Realistic DX440 and a version from Roberts Radio. The article was comprehensive and included detailed notes and photographs. I also had a full service manual and circuit diagrams for my own receiver and as the TMR7602 was not my main receiver I was happy to attempt the modification.

The TMR7602 has a wide i.f. filter but it is just not quite wide enough for the DRM signal to pass through intact. Instead the receiver needed an extra board that converts the second i.f. of 450kHz down to 12kHz. This board is available from a company called **Sat-Service Schneider**. They can supply either an LC tuned version which is tuneable for intermediate frequencies of 450 to 467kHz; pre-tuned for 455kHz at a cost of 25 Euros or a crystal controlled version for an exact 455kHz i.f. at a cost of 50 Euros. The correct version for the TMR7602 is the tunable LC based oscillator/mixer. Additionally, Sat-Service Schneider charge five Euros to cover postage and packing, plus VAT at a rate of 16%, so in total the board cost me

EUR34.8 - about £22. Sat-Service Schneider don't have an on-line ordering system but once I specified which version I wanted they E-mailed a *pro-forma* invoice for me to add my credit card details to, sign and return to them by ordinary post. The mixer board arrived a few days later well protected in an anti-static box.

The unit uses a mixer and oscillator on a single chip. There are two adjustments that can be used to tweak the board. One adjusts the oscillator frequency and as the board comes pre-tuned for 455kHz you may have to adjust this setting. Otherwise the otherwise output will be centred on 17kHz and the DRM software just won't work. There is also a potentiometer for adjusting the signal level into the mixer but this only needs adjustment as a last resort. The oscillator adjustment is very fiddly to centre exactly on 12kHz but luckily there is a second modification that converts the ATS-803A and variants' b.f.o. control to become a fine-tune control when the b.f.o. switch is in the off position. The modification retains the original function, so you can still switch the b.f.o. on for s.s.b. reception and it will work normally as before. At this stage I decided to just install the board and see if the fine-tune would pull the signal down by the required 5kHz.

Modifying The Receiver

The first step was to open up the receiver. The unit has to be placed face down, so I had to protect both the receiver and my work surface. There are six screws on the back panel and they all came loose fairly easily given that they had not been touched in about 20 years! The back panel had to be lifted slowly and then rotated anti-clockwise so that the antenna wire didn't get damaged. Working from the receiver modification notes and the service manual, I quickly located the area I needed to work on. I then set about soldering all the wires to the i.f. board ahead of securing it to a ribbon cable with a double-sided sticky pad adjacent to where the i.f. signal was to be tapped off. I used ordinary hook-up wire for the input to the mixer and screened miniature audio cable for the much longer run to

take the 12kHz output to an external 3.5mm stereo socket. The input signal was taken from across a resistor, both a magnifying glass and a multimeter were needed before I was sure that I had located the correct points! Locating the +9V point on the receiver's power supply p.c.b. also took some time. The external mains unit for the TMR7602 had failed some time ago and as removing the back panel also removes the battery compartment it took some work with the circuit diagram and a multimeter to be sure that I had correctly powered the add-on i.f. board. The TMR7602 is ever so slightly different to the Sangean ATS-803A so having the service manual was a godsend!

With the board securely in place, I now needed to modify the b.f.o. This is on the p.c.b. just behind the b.f.o. switch, which is mounted directly onto the circuit board and appears as six solder pads arranged in two rows of three. The trick is to isolate pin 3 on the top right by removing all the solder from this pad and then soldering the other two pins on the same top row together. Once you find the pins, it is pretty straightforward to do, provided you use a good quality desoldering tool.

I finished off by feeding the output cable through a hole I made near the battery compartment cover and attaching the signal side to both legs of the stereo socket. A quick check was made to confirm that the receiver still worked. Fortunately it did!

Testing

Before tackling the issue of the DRM software I needed a way to test if the modification had been successful. My TMR7602 still functioned as an analogue set, but I was both unsure that I had powered the board correctly, and that it would deliver enough drive into the soundcard. I hunted on the Internet for sound spectrum analysis software and after several downloads, I found that *Spectran* works with *Windows* and the soundcard to provide real-time displays of audio signals. The software installed very easily and once I connected the 12kHz output from the receiver to the microphone input of the soundcard I could see the carriers from the a.m. signals on the *Spectran* screen. The fine tune also worked and I could see the carriers shifting as I moved the b.f.o. control. Confident that I now had the receiver side pretty much covered and seemed to have a workable solution I decided to proceed with acquiring the decoding software.

DRM Software

There are currently only two viable choices with regards to DRM decoding software. The first is to purchase it from the official DRM group and this will cost EUR60. There is also a project called *Dream* that can be downloaded for free. The downside of *Dream* is that it requires a fair bit of software expertise to assemble all the software components needed to build the decoder and get them to work together to decode the DRM signal in either a *Windows* or *Linux* environment. I decided to choose the DRM consortium package and I waited a few weeks to ensure a good exchange rate to minimise my outlay.

The DRM package is downloaded from the website and the instructions are pretty easy to follow. Once the software was on my PC I 'unzipped' it, but it wouldn't work until the DRM group had E-mailed me a key to unlock it. This took a few days and once I followed the instructions in the E-mail, I was up and running in a few minutes. The DRM software then required confirmation that it had found the correct soundcard and asked for the location of the receiver. This could be inputted either using latitude and longitude or by reference to a bearing from a major airport.

Web Resources

Check these links for more DRM information:

DRM Schedule Updates.
www.rnw.nl/realradio/html/drm_schedule.html

DRM Consortium and DRM Software.
www.drm.org

DRM Reception and Radio Modifications.
www.drmrx.org

DRM Technical Information.
www.drmradio.co.uk

DRM JARGON

As you decode DRM you will come across a number of broadcasting parameters. Below is a brief explanation of what these acronyms mean.

The DRM signal has a number of components that are assembled into a multiplex stream.

Fast Access Channel (FAC): channel of the multiplex data stream, which contains the information that is necessary to find services and begin to decode the multiplex.

Main Service Channel (MSC): channel of the multiplex data stream, which occupies the major part of the transmission frame and that carries all the digital audio services, together with possible supporting and additional data services.

Service Description Channel (SDC): channel of the multiplex data stream, which gives information to decode the services included in the multiplex.

AAC coding

The DRM signals that I have managed to decode all use the MPEG4 encoding algorithm called AAC (Advanced Audio Coding). This is a way of compressing the bit streams so that they fit into the available bandwidth.

SBR coding

To maintain a reasonable perceived audio quality at low bit rates, classical audio or speech source coding algorithms need to limit the audio bandwidth and to operate at low sampling rates. Where an audio source has a wide bandwidth the AAC encoding used in DRM is likely to truncate the higher frequencies. These frequencies can be restored by the use of Spectral Band Replication (SBR) whose purpose is to recreate the missing high frequency band of the audio signal that could not be coded by the encoder. This is done by sending the information needs in the audio bitstream, removing a small percentage of the available data rate from the audio coder. This information is computed on the full bandwidth signal, prior to encoding and aids the reconstruction of the high frequencies after audio/speech decoding.

PS coding

An extension of SBR is a technique called Parametric Stereo coding where the stereo image effect is again sent as side information along with the mono signal to be synthesised at the decoder. This stereo information is very concise but does take up a percentage of the total bitrate.

QAM

Quadrature Amplitude Modulation is a combination of amplitude and phase modulation techniques. It is a way of encoding multiple bits into a single modulation change. For example 4-QAM uses two amplitude levels and two possible phase shifts, 16-QAM will use combinations of four amplitude levels and four phase shifts and 64-QAM will use eight and eight. In encoding terms 4-QAM has four possible states and in binary terms can encode two bits at a time. 64-QAM can encode six bits at a time so any interference will damage a lot more data in the bitstream.

MODES

DRM has four modes, A to D. Mode A is for l.w. and m.w. during the day, B (the most common) is for m.w. at night and for short wave. Modes C & D are for the tropical bands where signals are transmitted near vertically and reflected by the ionosphere.

Read the conclusion to Kevin's experience with his DRM conversion next month.

Another First from the UK's First RFSpace SDR-14 Part 2

Kevin Nice takes us through the new SDR-14 software defined radio from USA based manufacturer RFSpace - here's the final part of his findings.

The main problem I encountered with the SDR-14 was that I ran out of time - it really needs to be the subject of a long term test, the kind that motoring magazines conduct, so that I can report back every couple of months on aspects of use that I'd missed in the first pass. Such is the enormity of the capabilities of this software defined receiver.

There is much that can be done using the SDR as a basis, for instance I would be most interested in building some down-converters to be able to use the SDR-14 at v.h.f. and microwave frequencies, it is my understanding that the manufacturers are considering adding such a converter to their portfolio. Though for these parts of the spectrum it would be advantageous to have a wider span available so that a wider view of the spectrum would be possible. But, as I mentioned last month, this would require both a higher speed interface than the current USB 1.1,

which limits the data transfer rate to 12Mb/s, and a much faster PC to process the SDR-14's resultant output.

It is of course currently possible to view a wider span than the 150kHz supported in real-time, but as the segments captured and digitised by the SDR-14 need to be reassembled by *SpectraView*, the resulting display is a static record only. It is nonetheless, a useful feature to be able to produce a spectrum view from 0-30MHz - most enlightening!

It is quite possible to use the SDR-14 as a spectrum display, coupling the h.f. port of the unit to a suitable i.f. output on your receiver of choice. I have indeed used the SDR-14 in this manner in conjunction with my trusty Icom R8500. It is a joy to use - a complete contrast to, but sadly not a replacement for my SDU5500. As there is a huge trade-off in terms of spectrum covered. Using both with a splitter on the i.f. output was most entertaining however.

Clearly it is intended that the SDR-14 be used as a spectrum display, as the necessary configuration capabilities are present in the SDR set-up dialogue box - Fig.4.

RFSpace comment that they have a big percentage of customers who are using the receiver as a panoramic adapter at 10.7MHz. They have already implemented an RS-232 link to the different radios using the Auxiliary output of the SDR-14. But this was not available on the test unit.

They also plan on adding direct RS-232 out of the PC, but they say that there are some things that are able to be supported via the SDR-14 serial link that cannot be supported with the computer port. I await with interest to see these developments. I understand that

there is also AR5000 support in the offing, but this too is still in development. It's my guess that the changes will all be software related, so shouldn't be a reason for holding back on investing in an SDR-14.

Benefits

The other major benefit of SDR-14 ownership is the ability to record 150kHz chunks of spectrum for future examination. This facility is limited only by your imagination and your hard disk capacity...

The facility is enabled by making the appropriate selections in the Data Output Dialogue box - Fig. 5. As you can see this offers a flexible approach to recording, with either, just the demodulated audio saved as a standard '.WAV' file, or the whole r.f. span stored to an extended Wave file. The recording start time can be delayed to a specified time and the duration can be varied. It is possible to chain multiple record files, which are identified by having their names made up in a time/date format - well thought out indeed. The saved spectrum files can be replayed later on using *SpectraView*, the audio .WAV files with any suitable audio player on the platform of your choice.

Whilst discussing saving of SDR-14 output, it is also possible save signal level data in numerical form as an *Excel* spreadsheet file - this will appeal to the professional monitors but would make a superb tool for plotting r.f. background levels.

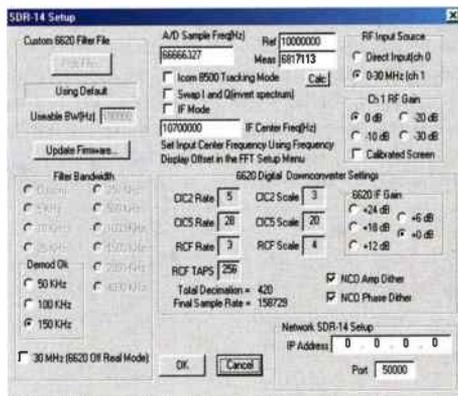
Then there's the ability to control and display the data from the

SDR-14 via an i.p. based network. Too much for the space I have here - as I said at the beginning what's needed is a long-term test.

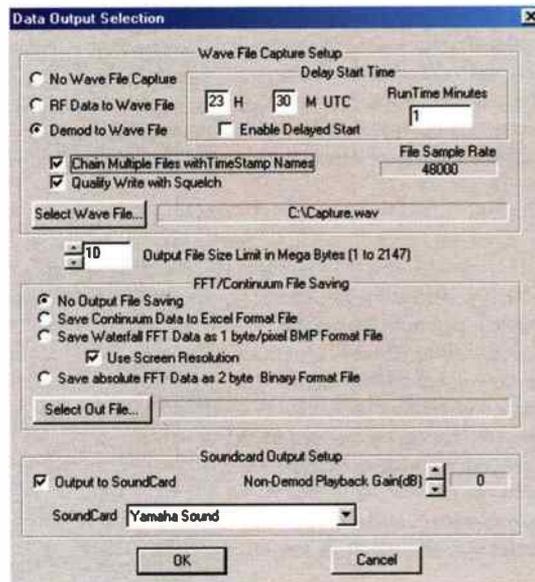
The Big Question

Would I spend my money? The answer is a resounding yes - I want one, I'm saving up already! This brings me to the next question.

Where do you buy an SDR-14? At the time of writing, there are no UK outlets for the RFSpace receiver, as the main thrust of their marketing is currently aimed at their home market in the USA. To this end, the SDR-14 is not currently CE



● Fig. 4: The SDR-14 Set-up dialogue box.



● Fig. 5: File capture and save options are controlled via this dialogue box.

approved. If you are considering buying an SDR-14 then you can contact RFSpace direct www.rfspace.com or their USA agents Universal www.universal-radio.com

Price is currently \$999, though if you import one personally, expect to pay import duty, carriage and VAT on top. This gives a total of about £880 based on exchange rates prevailing at the time of going to press.

SWM

Amateur

Bands

- **Clive Hardy** SWM, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
- **E-mail** clive@pwpublishing.ltd.uk

The Pacific DX Group plans to be on Kure Atoll - callsign KH7K - from mid to late October with a team of about 15 operators led by Kimo Chun KH7U and Patrick Guerin NH6UY. Many members of the international team are seasoned DXers with experience of the K5K operation on Kingman Reef in 2000.

Operations should last about ten days, with all the usual h.f. bands covered, plus 50MHz. As well as s.s.b. and c.w. there will be some activity on RTTY and PSK31. Kure Atoll is part of the Hawaiian Islands group and is the northern most coral atoll in the world. Although it is 10km in diameter, the only significant land component of the ring is Green Island, which is about 1km long and a mere 20m a.s.l at its highest point.

Another Stateside based DX group, this time from Florida, is off to the Caribbean's youngest island, Dominica, to operate with the call J75J during the CQ WW DX SSB Contest during the week starting 26 October. They'll be there from that date for a week and when not taking part in the contest will be using individuals, so listen out for J75WX, J79AA, J79CM, J79LR and J79VL.

Going around to the other side of the globe, Lord Howe Island, a volcanic remnant in the Tasman Sea off Australia's east coast, will see another DXpedition organised by Australia's Oceania Amateur Radio DX Group from the 9 to 23 October. VK9LH will be the callsign used by the eight or so operators. And as for modes, it's the usual voice, c.w. and RTTY - all going out on h.f. and 50MHz.

Shhh!

For those of you who like a secret there's a



DXpedition off to the Chesterfield Islands in October. Part of the French overseas territory of New Caledonia, these small, sandy, uninhabited islands are in the Coral Sea off Australia's north east coast. Not only is the team of half a dozen Germans who are running the show keeping the start and finish dates of their trip close the their chests, the callsign won't be made public until it hits the airwaves either.

In Its Day, Even More Hush-Hush

At a recent visit to the wartime code breaking establishment at Bletchley Park I was able to hand over a number of old valves I'd acquired to the team re-building the Colossus



Britain's efforts to decode German radio messages during World War Two.

If you've got any valves gathering dust and would like to see them go to a good home, then **Colossus Rebuild Project, Bletchley Park, Milton Keynes MK3 6EB** is the place to send them. Alternatively take them there yourself and visit the on-site amateur radio station **GB2BP** run by the Milton Keynes Amateur Radio Society as well. The types of valves the project requires are: 6J5, 6K8, 6V6, 807, ECH35, EF36, EF37 and EF37A.

Any contributions, large or small, would be appreciated. However, the valve to send them that will really bring a smile to their faces is the GT1C (CV1128) thyratron.

25 Not Out

Not a particularly spectacular cricket score, but not bad for the number of years writing the Amateur Bands Review column for the International Short Wave League's (ISWL) monthly Monitor magazine.

Congratulations to **John Fitzgerald G8XTJ** on a fine achievement. In recognition of all his hard work John was presented with a very smart 'Appreciation' plaque by ISWL council member **Arthur Knight G0KOC** at the Elvaston Castle Rally in June.

One of the things that always impresses me when dealing with members of the ISWL is

what a friendly, and I use the word carefully here as we are talking of radio enthusiasts, normal bunch of people they are! It no doubt explains the continuing healthy existence of the League as it approaches its 60th birthday in 2006.

Other machines being rebuilt there also require a large number of valves to operate. It's a worthwhile project to reconstruct and maintain these early computers that made such a significant contribution to

computer. The machine is all but finished, but will always need spare parts.

Other machines being rebuilt there also require a large number of valves to operate. It's a worthwhile project to reconstruct and maintain these early computers that made such a significant contribution to

what a friendly, and I use the word carefully here as we are talking of radio enthusiasts, normal bunch of people they are! It no doubt explains the continuing healthy existence of the League as it approaches its 60th birthday in 2006. Since the introduction of the Foundation licence the proportion of the ISWL's membership who are licensed has grown to around 80%, which should ensure activity on its ten weekly nets. There's not enough space here to list them all, but on Sundays try 50.270MHz at 1930 or 1.925MHz an hour later. On Tuesdays at 1900 its 3.700 MHz and Saturdays at 1030, there's a move fifteen kHz down to 3.685MHz. The mode for all those nets is s.s.b, and the times are clock, not UTC. Open to all licensed amateurs, short wave listeners and affiliated clubs, if you think the ISWL is for you then write for membership details to **Mr C. H. Jobling G4YHP, ISWL Honorary Treasurer, 'Joycliff', 20a Poplar Rd, Healing, Grimsby DN41 7RD**. Alternatively send him an E-mail to ch.jobling@ntlworld.com Now I wonder what sort of present I'll get if I'm still writing this column in 2027!

Location, Location, Location

A vital aspect of preparing maps for use with APRS (Automatic Packet Reporting System- see 'Amateur Bands' SWM Dec 2002) - in the need to precisely define the north west and south east corners of the map in terms of latitude and longitude. Finding the OS National Grid Reference (NGR) of those points for a UK based map is pretty easy. Accurately determining the lat/long of those points is not such an easy task.

Fortunately, whilst preparing some maps to use with APRS at the *Ironman Triathlon*

back in August I found a program for converting the OS National Grid Reference to latitude and

longitude with an algorithm that produces pretty accurate results. Small and DOS based, the program is simply called NGR.exe and can be found at

www.spsys.demon.co.uk

web page of Specialist Systems, Lasham, Hampshire. Primarily concerned with gliding, the site contains links to several downloadable flight and location related programs.



● **Peter Bond** *clo Editorial Offices, Broadstone*

● **E-mail** *skyhigh@pwpublishing.ltd.uk*

Every so often, an event takes place, which with the help of home video provides absorbing viewing that surpasses any Hollywood film. Unfortunately, it usually requires a disaster to provide that footage and that is exactly what happened to the people of Boscastle on 16 August.

After several hours of torrential rain, the sedate lives of the residents in this picturesque village were turned upside-down in just a few minutes. The sight of numerous trees, cars and buildings being washed away in the torrent like corks in a stream was almost unbelievable, but most importantly it is quite amazing that there were no fatalities or serious injuries from such a major incident.

I cannot recall an occasion where seven Search and Rescue (SAR) helicopters were called to such a localised incident. Fortunately, may not be the correct word to use, but it was indeed fortunate for the people in Boscastle, that so many SAR helicopters were based within such a relatively short distance. With thanks to all the 'Sky High' readers who sent me information concerning the incident, which I have collated and abbreviated as follows:

First indications of a problem appeared on Kinloss Rescue on 5.680 when several helicopters were tasked to, 'Bridge collapsed, this is a Major incident', it was not long before seven helicopters were on scene. The

being prioritised in terms of possible danger to the casualties.

Rescue 170 appeared to take on a high percentage of the casualty evacuation duties with over 50 people rescued in a relatively short period of time. Apart from the appalling damage caused by the flash floods the story could have been much, much worse except for the swift response and professionalism of the helicopter crews, ably backed up by the other emergency services.

To those in the 'powers that be' who have recently wanted to get rid of the Portland and other SAR helicopters, I strongly suggest that you re-watch the video of this incident several times before deciding to reduce our Search and Rescue capabilities to save a relatively small amount of money! I am sure that all our readers will join with me in complimenting all the emergency services involved for a spectacularly successful rescue in very difficult conditions.

RIAT 2004 Monday Mayday

With thanks to **Andy M**, I can report an emergency that happened on the departure day at Fairford. Having departed Fairford, Belgian Air Force F-16, callsign BAF 431 was working London Military, (Swanwick), on 233.8 when he reported a loss of cabin pressure. He made a MAYDAY call and asked for an immediate return to the airfield, he also

managed to re-start the engine and diverted to St. Mawgan keeping contact on frequency 370.55.

Defence Cuts

The latest round of defence cuts were announced on 21 July, with as expected a fair percentage being aimed at the RAF. One of our most famous bases RAF Coltishall is to be closed by the end of 2006 and the three based squadrons are to lose their Jaguars which are to be retired by 2007.

An as yet un-named Tornado F3 squadron is also to be cut. Added to other cuts announced in the last few years it is obvious that this present government is intent on decimating our armed forces. All this at a time when during the past decade our armed forces have been involved in more conflict and peace keeping duties than for many years previously.

This appears to be a bit of a premature 'knee jerk' reaction, once again no doubt fuelled by requests for financial cuts from the Chancellor'. The demise of the long serving Jaguar having apparently been brought forward, most importantly the proposed retirement date will see it withdrawn well before the Typhoon is in service with the RAF at its full compliment of 89 aircraft.

Airband Analysis (Part 2)

Following on from my initial look at the AOR SDU5600 and its ability to sweep selected parts of the civil airband up to 8 or 10MHz at a time. Next, it was now the turn for me to investigate the military airband. (If you didn't read the first part of this report you will have to get a back copy of the August *SWM*).

To identify which sections of the military airband may be the most productive, I thought it would be an interesting exercise to produce the following listing from my frequency database. They are listed in 10MHz bands but I actually searched for frequencies in 8MHz chunks so that I could utilise the 25kHz spacing on the SDU5600 as mentioned previously.

This listing encompasses my complete database, (which includes some adjacent European Radar and Air-to-Air frequencies), the information in brackets is the number of frequencies I have listed in each 10MHz band. Don't forget that there are no voice frequencies between 225 and 230MHz and that most of the band from 328.6 to 335.0 is used for the Glideslope element on Instrument Landing Systems (ILS).

Call	Aircraft	Operator	Based At
Rescue 169/Rescue 170	Sea King HAR.3A	22 Sqn/A Flight	Chivenor
Rescue 180	Sea King HAR.3A	203 (R) Sqn	St. Mawgan
Rescue 193/194/195	Sea King HU.5SAR	771 Sqn	Culdrose
Rescue Whisky Bravo	Sea King S.61	HMCG/MCA	Portland

aircraft involved were:

Rescue 180 is a rarely heard SAR callsign, but from piecing the evidence together I am fairly confident that this Sea King was from 203 (R) Squadron at St. Mawgan, (any comments). Because of a variety of reasons, not least of which was the size of the incident and access to the site it took a little while to establish a command control centre.

On scene co-ordination was set up on 123.1, but it appeared that some of the Sea Kings were initially having problems with this as they were passing messages via Kinloss Rescue on h.f. On site risk assessment was continually being carried out with each lift

asked for maintenance crews to meet him on his return.

He was handed off to Brize/Fairford Radar on 277.35 when Andy, (who was listening from Taunton) lost radio contact as he descended through 5000 feet. Nothing else has been reported so I assume a safe landing was made.

Not connected to the RIAT 2004, the following day (Tuesday 20 July), there was a second MAYDAY when SPIDER 1 reported a flameout to London Military on 275.475. From the callsign I would suggest that this was a Sea Harrier, although one other report suggested he had an American accent. He

- This month's photo is the Italian Air Force Piaggio P.166 arriving at RIAT 2004, just before he made his unexpected barrel roll!



230.0 - 239.975	(44)
240.0 - 249.975	(129)
250.0 - 259.975	(132)
260.0 - 269.975	(108)
270.0 - 270.97	(91)
280.0 - 289.975	(77)
290.0 - 299.975	(100)
300.0 - 309.975	(71)
310.0 - 319.975	(101)
320.0 - 329.975	(11)
330.0 - 339.975	(76)
340.0 - 349.975	(111)
350.0 - 359.975	(84)
360.0 - 369.975	(110)
370.0 - 379.975	(141)
380.0 - 389.975	(68)
390.0 - 399.975	(33)

Now before I report my findings it is worth mentioning one item. The SDU5600 has a sensitivity threshold set at a slightly different level to that of a wideband receiver. Whereas a sensitive radio will pick up a weak but audible weather broadcast on an ATIS 64km away, the '5600 may not show a peak on the display for the same signal. To those of you who like to drag those weak signals from the ether this may seem a bit odd, but it is done for a reason.

Without going into too much detail, for a given bandwidth the noise floor of the SDU5600 is set at around 100dBm whereas the AOR AR8600 for example is set at 133dBm. This is to ensure that any spurious signals or noise are not shown on the '5600 display. In other words if it shows on the '5600 display you can be pretty certain that it is a genuine signal.

I must quickly mention the software which is currently version 0.9.0, this is a late beta

version which can be downloaded free of charge from AOR's website. It is very simple to use and gives you all the basic controls of the '5600. Perhaps its strongest feature is the facility to record the waterfall facility.

Now the waterfall is literally just that. The screen splits into two horizontally, the top screen is the standard screen showing the peaks of received signals. The waterfall is the bottom screen which drops from top to bottom against a time gradient. Each time a signal is received in the selected span it shows as a vertical trace on the screen, if the frequency is busy then it will gradually fall down the screen as time passes looking on the display a bit like the dots and dashes of Morse Code.

The software has the same Waterfall facility but with a moving time scale running down the left hand side of the screen. This therefore not only allows you to see how busy a frequency has been but also the timescale of the transmissions. Add to this the record facility which allows you to playback the waterfall in slow or fast modes and you have a powerful piece of airband Intelligence/interrogation equipment.

So what happened on the u.h.f. airband, well I have combined the various searches over a couple of weeks and here are the results. I should point out that some of the results came from lengthy recordings of the waterfall and were not actually monitored by me. As expected, various London/Swanwick Military frequencies were noted including the rarely heard 245.0 standby.

Also predictably, quite a number of u.h.f. Approach and Radar frequencies were noted for some of my local airfields such as Culdrose, St. Mawgan, Yeovilton, Chivenor,

Boscombe Down and Cardiff. Also heard was Colerne Approach on 277.275, a frequency that I don't hear very often.

As for discrete frequencies, the following are just a selection of those noted: 273.45 and 311.0, both Royal Navy FOST. 277.875 NATO Fighter Control TAD 600. Yeovilton D School, 259.8, 276.25 and 249.725. AWACS Co-ordination 375.55 (Tad 080), plus NATO MAGIC 277.3 and 277.25. Brest Control u.h.f. Discrete frequencies 316.05 and 355.9.

Also, two new (to me), Lakenheath Air-to-Air frequencies 231.825/Aux 11 492 FS and 246.9/Aux 14 492 FS. I also confirmed 365.1 as a Plymouth Military discrete frequency. Unidentified transmissions were as follows: 274.3, 276.1, 276.525, 277.275, 278.575, 305.9 (used to be a Culdrose frequency), 311.775 (possibly French Air Force), 337.85 (TAD 056/ex OTA frequency, who is it now), 352.375 and 363.225 - any offers anyone?

I haven't really touched the surface of what the '5600 can do but needless to say there are all sorts of parameters that can be changed. Away from the airbands, I had great fun analysing other parts of the radio spectrum including h.f. I realise that with a price tag of just short of £1100 that the SDU5600 is not within the budget of many readers.

Nevertheless, if you can afford to splash out that hard earned cash then as a tool for investigating the airbands, (or any other band for that fact), you will not be disappointed. Real time monitoring of a 1, 4, 8 or 10MHz section of the airband can be very enlightening - it is a tremendous piece of kit. (The original review of the SDU5600 can be seen in the March 2004 issue of SWM).

● Ben Hogan, *do SWM Editorial Offices*
 ● E-mail ssb.utilis@pwpublishing.ltd.uk

Roughly 25 years ago I was gossiping with my friend Tim Maloney G6FIX, who very sadly died many years ago at a very young age. Tim was a police traffic officer and usually patrolled on a motorcycle. Tim was telling me that while on duty he had seen what was clearly a direction finding vehicle by the side of the A40 west of London. He had stopped and approached the operators of the vehicle and said, "Let me guess, you're looking for six meg pirates". The two chaps in the van were startled by the accuracy of his statement and they questioned Tim regarding his knowledge of the subject. Tim was still laughing at their reaction some hours later when he told me the story.

If Tim were around today he would see that nothing has changed. Just a brief trip around the 6MHz section of the dial last night found several of these people operating illegally, of course, on I.s.b. The most powerful was on 6.680MHz and although several of the pirates appear to be located in the Republic of Ireland where they don't concern themselves much with this sort of thing, most were quite obviously in the UK.

I have heard these people often make derogatory remarks with regard to the authorities inability to locate them and it has crossed my mind that, with the technology available to HM Government in this decade, there can only be two reasons for the perpetrators to still be on the air. Reason one may well be that there is a lack of will, for whatever reason, to deal with the matter. Reason two could be that a policy decision has been made to allow them to continue with their use of the band.

As utility monitors are all too aware 6MHz has many legitimate users mostly in the field of aviation and we can only assume that the authorities' general disinclination to prevent unlawful illegal transmissions in the band must indeed have a deep rooted cause.

Illegal Operators

While on the subject of illegal operators, 4.747MHz u.s.b. has been busy with the sort of conversations and language that listeners to the Scottish fishermen have come to expect. It seems that these fellows, however, are land based and have rural English type accents. A Peruvian broadcaster (Radio Huanta 2000) uses this frequency but it certainly wasn't them! In any case it seems unlikely that monitors will be

hearing fishing boats for very much longer as the British fishing industry is now definitely on its last legs having been very nearly legislated out of business. Make the most of it while you can.

Another strange capture was on 5.210MHz

I.s.b. This was a female operator sounding very efficient and using what I believe was French. I couldn't make out the substance of the traffic but she sounded so officious that it gave me the impression that she wasn't the slightest bit concerned whether she was legal or not.

A Morse numbers station is an occasional user of this frequency and it is one of two channels (the other being 5.031) licensed for use of Aboriginal people in Canada's northland. Both frequencies in use by Canadians use u.s.b. It's unlikely that any European or even American monitors of the Canadian traffic will make much sense of it as it's all in a native language called Inuktitut.

I believe that the transmitter is at Iqaluit and the idea is for native hunters and trappers to have access to weather reports and emergency communications, as well as to be able to post advance details of their travel plans. Range is supposedly limited to 400km of Iqaluit and provides a service for those Aborigines (formerly known as Eskimo people) working in the Frobisher Bay area.

The Australian Customs Service is busier than ever. The country has suffered a massive increase in contraband traffic in the last few years. Obviously the Royal Australian Navy operates in close co-operation with their colleagues in customs but the ACS have some h.f. frequencies of their own of which one or two have been monitored in Europe.

Listen out for them on 2.1495, 7.9615, 1.3925, 5.2865 and 10.4365MHz. The actual carrier frequencies are 1.5kHz below these 'dial' frequencies and I understand that frequencies may be adjusted to avoid noise/interference.

It's more interesting than the lottery and usually there is much more at stake. This

seemingly pointless collection of numbers, see **Table 1**, is an example of part of a cipher system that is, if properly used, totally secure.

In radio there are many ways of enciphering or encoding messages. The reasons for doing so are as varied as the information that they contain. These days most ciphers are created using computers and the hidden traffic

is sent via the internet or via some sort of telephone or satellite link. Having said that, there is still talk of 'one-time-pads' being used for communication purposes.

Each pad has a number of printed tear off pages that look pretty similar to the representation above. Each page is used only once and then destroyed. Only two copies of the pad exist. One is in the possession of the field agent (or asset) and the other is held by the agent handler or controller.

Assuming a short message is to be enciphered by the field agent - something like 'Quinn is in place'. Firstly separate the message into separate letters and number them according to a plan arranged between the agent and handler. In simplest terms and for this example, the letters are numbered according to their place in the alphabet. Then the numbers on the top sheet of the pad from left to right are added to the letter numbers using carrying arithmetic, see **Table 2**.

You can see that by using this method the same letters are never enciphered to the same four figure number although in theory it is possible. It will always work as long as the agent and the handler are using the same sheet of their respective pads. When the message has been passed the agent destroys his sheet and when deciphered the agent handler does likewise.

A disadvantage is that anyone caught with a one-time-pad in their possession could be in very deep trouble. Several methods of destroying these pads in double quick time have been developed but it still remains a risk to the agent. The message also takes a while to encipher.

Another problem is if the agent and handler somehow get out of sequence with regard to the sheet on the pad they are using. In that case they may as well chuck the whole thing away and give up. I appreciate that this is an old method of enciphering traffic, but with the widespread monitoring of cellular and satellite 'phones and E-mails by the authorities many field operations are reverting to older, tried methods that appear to be more secure.

In any case, if you hear talk of a one-time-pad, you can now explain it in the pub to an admiring audience.

Table 1:

7680	2180	1167	0304	7718
4195	3414	9792	3465	4103
5973	9088	5767	2144	7418
5665	8074	7113	5999	8725
1593	4203	2225	7297	3076
2794	9951	4327	6047	3949
6315	8790	5379	1267	1116
5842	5225	1908	1100	1930
4978	2621	7492	0518	5934
8874	6815	5130	5599	4106
8113	1091	1267	2498	1944
2346	7434	8555	1034	5696
3641	7288	2260	1772	8510
0838	6112	5024	8855	9142

Table 2:

Q	U	I	N	N	I	S	I	N	P	L	A	C	E
17	21	9	14	14	9	19	9	14	16	12	1	3	5
7680	2180	1167	0304	7718	4195	3414	9762	3465	4103	5973	9088	5767	2144
7697	2201	1176	0318	7732	4204	3433	9771	3479	4119	5985	9089	5770	2149

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The receiver is extremely sensitive, making it possible to comfortably read CW signals well under -130 dBm input level, yet featuring a respectable 95 dB dynamic range making the receiver resistant to strong signal overload.



The high sensitivity is also matched by that of the S-meter: The calibrated S-meter shows the received signal levels in dBm, μ V or S-units, down to the receiver noise floor. The IF bandwidth of the receiver is continuously adjustable from 1 Hz to 15 kHz, in 1 Hz steps.

Several WR-G313i receivers can reside in a single PC (as many as there are free PCI slots), which provides an ideal solution for high-performance multi-channel surveillance and monitoring systems.

As the last IF and demodulation processing are entirely software-defined, this means that additional demodulation or decoding modes can be easily added by a mere software change.

In addition to audio recording, the receiver can also record a 20 kHz wide spectrum at the IF level, making it possible to thoroughly analyse a signal, and experiment with a weak signal with different filter settings for the

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you learn there are a host of Morse tutor software programs to be found on the Internet. One that I've used over many years to brush-up my speed is *NuMorse*. I remember reviewing this one when it first came out and it has stood the test of time. You can download a trial version of the program from the following site:

www.nu-ware.com

That's about it for c.w. idents, but if you've found any useful tips or software please let me know so I can share it with other readers.

FAX Basics

One of the questions I often get from readers concerns the automated reception of h.f. FAX signals. h.f. FAX remains one of the most reliable sources of interesting information on the short wave bands, so is worthy of scrutiny. One of the snags with the mode is the time it takes to receive an image - a typical FAX taking up to 15 minutes to come through. If you try and receive these images manually it is very difficult to accurately capture the start, plus you have to hang around for 15 minutes to catch the finish. The solution to this is to make use of the automated reception facility that's built into most FAX programs. Even if you already use this facility, it's still interesting to understand what's going-on behind the scenes.

The automated process has been around for many years now and is extremely simple, yet very effective. The system employs just simple carrier switching and three tones that

are superimposed on the carrier. Despite the simplicity, it can automatically set drum speed, IOC, start, finish and synchronisation. Here's how it works: In it's idle state the transmitting station either sends a continuous white tone or no carrier at all. The start of the transmission is marked by either a 300Hz or 675 tone. This tone is used to signal the IOC of the following transmission with 675Hz used for 288 and 300Hz for the more common IOC of 576.

The next step in the process is a cyclic pulsing of the carrier from black to white. This has a dual purpose and signals the speed of drum rotation usually 60 or 120r.p.m. but equally this pulse also indicates the edge of the picture. If you've ever tried manual reception, you will know how irritating it is to have the edge of the picture in the middle of the screen! At the end of the image a final 450Hz tone is transmitted to indicate completion and switch the receiver back to standby ready for the next image.

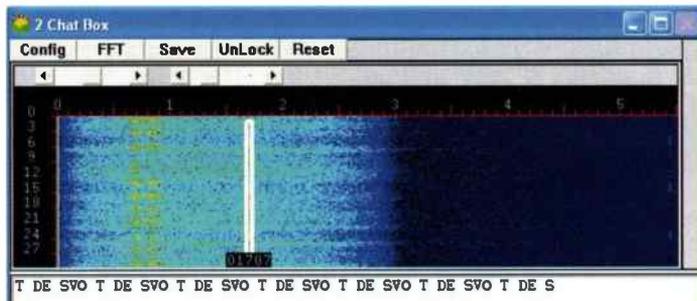
Each of the tones used in the automated reception process are usually sent for long enough to get through even quite difficult conditions, which is why the systems has survived largely unaltered for so long. Providing you have a stable receiver you can leave the automated system to receive pictures pretty much unattended - the whole point of the system is automation after all!

The other adjustment which is crucial to good image reception is skew. This is all

about getting the computer clock correction spot on. All computer systems have an internal clock which is used to drive the main processor and the timing of all the data transfers within the PC. Whilst these are usually crystal controlled, the absolute accuracy is not particularly important, so you will find quite a lot of variation between computers. However, when you start receiving FAX images, slight differences in absolute time show-up as a skewing of the image over the 15 minute receive period.

All FAX programs have a correction system built-in and you need to check the program's help file to see how to do this. The next problem is to find a suitable source with which to set the synchronisation. If there is one particular station that you use which is the best to use for calibration. You can use any of the major weather stations as most use very accurate clock standards to control their transmissions. An alternative is to use one of the many frequency standard transmissions that are available. My favourite is MSF on 60kHz as this produces a regular pulsing signal that's easy to see. To use this, just set your FAX program to 60r.p.m. and an IOC of 576 or 288 and start reception.

Now tune to around 60kHz with the receiver mode set to u.s.b. until you can see a pattern building up on the screen. When you have a screen full you need to use your program's skew correction to accurately align the picture. Once complete you will have a very accurate FAX set-up.



Using the *Skysweeper* program for error free decoding of c.w. idents.



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Digital Modes for all Occasions

This is the book for every person who is interested in Amateur Radio Digital Modes, as it is simply the most complete book yet written on this subject.

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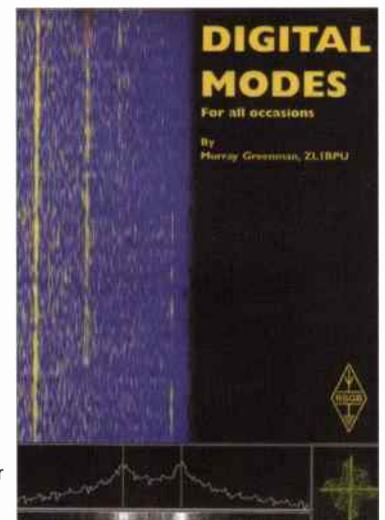
As well as over 100 illustrations, there are precise and carefully illustrated details of how to set up the computer and soundcard for digital modes. You'll find glossaries of digi-mode terms and extensive information on software and web site related to the digital modes.

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It only takes a glitch - an unexpected electrical impulse - to knock out a satellite. At first, that appeared to have been the cause of July's (temporary) failure of NOAA-12, the oldest of NOAA's operational polar orbiting weather satellites. The fascinating real story is explained this month. The first of my new monthly reports from the weather satellite (WXSAT) groups is included.

NOAA-12 Survives

Officially there was a battery undervolt event and the AVHRR scanner that provides all the imagery (h.r.p.t. and a.p.t., as well as many other products) was turned off at 2315 on 25 July. Such glitches are detected by system electronics and these power down the individual instruments for safety.

After the 'glitch' hit NOAA-12 on 25 July, **Chuck Vaughn** was the first to report the problem - a lack of 1700MHz band telemetry - followed by European observer **Nick Hewgill**. **Colin Schulz** of the Pacific Islands Met Project off the east coast of Australia reported anomalies at around 0620 on 26 July from NOAA-12: "No sign of APT carrier. (The) h.r.p.t. carrier seemed stronger than normal by a quite a few dBs".

Within hours, NOAA was studying the nature of the problem and identified the status as that following Safe State entry in which all instruments are powered off. This had happened during the point at which NOAA-12 was exiting eclipse.

During their orbits, periodically all the NOAA WXSATs pass through the earth's shadow. At that time, NOAA-12 relies on two batteries and, of course, they reach their lowest voltages just prior to the eclipse exit. This was the actual sequence: On 25 July at 2318 battery-2 voltage fell to 19.05V while exiting orbital eclipse. This value is below the 19.25V threshold for triggering autonomous power survival safestate and software routines on the spacecraft.

Battery-1 also fell to a similar value at the same time, but it was battery-2 that actually triggered the Safestate mode. When this trigger is reached, Safestate mode autonomously induced the spacecraft to perform an electrical power load shed that included the only two remaining operational payloads: SEM (Space Environment Monitor) and AVHRR (imaging scanner).

NOAA-12 is the morning standby satellite and does not have the number of daily ground station support sessions that later satellites (such as NOAA-17) have. This led to only a limited amount of engineering data being available for failure analysis. As is usual practice, other

ground stations were called up to provide extra support during the critical time.

During the following days, NOAA commanded the systems back on and were able to report that no further glitches occurred. Within just a few days, on 28 July at 1800, power to the high resolution telemetry system was switched on and NOAA's longest serving polar weather satellite (WXSAT) was back in operation.

The batteries on NOAA-12 are over 13 years old, so it is not unreasonable to anticipate power problems, possibly at an increasing frequency. I studied the detailed notes published by NOAA concerning this failure and they explained that hardware problems (a "degraded shunt performance") had previously



● **Fig. 1: NOAA-12 1531 25 July** from **David Oesch** - <http://saturn.unibe.ch/rsbern/noaa/dw/realtime/n1b/>

resulted in the need to adjust the position of NOAA-12's solar panels with respect to the sun. They also had to power on some otherwise unused systems. These adjustments have inevitably resulted in a lower than optimal charge rate for the batteries during the eclipse season.

This season is the period each year during which the satellite passes through the earth's

shadow during every orbit. NOAA-12's eclipse season started in mid-April, peaked in early July and began to wane in mid-July. It ended in mid-August. At other times the satellite's sun-synchronous orbit and height permit continuous illumination of the solar panels.

Many years ago, during the time when the British science satellite UK-5 was being commanded by our team at Appleton Laboratory in Slough, this battery eclipse exit voltage was monitored on every orbit. It finally hit the alarm value not long after I joined the group (I don't think the two were related!) Exercises such as battery re-conditioning are able to lengthen the lives of some types of rechargeable batteries.

During the Wallops Ground Station pass of NOAA-12 on 25 July at 2200, this voltage safety margin was breached. Unfortunately, commanding problems at the station resulted in an inability to turn off STX-2 before the spacecraft faded. STX-2 is a transmitter that can provide a number of forms of data transmission. This additional load was enough to bring the minimum voltage down and trigger the safestate situation which was then detected on the next scheduled pass on 26 July at 1025. Following this power failure, the battery voltage check



● **Fig. 2: NOAA-12 2206 25 July** from **Hendricus Lulofs**.

value has been reduced from 19.25 to 18.7V in case there is a recurrence.

After the eclipse season ends in mid-August, the next concern is Attitude Control operations during the low sun angle season that starts early September. NOAA-12's AVHRR (high resolution scanner) is considered sufficiently important to increase the number of NOAA-12 passes to four per day - effective immediately. This is good news.

During the day after failure, it became

evident that many monitors were operating continuous recording systems, so several people were able to identify their last received transmissions. **David Oesch** received **Fig. 1** showing the 1531 pass on 25 July.

Within an hour or so before *NOAA-12*'s failure, **Hendricus Lulofs** received **Fig. 2** during the satellite's final operational pass over the USA before the 'glitch'. Fortunately, there was to be a happy ending and *NOAA-12* resumed semi-normal operations during the next week.

Operating WXSATS

Following the rapid re-activation of *NOAA-12*, we are once more able to monitor a.p.t. (137MHz low resolution) imagery from *NOAA-12*, *NOAA-15* and *NOAA-17*. The next launch of an a.p.t. satellite will probably be *SICH-1M*, currently scheduled for launch on 15 October 2004 on a Tsyklon-3 from Plesetsk Cosmodrome, Russia. The launch of *NOAA-N* (18) is scheduled no earlier than 1 February 2005.

METEOSAT-5 Views Of Iraq

From the vantage point of *METEOSAT-5* over the Indian Ocean at longitude 63°E, the whole of the Middle-east and surrounding areas can be seen. Every 30 minutes, *METEOSAT-5* provides three high resolution images - visible, infra-red and water vapour bands of the spectrum.

On occasions, some incidents in Iraq can be observed vividly. On the morning of 3 August, we were alerted by an E-mail to the *MSG-1* (*METEOSAT-8*) forum of smoke billowing from a possible pipeline fire. The coordinates were given by **James Brown**, and on checking the region in the current *METEOSAT-5* image, there was a huge cloud of smoke.

I checked my *METEOSAT-5* visible-light images that morning (0515) switched on by my early rising wife Marion; her daily routine starts with switching on the USB *HotBird-6* (*METEOSAT-8*) receiver, followed by the computer. The smoke can be seen to have started early, to the south of Mosul - see **Fig. 3** - and the plume lasts for several hours before slowly dispersing - see **Fig. 4** and **Fig. 5**.

There are satellites recording much higher resolution imagery, some of which eventually appear on the Internet. To be able to see these events - not all of which are reported in the media - within hours, if not minutes of their happening - seems quite remarkable.

Correspondents' Pictures

George Newport received this *NOAA-12* pass and processed it using *WXtoIimg* to produce **Fig. 6** in which regions of probable heavy rain are indicated with brighter colours. My review of the recent version of *WXtoIimg* should be included in the forthcoming Special.

Kevin Hughes sent in **Fig. 7**, his usual remarkably clean images from *NOAA-17*. **Figure 8** shows the record breaking hurricane Alex that eventually crossed the Atlantic to rain over Britain in diminished form!

Yaesu Elevation Motor Repair

Last month I had just completed cleaning and re-assembling the motor ready for test. Marion helped me to position the dish on the cylindrical bar and we adjusted the mounting brackets to the correct position. Tightening the bolts is a difficult judgement. Too tight and you may strip the threads; not enough and you can watch the dish slide down on its support. I watched the dish slide down! (*Time to read the manufacturers' torque setting recommendations - Ed.*)

I put a marker on the cylinder to monitor any relative motion and this proved very useful. The tightening was then good so I completed the dish calibration procedure. The first pass worked perfectly; the second pass was near overhead and that went perfectly as well.

I was feeling rather pleased with my efforts by the third test when it became obvious that the dish had stopped moving correctly. Further tests unfortunately confirmed that the respite had been temporary and I was back to square one.

Having received a rather large cost estimate for factory repair, I posted a request for help in the WXSAT forums and was delighted to receive responses. The unit was collected that weekend. (t.b.c.!)

WXSAT Group Activities

Although the main communication channels for both RIG (Remote Imaging Group) and GEO (Group for Earth Observation) are their respective quarterly magazines, I have offered both organisations the opportunity to provide some notes for me on a monthly basis to help both groups keep in touch with their members more frequently. I am sure their members will appreciate this new feature.

RIG Notes - Courtesy Adrian O'Hea

"RIG is alive, but not too well at the moment. Following the AGM in May it is running with a minimum committee of five. The meeting turnout was poor with only eight members attending, including the committee! With a committee of just five, it is not possible for RIG to maintain the momentum it once had. The most pressing problem still to be overcome is the lack of an editor for the Journal and a lack of material.

The last Journal published was RIG 75 (December 2003). The position is a demanding one as the standard set by the previous editor, Les Hamilton, was extremely high. If anyone relishes this challenge please let the RIG committee know; similarly, anyone with ideas or articles for publication, please contact the

committee.

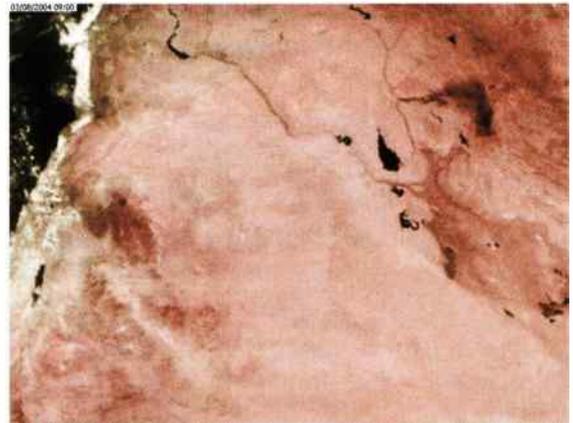
With the lack of a journal, members have not seen a return on their subscriptions for 2004. This is of great concern to the committee and members alike. Some members have requested the return of their subscription and their membership terminated. More than ever before, RIG needs the active support of members.

On a more positive note, there are plans to combine the AGM in 2005 with a one day symposium. This formula has worked well in the past and enables members to meet, learn and exchange experiences as well as take an active part in electing the committee. RIG also plans on attending the LARS event at Donnington Park on 1 and 2nd October 2004.

Regular committee meetings now take



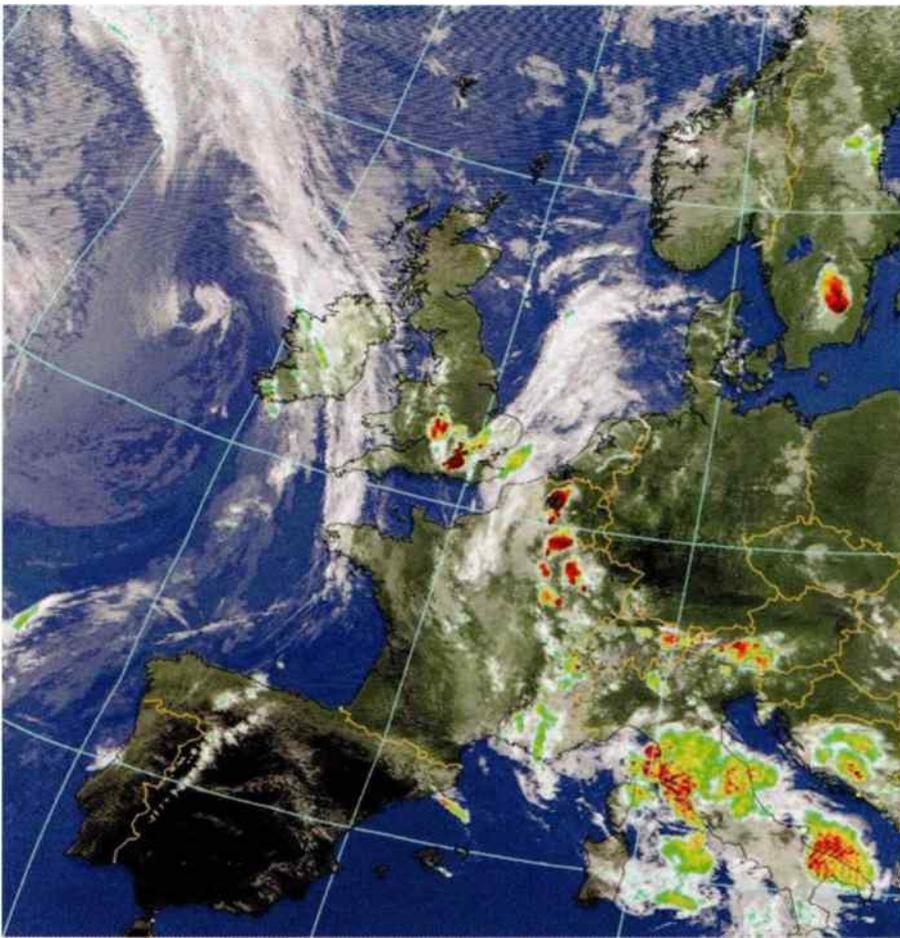
● **Fig. 3: 0530 3 August METEOSAT-5 visible**
© EUMETSAT 2004.



● **Fig. 4: 0900 3 August METEOSAT-5 visible**
© EUMETSAT 2004.



● **Fig. 5: 1330 3 August METEOSAT-5 visible**
© EUMETSAT 2004.



● Fig. 6: NOAA-12 1558 5 August from George Newport.

place, and members are encouraged to submit agenda items. The RIG shop is open for business and doing well. RIG has achieved great things in the past, and with drive and determination it can do so again. Let's hope it does".

GEO At AMSAT - From Francis Bell

Francis was pleased to receive an invitation from AMSAT-UK on behalf of GEO to attend their July - August colloquium in Guildford. They have their colloquium in late July each year. Surrey Satellite Technology Limited have their roots within the University of Surrey where the strong amateur radio interest gave birth to UoSAT-1 and UoSAT-2. The colloquium lasted three days and GEO agreed to have on display live weather satellite reception and provide speakers on direct readout weather satellite reception.

"Our task of establishing live reception of METEOSAT-8 via Eutelsat's HOTBIRD-6 presented some problems. There was a view of the southern sky but the 600mm dish we were using had to be repositioned. We achieved a balance and delivered a cable into the meeting room, adjacent to the main lecture theatre. Thanks to David Simmons and Carlos Eavis for their help; our dish was on the top of their vehicle for all three days. We had two computers running live reception, and a computer projector for live animations onto a large screen. APT receivers were also on display including Ray Godden's with its reprogrammed PIC for an extended range of

frequencies. Live APT was also demonstrated.

EUMETSAT were very supportive of GEO's presence, providing an outstanding speaker - Gordon Bridge. His presentation about EUMETSAT's structure and future programmes is also available by sending an s.a.e. to - GEO, Coturnix House, Rake Lane, Milford, Godalming, Surrey GU8 5AB, UK.

David Taylor is a software guru and his presentation was spectacular. He demonstrated previously received images and their processing using his SatSignal software. David made the computers work in real time. AMSAT had other speakers, and provided tours around the ground station. Francis saw the GEO Quarterly Launch issue outside Prof. Sir Martin Sweeting's office. He said: "Oh yes we are GEO members". John Tellick was there every day organising and answering questions. In the best tradition of our hobby it was a lot of fun".

Coming Soon

I notice that the WXSAT Special looms! I have three software reviews planned to join other features.

Frequencies

a.p.t. (137MHz band low resolution images).

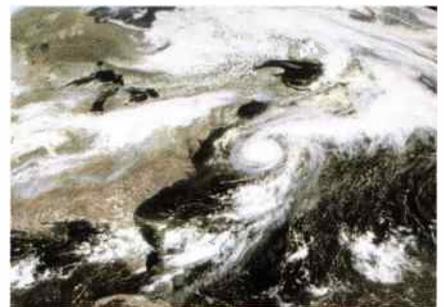
NOAA-12 and NOAA-15 transmit a.p.t. on 137.50MHz.

NOAA-17 transmit a.p.t. on 137.62MHz.

h.r.p.t. (1700MHz band high resolution images).



● Fig. 7: NOAA-17 a.p.t. 1136 12 August from Kevin Hughes.



● Fig. 8: Hurricane Alex - GOES-12 1800 4 August © EUMETSAT 2004.



● Fig. 9: GEO delegates with others at Surrey Space Centre. Photo: David Taylor, Edinburgh.

NOAA-12 and NOAA-16 transmit h.r.p.t. on 1698.0MHz.

NOAA-14 (faulty) transmits on 1707MHz.

NOAA-15 transmits on 1702.5MHz.

NOAA-17 transmits on 1707MHz.

FENGYUN-1C and -1D transmit on 1700.5MHz.

WEFAX: METEOSAT-7 (geostationary) transmits WEFAX on 1691 and 1694.5MHz and Primary Data on 1691.0MHz - (provisionally until end 2005).

METEOSAT-8 various formats transmitted via HotBird-6 at 13°E on 11.096GHz as EUMETCast data - get registered!

Propagation

Forecasts

- Jacques D'Avignon VE3V9A
- E-mail: Jacques@pwpublishing.ltd.uk

How to use the Propagation Charts

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

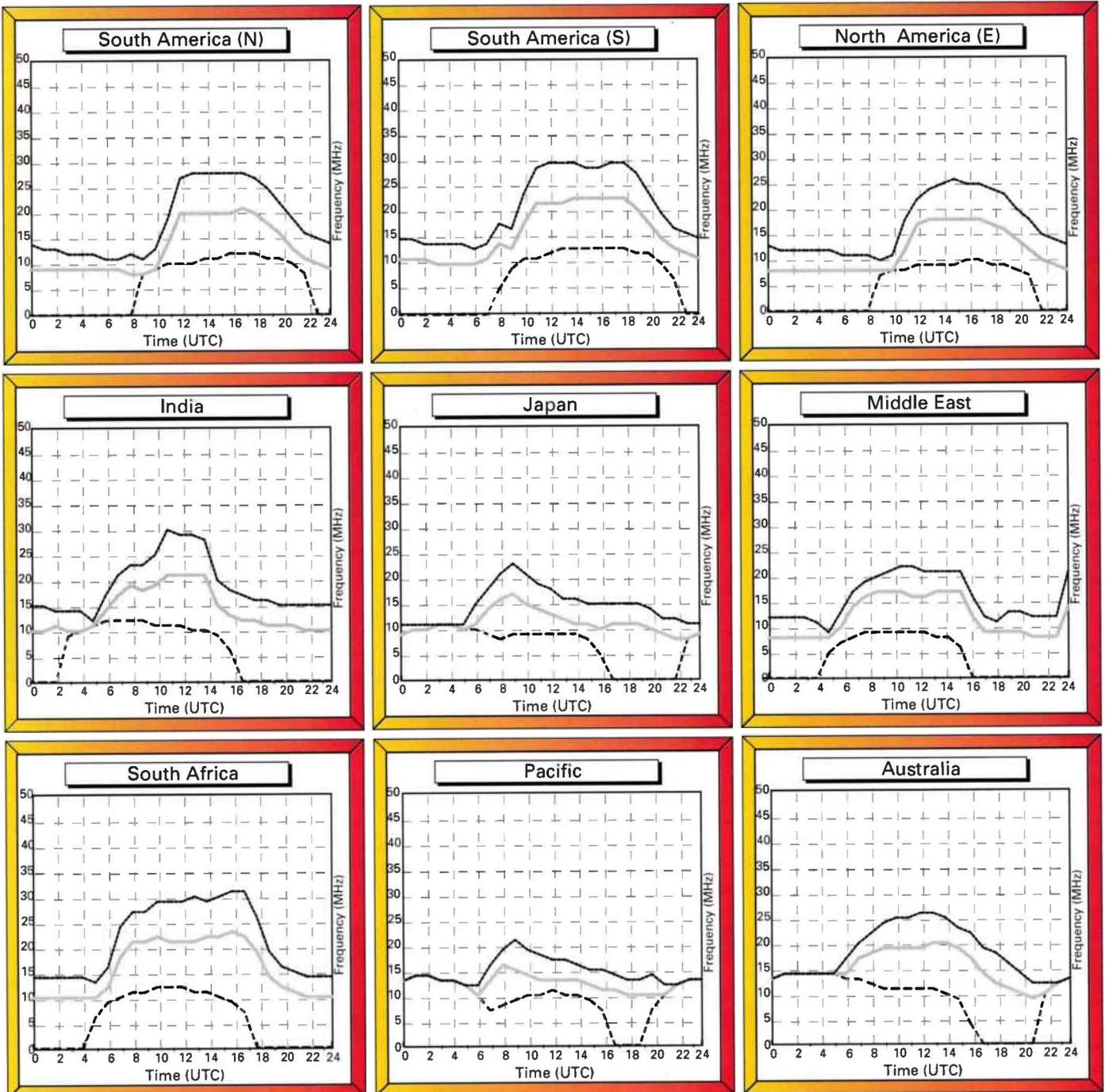
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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

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

Good luck and happy listening.

October 2004
Circuits to London



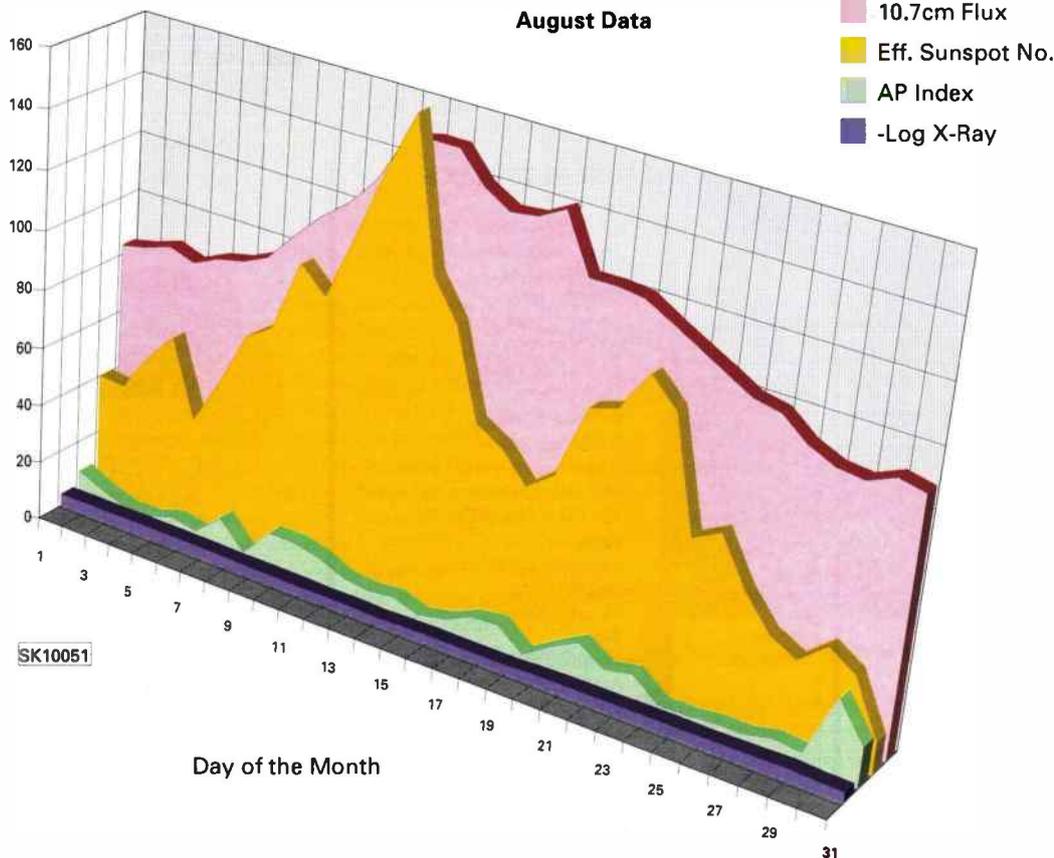
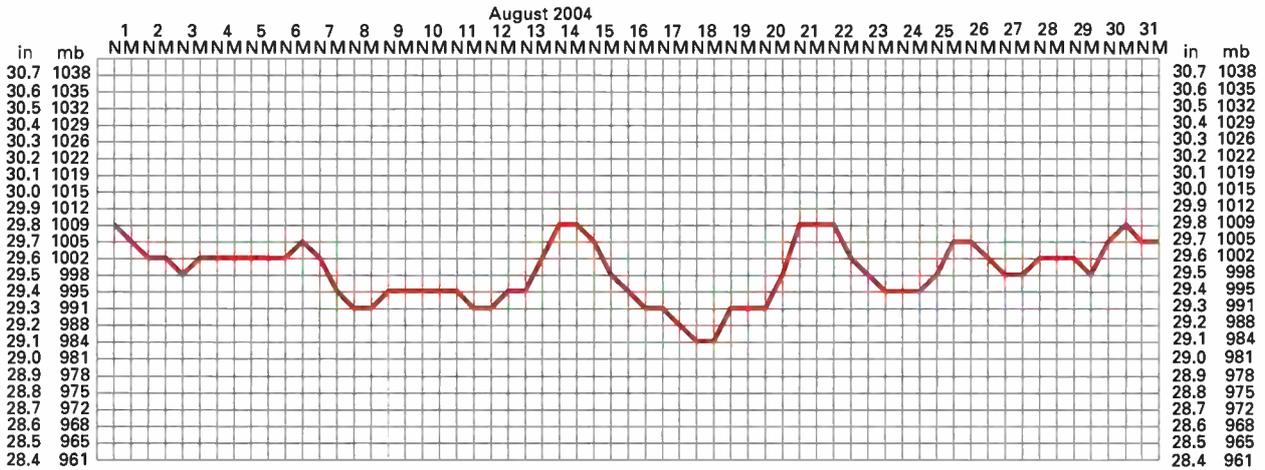
SK10050

Propagation

Extra

- **Kevin Nice** G3UNR, BRS95787,
SWM Editorial Offices, Broadstone
- **E-mail:** kevin.nice@pwpublishing.ltd.uk

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, August 2004.



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.



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

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Mast diameter 30-50mm can be fitted

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

Ideal for base stations



TECHNICAL PERFORMANCE

Frequency range 50-2100MHz

Output impedance 50-75 ohms coaxial

Gain 18dB -1000MHz
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6dB -2100MHz

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

3rd order IP +38dBm typical
PidB = +22dBm

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 comes 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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Scanning

Scene

● **Dave Roberts** do SWM Editorial Offices, Broadstone
● **E-mail** scanning@pwpublishing.ltd.uk

Have you ever seen the film *Blade Runner*? If you have then you'll know what I mean when I describe Edinburgh in early August as needing the attendance of a 'Blade Runner' squad at the Edinburgh *Fringe* Festival. People pretending to be animals, people pretending to be robots and robots pretending to be people. You get the picture.

I went there one year and have not returned since. It scared me that much! And since the police have their new 'Airwave' system up and running in some areas of the city it has become increasingly difficult to find a cab to facilitate your escape. Roy from Dalkeith was kind enough to send me a cutting from the *Edinburgh Evening News* of 23 July describing an ailment that seems only to affect taxis in the historical city.

Drivers of the black TX1 cabs who park on the rank near Fettes, where Lothian & Borders Police have their HQ, find that they are unable to start them again. A similar problem afflicts the rank at Murrayburn Road where there is another Airwave mast. Around 600 of the City's 1200 black taxis are affected.

The cabbies can't leave their vehicles running as there are 'environmental wardens' who issue fines to drivers of stationary vehicles that are left on tick-over. The cabs have to be towed to another area, out of the range of the Airwave transmitter, before they can be started.

The problem affects the immobilisers fitted to taxis registered prior to August 2000 and is believed to also cause difficulties to some Range Rovers and Vauxhalls of similar vintage. The problems associated with r.f. immobiliser systems seem interminable don't they.

Thanks again Roy for the clipping.

Airwave Anomalies

As I reported last month the Thames Valley Police are all running Airwave but two anomalies presented themselves to me.

One of their motorway controls is certainly running on 154.950 a.m. (I think the designation is HB7) as of the first week in August. I am informed that traffic refers to the M4 motorway.

It seems conceivable that vehicles from other police forces or agencies not yet equipped with the new system will travel on the motorway. A blank carrier is present most of the time on 154.775 (HB8). The presence of carrier on this frequency is probably an error and I wonder how long the poor old transmitters will stand the strain before giving out?

Pilot Scheme

News from Ofcom is that there is to be a year long pilot scheme run in West Yorkshire and Northern Ireland allowing short range religious broadcasts to be made from places of worship. This is all very familiar, as we know that very many mosques in the UK are licensed to use 'call to prayer' channels at u.h.f. All sensible stuff as residents in the locale of these establishments wouldn't like to be woken up by an amplified voice at some early hour.

The pilot scheme is different in two respects, firstly that the frequencies to be used fall within the UK citizen band allocation and secondly that the implied intention is to transmit the whole religious service to the locality so that people who are unable to attend the service can listen at home. This is already occurring in the Republic of Ireland and there the CB channels are used although I don't think it is legal but no action appears to be taken against churches relaying their services.

In the UK it will be 'one way' only so that there's no chance of someone interrupting the service with a "Breaker one nine for the Wiley Wombat" type call.

Emergency Network

A recent press release confirms that the frequency band currently used by pager services and the 'emergency network spectrum' will be sold off in 2006. No big surprise really regarding the 153MHz pager frequencies.

There's little doubt amongst us cynics that the real reason that police forces (i.e. council tax payers) were forced into purchasing the TETRA system was to enable the government to make yet more cash by flogging the old police and emergency service frequencies off.

I wonder what else we can do with mobile 'phones and just how many more, as a nation, do we need. In every town it looks as though fifty percent of pedestrians are using one. Perhaps we should increase the birth rate to boost demand. I suppose I had better start working on that one!

The military of any nation have the use of pretty much any part of the radio spectrum that they choose.

Listeners who reside near military bases will no doubt have identified the frequencies used at the facilities in their regions.

In operational terms the military remain

fairly mobile and again much of their communications these days are done by satellite or normal mobile telephones. Having said that, I understand that the following low v.h.f. frequencies may have occasional use and could make fun listening. All are n.b.f.m., 30.350, 33.625, 34.300, 36.250, 36.900, 38.825, 37.100 and 39.800MHz. These frequencies may only be used infrequently but the wait could be worthwhile.

Radio Scanning Future

For the last ten years there has been a fair bit of discussion regarding the future of the radio scanning activity. The debate about whether it's a good idea to replace that ageing scanner or take up rug making.

Although the emergency services are disappearing at the moment the situation is counterbalanced by the increasing availability of consumer electronics at pretty cheap prices. More people buy transmitting kit (legal or otherwise) so there's more to monitor. In addition more shops and businesses are using short range radio.

If a major incident 'kicks off' in your area, you may not hear the emergency services but the shopwatch or pubwatch channels will be alive with it as will PMR 446. Likewise the taxi companies, although they may not necessarily converse in English. You are also likely to get the full information in short order as well, as you can bet everyone will be wanting to tell their mates/colleagues about what's happened.

As an example...illegal long range cordless 'phones are bowling into these shores by the shipload. I mentioned the use of some of these devices a few months ago.

Some extra frequencies include 229-230MHz for the base transmitter and 146-147MHz (all are n.b.f.m.) for the handsets, this frequency set being very easily monitorable on almost every 2m amateur radio set. Channel spacing is usually 25kHz so, search between those limits and in most built-up areas you'll hear something from time-to-time.

Some manufacturers are very vague about frequencies in use and quote 230-450MHz - not very comforting. These handsets are always made to look like common or garden mobile 'phones. Power from the base station is about 9W.

Occasionally the older type long range cordless 'phones can be heard. They also worked well but instead of being copies of mobile 'phones like the Nokia 3310 (albeit with telescopic antennas) they were 'house brick' size. Base transmissions were on about 47MHz with the handsets on 68MHz, again f.m.

All these things work (or worked well). The problem is that they were, and are, illegal. The main reason for the legislation was initially to keep the public using 'phones on which calls have to be paid for thereby ensuring that VAT is levied on the bills. I suppose the same holds true these days because it wouldn't take much work to authorise a couple of megahertz of frequencies on which long range 'phones could be licensed.

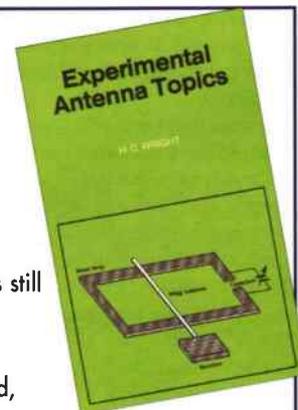


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Although over a century has passed since Marconi's first demonstrations of radio communication, there is still research and experiment to be carried out in the field of antenna design and behaviour. The aim of the experimenter will be to make a measurement or confirm a principle and this can be done with relatively fragile, short-life apparatus. Because of this, devices described in this book make liberal use of cardboard, cooking foil, plastic bottles, cat food tins, etc. These materials are, in general, cheap to obtain and easily worked with simple tools, encouraging the trial and error philosophy which leads to innovation and discovery. Although primarily a practical book with text closely supported by diagrams, some formulae which can be used by straightforward substitution and some simple graphs have also been included. Order your copy now for just **£3.50**.



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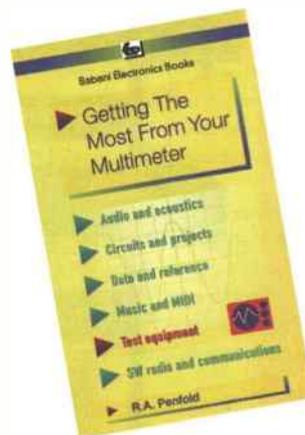
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July was another spectacular month for exotic Sporadic-E catches, particularly during the first week. Spanish Band I outlets on E2 and E4 continued to operate, despite their planned closure at the end of June. Is it too much to hope that the authorities have abandoned their plans to shift transmissions to an overcrowded u.h.f. spectrum!

Reception Reports

July 1 produced a wealth of signals from the Middle East for much of the day. **Paul Foley** (Newhaven) remarked that SYR-2/ORTAS (Syria) was evident on Channel E2 from 0930 until after 1623. At 1345, EDTV (Dubai) was resolved on E2 by Paul. At 1515, **Tom Crane** (Hawkwell) observed IRIB-2 (Iran) E2, measured at 48.239MHz, with its logo in the top-right of the screen. By 1810, Paul was receiving street interview pictures from JTV (Jordan) E3; a co-channel Arabic signal was also present.

A spectacular event with a good old-fashioned all-day DX extravaganza occurred on the 10th. By 0847, Paul Foley had identified Iran and Syria E2, the latter returning with a children's programme at around 1106. **Peter Barclay** (Sunderland) discovered that a co-channel signal to Spain on E3 was JTV Jordan, lasting between 0951 and 1030 with a return at 1207 until 1245. JTV has been identified more this year than ever before. A few hundred kilometres south of Sunderland, in Newhaven, Paul Foley was experiencing co-channelling on E3 between Syria and Jordan.

At 1933 on R3, Peter Barclay spotted a news bulletin bearing the logo TVC1 in the top-right. A '5' logo noted by Paul on R3 during the news and weather was St. Peterberg TV. At 2002, **Simon Hockenhull** (Bristol) captured Albania on Channel C during a commercial break. At around the same time, **Stephen Michie** (Bristol) noticed a programme from Sweden about archive TV complete with old TV captions.

On the 24th between 1034 and 1037 on E4/B, Peter Barclay resolved programme schedules from the south-east with a rotating '2' logo in the lower-right. Both TELE A+ (E2-) and RAI UNO (A) were in at the time. Incidentally, Italian reception has been an almost daily event, according to the many references to private stations Tele A+ and TVA in the logs of **Vincent Richardson** (Dolgarrog) and **Peter Barber** (Coventry).

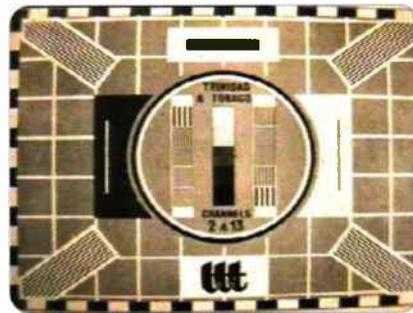


Fig. 1: An historic and rare photograph of Test Card 'C' radiated by Trinidad & Tobago Television.

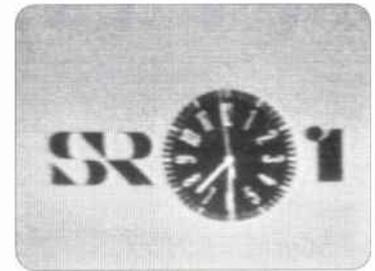


Fig. 2: The Swedish Clock caption radiated in the late 60s and early 70s by Sveriges Radio (SR-1).



Fig. 3: Forget this year's Olympic Games in Greece! This is the special BBC-1 Identification Symbol used for several weeks from 30 July 1984.

On the 29th, here in Derby, an opening to the Middle East was already established at 0830 with Iran (IRIB-2) and Syria (SYR-2) waging a battle on E2 with female announcers on both channels. The audio and video carriers were exceptionally strong for over 40 minutes. Syria emerged weakly on E4 and at times there was an unidentified Arabic signal co-channelling with a PM5534 test card on E3. Peter Barber comments that the test card was probably Norway rather than Sweden.

Transatlantic Events

This time last year, **Roger Bunney** (Romsey) reported that **Hugh Cocks** (Algarve) experienced transatlantic reception on five consecutive nights. Well, it seems that history does indeed repeat itself! On 2 July, Hugh heard news in Spanish on A2 going onto a soap opera at around 1700. On the 3rd at 1700, a UK cricket commentary was heard in English of West Indies against New Zealand (possibly). Trinidad and Tobago seems to be the only A2 station in the Caribbean likely to be interested in carrying a cricket commentary. Later, at 2215, Canada was identified on A3 with references to Newfoundland and Labrador in adverts preceding a *Coronation Street* trailer.

Enthusiasts in the UK had their share of transatlantic exotica too. Towards midnight on 7 July, several enthusiasts (including **David Hamilton**, **John Faulkner**, **Cyril Willis**, **Paul Logan** and **Tim Bucknall**) discovered signals piling up on channels A2, A3, A4 and A5. The Spanish audio and measured vision offsets strongly suggests Puerto Rico.

Asian DX

Lt. Col. Rana Roy (Northern India) reports reception of Dubai TV E2 and China (CCTV-3) C1 on the 4th and daily between the sixth and 13th. Azerbaijan TV (AZTV) was identified on R1 on the 15th, Thailand (TV3) E3 on the

22nd, Syria E2 on the 24th and a tentative Malaysia E3 with a TV1 logo on the 25th.

Observations

Stephen Michie and Simon Hockenhull have twice noticed L1 (Lithuania) displaying an additional N-7 logo. Care needs to be taken when distinguishing between Lithuania and Latvia as the latter is called LTV-7 and both are officially known as LTV! Paul Foley advises that an accented 'e' logo belongs to Ukrainian EPA-TV, which shares airtime with 'Inter 1+1'.

Digital Failure

Gösta van der Linden (Netherlands) advises that the terrestrial digital service 'Digitenne' ceased operation after a week because of interference to analogue services.

Better Reception

Tony Jones (Basildon) has relocated to the east of the town and is amazed at how much better the take-off is with Belgian Band III pictures receivable most of the time on a telescopic antenna. On the 29th, a slight tropospheric lift jammed virtually every u.h.f. channel. No doubt Tony will be in a prime location for receiving the Dutch digital multiplexes, once the service is sorted out!

Icelandic Trip

George Garden (Edinburgh) recently visited Iceland armed with a Citizen v.h.f./u.h.f. set with an l.c.d. screen. While touring he saw the Gagnheidi transmitter (Channel E4 80kW). Few u.h.f. transmitters operate in Iceland and in Reykjavik there were some extremely very short v.h.f. arrays. The PM5534 test card was not seen during the visit. The main Icelandic RDS identifications are RUV-1 and RUV-2, i.e., the two state-owned radio services. RUV stands for Ríkisutvarpid.

Keep On Writing!

Please send your DXTV, slow-scan TV and f.m. reception reports, news, off-screen photographs and information to arrive by the first of the month to: **Garry Smith, 17 Collingham Gardens, Derby DE22 4FS**. We can also use off-air pictures stored as JPG files on PC discs and good-quality video recordings. Our DXTV and Archive TV website can be found at: www.test-cards.fsnet.co.uk

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Top Secret.

For the attention of 'PO Box 25, Forfar'.

This was the address used by one of Britain's most secret sites, both during and after the Second World War. This site, 10km east of Forfar, was set up in early 1943 by **MI6** in order to monitor German communications, particularly those of the Gestapo, the SS, the Abwehr (German Secret Service) and Hitler's bunker. It complemented the work of **Hanslope Park** and, like other such receiving stations, the intercepts were passed onto the GC&CS at **Bletchley Park** for cryptanalysis. Due to its Buckinghamshire location, Hanslope, Bletchley's main listening station, suffered reception difficulties with incomplete messages being received. Montreathmont was created in order to minimise the effects of fading and drifting, and combining the received signal from both stations resulted in overall better reception.

Although mail was addressed to PO Box 25, Montreathmont's official designations were SCU (Special Communication Units) Nos 3 and 4. At the time it was the second in size only to Hanslope and was operated by the **Radio Security Service**, section 8 branch of MI6. The site was chosen carefully for its good earth qualities and its electrical 'quietness'. A two storey building was erected, with signal operators on the ground floor, and DF operators and map room on the first floor. Like all such sites at the time, the 20 or so masts were wooden and remained so until the 1970s. Diversity reception was employed, using two antennas and two receivers, each feeding into a separate ear phone. By 1944 a transmitting site run by Royal Signals was established at **Forestmuir**, closer to Forfar, and linked by land-line to Montreathmont. These transmissions are likely to have been similar to those sent from Poundon - groups of numbers in Morse sent to agents in Europe.

Eastern Bloc Traffic

Towards the end of the war, the various monitoring sites began concentrating more on Russian and Eastern bloc traffic rather than German, a trend which was to continue throughout the Cold War. In 1947, Hanslope, Montreathmont, etc., were taken over by the newly-named **Diplomatic Wireless Service**

(DWS). We know that its two Buckinghamshire receiving stations became **Hanslope** (their HQ) and **Poundon** (formerly MI6 transmitting site, Signal Hill). The DWS transmitting sites (also in Buckinghamshire!) were **Gawcott** (formerly a Black Propaganda station) and **Creslow** (a new and very large site). By the 1980s the DWS had been renamed the **HM Government Communications Centre** (HMGCC) and a vast rebuilding of these four sites began. Dropping the word 'diplomatic' perhaps reflects its role as provider of MI6's communications.

Where does Montreathmont fit into all this? Unlike most of the other SCUs and Y stations, it neither closed down nor became one of the man stations run by GCHQ's **Composite Signals Organisation** but it quietly passed to the DWS and became a highly secret transmitting site and a new receiving site was built at **Laurencekirk** further up the coast. The old wartime equipment (including AR88s and HROs) was buried on the moor, and operations moved from near the public road into the centre of a wood! At one stage, there were as many as 39 0.5kW transmitters and one 30kW transmitter installed and in 1968 the following antenna arrays, using 35 wooden masts, were present, five rhombics (all aiming E to SE), 16 dipoles and a newer 90m steel tower, possibly for carrying v.h.f. and/or microwave links - later replaced by the present 45m tower. At an earlier date there had been at least 57 masts.

Questions, Questions

The question that most interests ENIGMA is, as Montreathmont was not a SIGINT monitoring site, what was its purpose during the Cold War? Was it a northern Lincolnshire Poacher outlet (like Gawcott and Creslow seem to have been in the South) - using its 30kW transmitter? Did other Morse numbers transmissions (unknown to us) once come from this remote Scottish outpost? This is quite possible, but what is certain was that well into the 1960s, and possibly even later, this station was the key transmitting site for the **Stay-Behind Networks** - later to be exposed in the infamous Gladio case. Lawrencekirk remained the receiving site. It is still little known that after the war nearly all the non-Eastern bloc countries of Europe set up Stay-Behind networks which would be activated in the event of Soviet invasion. The countries were split into two groups under the control of MI6 and CIA respectively. Britain's own Stay-Behind (whose history is

still shrouded in typically British secrecy long after the need for this has passed) drew its recruits from the **SOE** veteran's society founded by Major General Gubbins. This is because SOE-trained operatives were ideally suited for their new role. Throughout the country, small ingeniously disguised underground bunkers were built by the army (like those of the so called Auxiliary Units) and stocked with weapons, supplies and h.f. radios. Radios, arms and gold were also buried throughout Europe, to be dug up on the event of mobilisation of Stay-Behind. These radios were made and designed at Hanslope and were more modernised versions of the famous B2 suitcase spy set, using 20W c.w. transmitters, covering 2.5-20MHz. When in use, their antennas would be cleverly disguised, often by embedding the insulated wire in tree trunks!

Less Well Known

Even less well known was the recruitment of Western sympathisers in Eastern Europe to create a parallel network of cells whose purpose, during the expected third world war, was to foment resistance amongst their own people, to destabilise, to demoralise and to sabotage. MI6 made use of East European exile groups to create these networks, which were activated in 1988/9 during the collapse of communism. The ageing aristocrat **Otto von Habsburg** was covertly pulling the strings from Austria and certain numbers stations were set up for the purpose of destabilisation. Throughout the Cold War regular simultaneous Stay-Behind exercises took place in most countries of Western Europe. These included so-called neutral countries, such as Switzerland and Sweden. Those countries under MI6's umbrella had their networks controlled from the Montreathmont Moor Transmitters, which for the rest of the time probably remained silent. As communications with agents and exiles was intimately linked with the Stay-Behind operation, it was only natural that MI6 (under DWS cover) would take control of all these communications. The famous exercise where a Stay-Behind cell was to be holed up in the Rock of Gibraltar received its instructions (in Morse) directly from Montreathmont.

We'd be very pleased to hear from anyone who can throw more light on any of the matters discussed - especially Stay-Behind operations and the sites at Montreathmont, Laurencekirk and Forestmuir. Further details can be found on GM4XRF's interesting website <http://uk.geocities.com/gm4xrf/>

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Being a supporter of regional and local television, having worked within the broadcasting environment including news, it will not have gone unnoticed that I often feature the activities of the GranadaMedia satellite trucks on their journeys around their respective regions namely the *BT-TES-41* and closely related sister trucks that currently appear over *Telecom-2D*. Things however are changing with 'ITV' as the central administrating entity negotiating a new contract for satellite linking in both network and regional fields with *SisLINK*. The mid-July press release indicated that *SisLINK* would take over from *BT* in the coming months which may mean that the downlink will be received atop each regional TV centre rather than the *BT* technique of receiving the downlink feed at the London *BT* teleport and using terrestrial circuits to carry the remote programming back to the respective studio centre. It may also mean that another satellite eg *Intelsat 801 @ 31.5°W* may be used rather than the *5°W Telecom* bird and that *Anglia*, *Harlech* and *Meridian* will be affected. *Anglia* were using another facility sat truck from the 'SNG BROADCAST LONDON' company for a short spell in July, curiously though the usual *BT-TES-42* downlink of 12.583GHz-V with Symbol Rate 5632 + Forward Error Correction 3/4, the signal wouldn't lock up due to the use of different PIDS on audio, video and PCR.

Things are changing with the horse racing service transmitted by the South African 'Tellytrack' service over *Europe*Star-1*, 45°E. There's a corporate makeover for the service, which is to be called 'Tellytrack International'. The channel offers racing from South African and race courses from other countries including live UK meetings - free-to-air at the time of writing. It's very strong in the UK and found at 11.497HHZ-V (3253+7/8). My RSD 302 shows the service ident as 'TELLYTRACK RS' with additional ident in an information menu as 'MCCNETWORK'.

Some years ago during the Clinton era, I received several live sat transmissions that weren't intended for the public. These contained live coverage from a surveillance camera fitted to a security truck behind the President's limousine in the usual cavalcade. One transmission followed Bill from the White House to Andrews AFB, another the visit to North Vietnam from the airport to the Hanoi Hilton, yet another was the President Bush election drive to the White House after having been sworn into office, camera coverage was mainly of the crowd, checking faces and places for possible 'trouble'. As the voices and conversations of the security personnel in the truck could be heard, this was not news coverage! My writings are noticed elsewhere it seems and such transmission anomalies have since ceased - well they had up to 29 July.

At 2200 whilst checking over the Atlantic airwaves I 'found' a transmission originating from the 'Missile Defense Agency - Department of Defense'. This was a short, perhaps four minute video compilation with no audio, detailing aspects of the replacement missile for the *Patriot*, the *Arrow* missile. The transmission covered the basic operation of the missile in the *Arrow Interceptor Launch* video, showing the missile launching and a simulation of how the enemy missile is being zapped. Close-ups of the planar sensing antenna (similar to the *IBA's* adaptive phasing system), the control room and general air view of the missile test facility at Point Mugu, California were included. A defence control room in Jerusalem followed, the Israeli flag and a clock showing 'JERUSALEM TIME' confirming the location as Israel though an adjacent clock at +2 hours Israeli time was odd. A contact listing of names and phone numbers in both the USA and Israel followed. The video then rewound and replayed, perhaps a dozen replays, then analogue video shash (snow) and signal cut. From this one must assume that the *Arrow* missile is now operational or on trial with the Israeli forces and the *Patriot* is being phased out. I'm not including any satellite signal source details with this one...

A technical discussion on the Sabre adaptive antenna for u.h.f. use can be found on <http://tx.mb21.co.uk/features/sabre/> - see 'QSL' item *Alderney Antennas - Ed*.

Olympics, 2004 and the satellite feed industry is ramping up for enhanced sporting coverage that will be the Clarke Belt flavour for the rest of August/early September. One of the first on air was a three channel bouquet over *Europe*Star*, 45°E signing as 'Athens Broadcast Services' at 11.602GHz-V (13328+5/6) and service ident 'BB1', or 'BB2' or 'BB3' depending on the relevant channel. Curiously though noting the bouquet over *Europe*Star*, the caption indicates that the 'Athen....' facility will be linking over *AsiaSat-2*, *PAS-1R*, *PAS-4* and *Eutelsat W1*. The 'hidden RSD ident' advises 'DTF-1', or 'DTF-2' or 'DTF-3'. Already *Hellas-Sat*, 39°E has been carrying test cards and promotions for Olympic coverage. **Edmund Spicer** (Littlehampton) noted 12.606-V (27500+3/4) and 12.631-V (6111+3/4) with promos and pre-event info but checking below 11.000GHz-V suggests *BT* feeds all using MPEG 4:2:2 "with wierd symbol rates, all signals are v. strong" on his 800mm dish!

On 1 August the anniversary of the Warsaw Uprising saw a moving and prolonged memorial service honouring those who died. Many of Europe's political leaders and their representatives were present for the wreath laying, John Prescott representing the UK. As each wreath was about to be laid, a Polish soldier would present the wreath-layer with a small red circular jar [incense?] which was laid along with the flowers. 'UNIX UKI-382 WARSAW' uplinked the occasion over *Eutelsat W1*, 10°E in its entirety though cutting out during the credits at the end of the broadcast - for Polish national TV. The evening transmission received over *W1*, 10.972GHz-V, a report for French TV was also transmitted at 10.961GHz-V (both using 4167+7/8). *Eutelsat W1* was the signal venue for a remarkable outside broadcast from Serbian TV that was relayed over APTN capacity for European coverage by their subscribers on their 'UP4' lease - 10.972GHz-V (4167+5/6). The historical Mostar bridge was demolished during the Balkans unrest in the early '90s and has only just been rebuilt to the original design and with locally quarried stones to retain the original high arched appearance. On 23 July the official opening of the new structure and celebrations must have been ongoing throughout the day. Nightfall and a large crowd gathered, the bridge was illuminated in many colours - a *Mostar son et luminaire* - a large choir assembled, speeches by local dignitaries, blessings, fireworks and even excited 'swimmers' leaping from the bridge holding flares and plunging into the waters far below - remarkable pictures! **Roy Carman** confirmed the outside broadcast originated over *SESAT*, 36°E 12.698GHz-H (4339+2/3) via the local unit 'OBN BIH 387' with additional coverage carried over *Eutelsat W2*, 16°E as follows - 'SKY NEWS' - 12.554GHz-H; 'LINX-1 (UKI-382)', 'LINX-2' and 'LINX-3' over 11.134, 11.126 and 11.189GHz-V (all 5632+3/4).

Hispasat @ 30°W carries many Spanish links and OBs and in July the *Nations Senior Cup* tennis championships were carried as the players fought it out in Costa-del-Sol temperatures exceeding 25°C. **Alan Richards** (Skegness) found the 30°W downlink 'MARBELLA TENIS' at 12.640GHz-V (6750+3/4). A few days earlier another live news feed had been transmitted a few miles down the coast at the Spanish border with Gibraltar. Always a political hot-pot, the Spanish government were upset when a Burns class British nuclear submarine was about to dock at the 'Rock' provoking sufficient annoyance to wheel out a sat truck for a reporter to update the situation with the 'Rock' as background. Another *Hispasat* presentation at 12.652GHz-H (4500+3/4).

And finally several reports have been received (at the time of writing) of a new TV channel on test over the *Telecom 2D/AB1* slot at 8°W. 'TV 8 MONT BLANC' is airing programming, music and current [French] affairs content - check out 11.656GHz-H (2442+2/3).



The Molson Indy 2000 from Canada via 'Sure Connect' capacity.



Stuart Rose of Marks and Spencers updates his shareholders.



Spectacular images from the Mostar Bridge opening



Rescue worker at a Turkish train crash, mid July, via 10°E.



The Mostar bridge alight for the official opening ceremony.



A Baghdad news report caption, via 1°W.



Wreath laying, Warsaw Uprising service, Warsaw.



Adaptive aerial used for the Arrow Missile tracking.

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CHESHIRE

CHESTER & DRS, G3GIZ. Meets at the Burley Memorial Hall, Waverton. Details from Chris Wild. Tel: (01224) 683629.

HALTON RADIO CLUB, M0BQZ. Meets at the Play Centre, Norton Hill, Windmill Hill, Runcom. Details from Alan Parker 2E1DSF. Tel: (01928) 790228.

MACCLESFIELD WIRELESS SOCIETY, G4MWS. Meets at the Pack Horse Bowling Club, Abbey Road, Macclesfield. Details from Mrs Hazel Parrott.

MID CHESHIRE ARS, G3ZIT. Meets at the Cotebrook Village Hall, Cotebrook Nr. Tarporley, Cheshire. Details from Niall Neilly G0VOK.

NORTH CHESHIRE RC, G0BAA. Meets at the Morley Green Club, Moberley Road, Wilmslow, Cheshire. Details from Jill Gourley G0OZJ. Tel: 0161-485 5036.

RADIO OFFICERS ARS, M0ROA. Details from Mr J. Bell G0CMM.

URFM GROUP WESTERN, G83MP. Meets at the Morley Green Club, Moberley Road, Wilmslow, Cheshire. Details from Gordon Adams G3LEQ. Tel: (01565) 652652, FAX: (01565) 634560.

WARRINGTON & DARS, G0WRS. Meets at the Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington, Cheshire. Details from John Riley G0RPG. Tel: (01925) 762722.

WIDNES & RUNOORN ARC, G0FWR. Meets at the Scout Hut, Caste Road, Halton Caste, Runoorn, Cheshire. Details from Marion Tust G4LUQ. Tel: (01928) 714843.

CUMBRIA

EDEN VALLEY RS, G0ANT. Meets at the BBC Club, Penrith. Details from John Ross G0VMP. Tel: (01931) 716421.

FURNES ARS, G4ARF. Meets at the Farmers Arms Hotel, Newton-in-Furness. Details from Mr K. Moore M1BWA. Tel: (01229) 465691.

WHITEHAVEN ARC, M0BEE. Details from Mr N. Williams M0CRM.

GREATER MANCHESTER

BURY RS, G3BRS. Meets at the Mosses Centre, Cecil Street, Bury, Lancs BL9 0SB. Details from Steve Gilbert G3OAG. Tel: 0161-881 1850.

DOUGLAS VALLEY ARS, G3BPK. Meets at the Wigan Sea Cadet HQ, Training Ship Scopette, Brookhouse Terrace, off Warrington Lane, Wigan. Details from Mr D. Snape G4GWG. Tel: (01942) 211397.

EDDES & DARS, G3GAI. Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester. Details from Chris Hanson G3KRG. Tel: 0161-773 7899.

THE MANCHESTER WIRELESS SOCIETY, G5MS. Meets at the Simpson Memorial Community Hall, Moston Lane, Moston, Manchester. Details from Ian M0IPR. Tel: 0161-288 730 or visit www.g5ms.com

OLDHAM ARC, G4ORC, G1ORC. Meets at the Royston Air Training Corps, Park Lane, Royston, Oldham. Details from Michael Crossley M1CVL. Tel: (01706) 367454.

OUTDER HILLS ARS, G0UQA. Meets at the Outder Community School, Hudsons Walk, Outder Hill, Rochdale. Details from Alan G4TMV. Tel: (01706) 344186, E-mail: info@outderhills.org.uk

ROCHDALE & DARS (RADARS), G0ROC. Meets at the Barnfield & Fieldhouse, Oaklet Club, Barnfield Village. Details from John Cannell G70AI. Tel: (01706) 376204.

SOUTH MANCHESTER RAD & COMP CL, G3PVA. Meets at the Sale Cricket Club, Dave Road, Sale, Cheshire. Details from Chris Ward G4HON. Tel: 0161-483 5174.

STOCKPORT RS, G8UQ, G8SRS. Meets at the T.S. Hawkins, Stockport Sea Cadets HQ, Pearmill Ind. Est., Stockport Road, West. Howe, Lower Bredbury, Stockport. Details from David Simcock M1ANT. Tel: 0161-456 7832.

TRAFFORD ARC, G0TRC, G1TRC. Meets at the Watch House, Cruising Club, Canal Bank, Stretford, Manchester M32 8WE. Details from Roger May G4YUQ. Tel: (01457) 866575.

TRAFFORD RADIO GROUP, G0TRG. Meets at 17th Stretford Scouts HQ, Barton Road, Stretford, Manchester. Details from Jon Mossman G7JKK. Tel: 0161-865 5609.

WEST MANCHESTER RC, G4MMC. Meets at the Astley & Tydesley Miners Welfare Club, Meantley Road, Astley, Tydesley, Manchester. Details from Jeffrey Moran M0BGU. Tel: (01204) 497694.

WIGAN & DARC, G0HRW. Details from Mr D.H. Barkley G0DPI. Tel: (01942) 237162.

ISLE OF MAN

ISLE OF MAN ARS, G03FLH. Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas. Details from Dave Walton M0B0U. Tel: (01624) 816308.

LANCASHIRE

BURNLEY & DARS, RS87674. Meets at Barden High School, Barden Lane, Burnley, Lancashire. Details from Bill Sorverner G0BQC.

CENTRAL LANCAS ARC, G0FDK. Meets at the Priory Club, Broadfield Dne, Leyland, Lancs. Details from Steve Shearing M1AJC.

DARWEN ARC, G4JS. Meets at the Darwen Catholic Club, Wellington Fold, Darwen, Lancashire. Details from Len Jackson G0NPI.

FISTS ON CLUB, G0IPX. Details from Mr E. Longden G3ZQS. Tel: (01254) 703948.

FYLDE ARS, RS59399. Meets at the A.N.T. Flying Clubhouse, Blackpool Airport. Details from Ken Randall G3RFH. Tel: (01253) 407952.

MORECAMBE BAY ARS, G4YBS. Meets at the Trnmpell Sports & Social Club, Outmoss Lane, Morecambe, Lancs. Details from Paul 2E0DD. Tel: (01524) 427793, E-mail: 2e0dd@mears.co.uk

PRESTON ARS, G3KUE. Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from Eric Eastwood G1WQC. Tel: (01772) 686708.

ROLLS-ROYCE ARC, G3RR. Meets at the Club Room, Rolls-Royce Sports Ground, Barnoldswick. Details from Mr J.A. York G3KYI.

ROSSDALE ARS, G1RRS. Meets at the Old Fire Station, Burnley Road, Rawtenstall, Rossendale, Lancs BB4 8EW. Details from Ken Slaughter. Tel: (01706) 830306.

THORNTON CLEVELYS ARS, G4ATH. Meets at the Frank Townsend Centre, Beach Road, Thornton Clevelys, Lancs. Details from Mr J.E. Duddington G4BPH. Tel: (01253) 853554.

MERSEYSIDE

LIVERPOOL & DARS, G3AHD. Meets at the Churchill Conservative Club, Church Road, Wavertree, Liverpool L15. Details from David G. Parr G8DEY.

SOUTH WIRRAL CONTEST GROUP, G3CSA. Details from Mr T.B. Saggerson G4WSE. Tel: 0151-339 0842.

SOUTHPORT & DARC, G2QA. Meets at St. Marks Church Hall, Scansnick, Lancs. Details from Don Atkins M1BLU.

WIRRAL & DARC, G4MGR. Meets at the Ivy Cricket Club, Mill Hill Road, Wirral. Details from Tom G4BKF. E-mail: secretary@wadarc.com Tel: (07050) 291850.

WIRRAL ARS, G3NMR, M1LARC. Meets at the Club Room, Ivy Farm, Arrow Park Road, Wirral L49 5LW. Details from Alan Upton G3UJU. Tel: 0151-677 3266.

NORTH EAST

CLEVELAND

EAST CLEVELAND ARC, G4CRS. Meets at the New Marske Institute Club, Gurney Street, New Marske (near Redcar). Details from Alistair Macleay G4OLU. Tel: (01642) 475671.

STOCKTON & DARG, G4XXG. Meets at the Billingham Community Centre, Billingham. Details from David J. London G0VGB. Tel: (01642) 896395.

CO DURHAM

BISHOP AUCKLAND RC, G4TTF. Meets at the Stanley Village Hall, Rear High Road, Stanley, Co. Durham. Details from Mark Hill G0GFG. Tel: (01388) 745353.

DERWENTSIDE ARC, G4PFG. Meets at the Steel Club, 36 Medonsley Road, Consett, Co. Durham. Details from Mr G. Darby G7GUU. Tel: 0191-370 2032.

GREAT LUMLEY AR & ES, G4ELZ. Meets at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Details from Nancy Bone G7UUR. Tel: 0191-477 0036, mobile (07990) 760920.

PETERLEE RADIO CLUB, G0KVJ. Details from Andrew Pennell G0NSK.

HUMBERSIDE

EAST YORKSHIRE ARS, G0EGR. Meets at the Northern Foods Sports & Social Club, Millhouse Woods Lane, Cottingham, E. Yorks. Details from David Taylor G4EBT. Tel: (01482) 876702.

GOOLE R & ES, G0OLE. Meets at the West Park Pavilion, Goole, South Humberside.

GRIMSBY ARS, G3CXC. Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

HORNSEA ARS, G4BKT. Meets at The Mill, Alwick Road, Hornsea, North Humberside. Details from Jeff Southwell G4NGY. Tel: (01964) 533331.

HULL & DARS, G3AMW. Meets at the SWL Centre, Club Room, Gothland Ind. Cste, Walton Street, Hull. Details from Mr R. Hutton.

RAYWELL PARK SCOUTS ARS, G4CMT. Details from Mr A.D. Russell M0AWU.

SCUNTHORPE STEEL ARC, G4FUH. Details from Alistair Butler M1EDF.

NORTH YORKSHIRE

DARLEY ARC, G0FOS.

HAMBLETON ARS, G0JQA. Meets at the Menca Centre, Northlorton, N. Yorks. Details from Ian Binkwood G0JQA. Tel: (01609) 775598.

QUEEN MARY ARS, G6QM. Meets at Blazefield, Pateley Bridge, Hamgost, North Yorks HG3 5DR. Details from Frank Harris G4IEY. Tel: (01242) 236715.

RIPON & DARS, G4SJM. Meets at The Bunker, rear of Ripon Town Hall, North Yorkshire. Details from Nigel Drumm M1B0Z. Tel: (01423) 884733.

ROYAL SIGNALS SCARBOROUGH ARC, G0RCS. Details from Mr A.W.W. Timme G3CWW. Tel: (01484) 842330.

SCARBOROUGH ARS, G4BP. Meets at the Scarborough Cricket Club, Pavilion, North Marine Road, Scarborough, North Yorks YO12 2TJ. Details from Mr D.P. Tipper G3JBR. Tel: (01723) 377296.

SCARBOROUGH SE GRP, G0XDD. Details from Roy Clayton G4SSH. Tel: (01723) 862924.

THE VINTAGE & MILITARY ARS, RS183536. Details from H.A. Aspinall.

YORK ARS, G3HWW. Meets at the Guppy's Enterprise Club, 17 Nunney Lane, York. Details from Keith Cass G3WVQ. Tel: (01904) 422064.

YORK RADIO CLUB (AMATEUR) G4YRC. Meets at the Bishopthorpe Social Club, Bishopthorpe Main Street, York. Details from Gareth Foster G1DRG. Tel: (01904) 421392.

NORTHUMBERLAND

NORTHUMBERIA ARC, G4AAK. Meets at the Old Telephone Exchange, Cresswell Road, Ellington, Morpeth,

Northumberland. Details from Mr D. Stansfield G0EIV. Tel: (01670) 513026.

SOUTH YORKSHIRE

FRININGLEY ARS, G7MAH. Details from John Fannell G4HOY. Tel: (01427) 872522.

MALTBY & DARS, G4SHM. Meets at the Centenary Hall, Cliford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

MEDBOROUGH & DARS, G4BTS. Meets at the Harrop Hall, Medborough, South Yorks. Details from Mr R.T. Sheppard G0KSK. Tel: (01709) 586329.

SHEFFIELD ARC, G0INF. NRA/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Glossop G0SPH.

TYNE & WEAR

HOUGHTON-LE-SPRING ARC, G3NMD. Meets at the Dumbrie Royal British Legion, Dumbrie, Fencehouses, Tyne & Wear DH4 6LJ. Details from Foster Aungles G0ABF. Tel: 0191-584 4673.

SOUTH TYNESIDE ARS, G2XWQ. Meets at the Boldon Scout Hut, Grey Horse Car Park, Front Street, Boldon. Details from William Wilson M0BWM. Tel: 0191-421 9921.

TYNEMOUTH ARC G0NMM. Meets at the Linskill Centre, Linskill Terrace, North Shields, Tyne & Wear. Details from Mr G.N. Thompson G0GBH.

TYNESIDE ARS, G3ZQM. Meets at the St Teresa's Club, 200b Heaton Road, Newcastle-upon-Tyne NE6 5HP. Details from Mr J. Pickersill G0DZG. Tel: 0191-265 1718.

WEST YORKSHIRE

DENBY DALE & DARS, G4CDD, G8KWK. Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4FQJ.

HALFAX & DARS, G2UG. Details from Mr S.P. Ortmeyer G4RAW. Tel: (01422) 203062.

KEIGHLEY ARS, G0KRS. Meets at the Cricket Club, Ingrow, Keighley, West Yorkshire. Details from Mr I. Townson M1BGY. Tel: (01274) 723951.

LEEDS & DARS, G4LAD. Meets at The Radio Shack, Yarmbury (Horsforth), RUCF Grounds, Brownbeme Lane, Horsforth. Details from LS18 5HB. Details from Mr E. Howden G0BUB.

NORTH WAKEFIELD RC, G4NKC. Meets at the East Ardsley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parler 2E1ASV. Tel: 0113-253 9087.

OTLEY ARS, G3NND. Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop G0SNV. Tel: (01274) 636197.

PONTEFRAC & DARC, G3FYQ. Meets at the Carleton Community Centre, Pontefract, West Yorkshire. Details from Colin Wilkinson G0NQE. Tel: (01977) 677006.

SPEN VALLEY ARS, G3SYV. Meets at the Old Bank WMC, Mirfield, West Yorkshire. Details from Mr J.R. Wilde G0F0I. Tel: (01274) 875038.

WAKEFIELD & DARS, G3WRS. Meets at the Ossett Community Centre, Prospect Road, Ossett, W. Yorks. Details from Ian Roberts. Tel: (01924) 216502.

WAKEFIELD RPTP RC, G0KNR. Details from Mike Cherton G6OXZ.

WHITE ROSE ARS, G3XEP. Meets at the Moortown RUCF, Moss Valley, Kings Lane, Leeds LS17 7NT. Details from Mr M. Wilson G7SDW. Tel: 0113-273 6039.

MIDLANDS

BEDFORDSHIRE

DUNSTABLE DOWNS RC, G4DDC. Meets at the Chevs House, 77 High Street, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419.

SHEFFORD & DARS, G3FJE. Meets at the Church Hall, Amphil, Shefford, Beds. Details from John West. Tel: (01462) 812739.

ST SWITHUN'S ARC, M0AVU. Meets at St. Swithun's Church, Rectory Rooms, Sandy, Beds. Details from Kelynn Darton G0W0D. Tel: (01767) 683179.

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2ZW. Meets at the Coleridge Community College, Radesund Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

DUXFORD ARS, G82MM. Meets at Building 177, Imperial War Museum, Duxford Airfield, Cambs. Details from Mrs B.I. Pope. Tel: (01279) 656149.

GTR PETERBOROUGH ARC, G4EHW. Meets at the 6th Form Building, Stanground College, Facet Road, Fletton, Peterborough. Details from Alan D. Ralph G9ULH.

HUNTINGDONSHIRE ARS, G0HSR. Meets at the Medway Centre, Medway Road, Huntingdon. Details from David Leach G7DUU. Tel: (01480) 431333.

MARCH & DARS, G3PMH. Meets at the British Legion Club, Rookwood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

PETERBOROUGH R & ES, G3DQW. Details from Mr V. Edwards G8NXC.

WSBECH AR & ELEC. CLUB, M5ARC, G4POL, G8NED. Meets at RAFA Club, Old Market, Wsbech. Details from Alan Bridgstand M0DUQ. www.werec.org.uk

DERBYSHIRE

BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morris G0R0T. Tel: (01246) 822856.

BUXTON RC, G4SPA. Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4H0H. Tel: (01298) 25506.

DERBY & DARS, G2DJ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Shandlow G3SZJ. Tel: (01332) 556875.

EREWASH VALLEY ARC, G0PCK. Meets at The Stowell Arms Public House (between Horsely Woodhouse and Woodside). Details from Peter Russell M0AQI.

MOUNT ST. MARY'S ARC, G4MSM. Meets at the College, Spin Hill, Sheffield. Details from Rev. P. McArdle G0DAG. Tel: (01246) 812230.

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marpool United Reform Church, Chapel Street, Marpool, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

NUNSFIELD HOUSE ARC, G3EEO. Meets at the Nunsfield House, Bouton Lane, Avaston, Derby. Details from William F. Smith G7PJJ.

STH DERBYS & ASHEY W ARC, G0SRC. Meets at the Moira Regian Centre, 17 Ashby Road, Moira, Swadincote, Derbyshire DE12 8DJ. Details from Mrs B. Waley. Tel: (01283) 760622.

STH NORMANTON, ALFRETON & DARC, G0CPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Gethring M0CUL. Tel: 0115-955 5766.

GLOUCESTERSHIRE

CHELtenham AR ASSN, G5BKB. Meets at the Presbury Library, Presbury, Cheltenham. Details from Ivan Wilson G4B6W. Tel: (01452) 731956.

CHELtenham CLUSTER SUPP GP, G87DC. Details from Mr A.M. Daves G0DDB. Tel: (01684) 72178.

GLOUCESTER AR & ES, G4AYM. Meets at the Churchdown School, Churchdown. Details from Mr A.J. Martin. Tel: (01452) 618930.

SMITHS INDUSTRIES RS, G4MKN. Meets at the Sports & Social Club, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from A.J. Hooper G1JMF.

STROUD RS, G4SRS. Meets at the Minchampton Youth Centre, Nr. Stroud. Details from Mr S.G. Spencer G3L10.

WHITE NOISE LISTENING G0WNL. Details from Adnan Deane G7KCG.

HEREFORD & WORCESTER

BROMSGROVE & DARC, G3VMG. Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4OAZ.

BROMSGROVE ARS, G4TUI. Meets at the Link End WMC, Bromsgrove, Worcs. Details from Barry Taylor G0TPG. Tel: (01527) 542266.

DROTWICH ARC, G4PVO. Meets in the Community Hall, Drotwich Spa, Worcs. Details from Hector Wrang M1BLU. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gao Street, Hereford. Details from Tim Bridgand-Taylor G0JWJ. Tel: (01432) 279435.

KIDDERMINSTER & DARS, G0KRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders G00ZB. Tel: (01295) 400172.

MALVERN HILLS ARC, G4MHC. Meets on the second Tuesday of the month at the Town Club, Great Malvern. Details from Mike G3TGD. Tel: (01905) 830752, E-mail: mike@allensons.fsnet.co.uk

REDDITCH ARC, G4AQC. Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01789) 762041.

VALE OF Evesham RAC, G0EFA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NFD. Tel: (01386) 41508.

LEICESTERSHIRE

1F ATC, G7MCD. Details from Sqn. Cndr. Adrian Utting G1WQZ.

BEAUMONOR ARC, G3BMR.

DEMONTFORT UNIVERSITY, G3SDC. Open to past & present students. Details from Mr R.G. Titterton. Tel: 0116-257 7059.

HINCKLEY AR & ES, G3VLG. Meets at the United Services Club, St. May's Road, Hinckley. Details from Mr R.A. Bennett G8BFF. Tel: (01455) 846493.

LEICESTER RS, G3LRS. Meets at Gires Cottage, Groby Road, Leicester LE3 9QJ. Details from Mr S.P. Hay G3PHY. Tel: 0116-224 2598.

LOUGHBOROUGH & DARC, G3RAL. Meets at Hind Leys College, Shepshed, Loughborough, Leics. Details from Chris Walker G1EZF. Tel: (01509) 504319.

MELTON MOWBRAY ARS, G4FOK. Meets at the St. John Ambulance Hall, Astford Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3JVK. Tel: (01664) 63368.

NATIONAL SPACE CENTRE ARS, M1NSC. Details from Mr J. Heath G7HIA.

TAMWORTH ARS, G8TRS. Details from Mr A.J. Dyson G0JWU. Tel: (01827) 830403.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The Secretary.

Coningsby. Details from Peter Hanson G0VNV.

RAF WADDINGTON ARC, GORAF. Meets at Pyewee Inn, Fossebank, Saulty Road, Lincoln. Details from Robert Pickles G3VCA. Tel: (01522) 528708.

SPALDING & DARS, G4DSP. Meets at The Old Fire Station, Spalding, Lincs. Details from Raymond Pearson G8ELV. Tel: (01775) 711953. Web: www.sdars.org.uk

SPILSBY ARS, RS9146B. Details from Clive Ironmonger G6HYF. Tel: (01790) 752112.

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Ulcus Public House, 39 Church Street, Isham, Kettering, Northants NN14 1HD. Details from Fay Barwell G6AKS. Tel: (01536) 390954.

MID NORTHANTS AR EXP, GOING. Details from Lionel Parker G5LP.

NORTHAMPTON RC, G3GWB. Meets at the British Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller G0GZ. Tel: (01327) 349198.

NORTHAMPTON SCOUT ARG, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rivett G8WPU.

PARALLEL LINES CG, GAUP. Details from Mr P.S. Lindsay G4CLA.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3EKV. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XUJ. Tel: 0115-919 9177.

DUKES ARS, G4XL. Meets at Ambleside Community Centre, Ambleside, New Olerton, Notts. Details from Colin Foster G7DEX.

HUCKNALL ROLLS ROYCE ARC, G5RR. Meets at the Hucknall Rolls Royce Sports & Social Club, Watnall Road, Hucknall, Nottingham. Details from Mr P. Hart G4J5H.

MANSFIELD ARS, G3QCQ. Meets at the Debdale Park Sports & Recreation Club, Debdale Lane, Mansfield Woodhouse, Notts. Details from David Peat G0RDP. Tel: (01623) 631931.

NORTH NOTTS DATA GROUP, G0VMN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8GQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VYK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0OAU. Meets at the Fairham Community Centre, Farnborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WVU. Tel: (01509) 672846.

WORKSOP ARS, G3ROW. Meets at the Club House, 59-61 West Street, Worksop, Nottingham S80 1JP. Details from Terry Calvert G4GBS. Tel: (01302) 743130.

SHROPSHIRE

SALOP ARS, G3SRT. Meets at the Telesport Club, Railway Lane, Abbey Forgeate, Shrewsbury. Details from John Burnford G0GTN. Tel: (01743) 249943. E-mail: john.burnford@virgin.net

TELFORD & DARS, G3ZME. Meets at the Dawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UKV. Tel: (01952) 255416.

STAFFORDSHIRE

BURTON-ON-TRENT & DARS, G3NFC. Meets at the Stapehill Institute, Main Street, Stapehill, Burton-on-Trent, Staffs. Details from Mr M.W. Cotton G4HBT.

CANNOCK CHASE ARS, G6SW. Meets at the Four Crosses Inn, Watling Street, Hatherton, Cannock. Details from Arnold Matthews G3FZW. Tel: (01543) 262495.

CHAD RC, G4CAR. Meets at the Swinford Officer's Club, Swinford, Lichfield, Staffs. Details from Bernard Jayne G8BL. Tel: (01543) 288589.

LICHFIELD ARS, G3WAS. Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smethers G3NLV. Tel: (01543) 672762.

MORLANDS & DARS, G4NHT, G1MAD. Meets at the Creta Works, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKQ. Tel: (01782) 395793.

NEWCASTLE-U-LYME SCOUT AR COM GR, G7UQG

STOKE-ON-TRENT ARS, G3GBU. Meets at the '45 Club, 92 Lancaster Road, Newcastle-under-Lyme, Staffs. Details from Albert Allen G4DHO. Tel: (01782) 638801.

SUTTON COLDFIELD RS, G3RSC. Meets at the Rugby Club, Walmley Road, Sutton Coldfield, West Midlands. Details from Paul G. Turner G7MWD. Tel: 0121-350 4263.

WARWICKSHIRE

AVON VALLEY AREA, M0RAD. Details from Mr Peter Bradham G0WJ. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St John Ambulance HQ, 61 Embscote Road, Warwick. Details from Bernard Piteway. Tel: (01926) 420913.

RUGBY ARS, GAAPD. Details from Tony Humphries G0OLS. Tel: (01455) 552683.

STRAITFORD-UPON-AVON & DRS, G0SOA. Meets at the Home Guard Club, Todingham, Stratford-upon-Avon, Warwicks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, G0NEJ. Meets at the Aldridge Central Hall Community Centre, Middlereons Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker G0NOL. Tel: (01922) 636162.

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Brinklow Road, Coventry. Details from John Beech G8SEQ. Tel: (01203) 673999.

DUDLEY ARC, G4DAR. Meets at the Community Centre, Sedgely, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LV4. Tel: (01384) 277925.

HILLCREST ARS, G0SPM. Meets at The College, Simms Lane, Netherton, Dudley, West Midlands. Details from Stuart Viney. Tel: (01384) 232457.

KYNOCH R & TYS, G3HPP. Meets at the Club Workshop, IMI Ltd., Spornfield, Perry Bar, Birmingham. Details from Mr G.

Nicholls. Tel: (01922) 635376.

MIDLAND ARS, G3MAR. Meets at Unit 22, 60 Regent Place, Hockley, Birmingham (jewelry quarter). Details from John A. Crane G0LAI. Tel: 0121-628 7632.

SANDWELL AMATEUR RADIO CLUB, G0CWC. Meets at Sandwell ARC, Broadway, Oldbury, Warley, West Midlands B68 9DF. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARG, G0OBS. Details from Warwick M. Hall G4WMH.

SOLIHULL ARS, G3GEJ. Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYY. Tel: 0121-783 2996.

SOUTH BIRMINGHAM RS, G3OHM. Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRS Secretary.

STOURBRIDGE & DRS, G6OI, G6RS. Meets at the Old Swinford Hospital/School, Stourbridge, West Midlands. Details from Tom Edwards.

WEST BROMWICH CENTRAL RC, G4WBC. Meets at The Sandwell Public House, High Street, West Bromwich, West Midlands. Details from Ian Lettich G0PAL. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, G0COOP, G1WMP. Details from Steven Jones G6URL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Willeshall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

WOLVERHAMPTON ARS, G8TA. Meets at the Electricity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

WORDSLEY RC, G4WRA. Meets at the Brick Maker's Arms, Mount Pleasant, Brierley Hill, West Midlands. Details from Andy Evans G1PKZ.

LONDON & CENTRAL

BERKSHIRE

ARBORFIELD ARC, G3IHH. Details from Mrs E.W. Harding 2E1AUJ.

BRACKNELL AEC, G4BRA. Meets at the Coppers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Ellerton G3NKN.

BURNHAM BEECHES RC, G3WIR. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G8EL. Tel: (01628) 625720.

MAIDENHEAD & DARS, G3WXX. Meets at the Red Cross Hall, The Crescent, Maidenhead, Berkshire. Details from Neil Savin G0SVN. Tel: (01628) 626210.

NEWBURY & DARS, G5XV. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Max Maxwell G7DXC. Tel: (01635) 253233.

READING ARC, G3ULT. Meets at the Woodley Pavilion, Woodford Park, Haddon Drive, Woodley. Reading. Details from Marnoch Standen G0JMS. Tel: 0118-972 3504.

BUCKINGHAMSHIRE

AYLESBURY VALE RS, G4VRS. Meets at the Harwick Village Hall, Aylesbury, Bucks. Details from Mr L.I. Cropley G0DFC.

CHESHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirwell G0FVY. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4VAN. Tel: (01494) 534216.

MILTON KEYNES ARS, G3HIU. Meets at Bletchley Park Museum (The Green Room, B Block Annex), Wilton Avenue, Bletchley, Milton Keynes. Details from Malcolm Bay M0MBO on (01525) 874075.

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quarnes, M.K. Scout Campsite, Cosgrove. Details from Mr P.A. Orchard G0RYZ. Tel: (01908) 648186.

GREATER LONDON

ADDISCOMBE ARC, G4ALE. Meets at the Lion Inn, Pawsons Road, Croysdon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-655 6948.

BARKING R & ES, G3XBF. Meets at the Parkside Community Centre. Details from Bill Chewter G0IQK. Tel: (01708) 474443.

BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger G0TLJ.

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Vesney G7BRH.

CRYSTAL PALACE & DRC, G3VCP. Meets at All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G30OU. Tel: (01737) 552170.

DARENTH VALLEY RADIO, G0KOV. Meets at the Crookenhill Village Hall, Swinley, Kent. Details from Mr K.W. Halls G6VJG. Tel: (01322) 663022.

ECHFORD ARS, G3UES. Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3TDR. Tel: (01784) 456613.

EDGWARE & DRS, G3ASR. Meets at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware, Middlesex. Details from Stephen Slater G0PQB. Tel: 0208-953 2164.

HAVERING & DARS, G4HRC. Meets at the Fairkites Arts Centre, 51 Billet Lane, Hornchurch, Essex.

RS OF HARROW, G3EFP. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Friel G4UJF. Tel: (01895) 621310.

SILVERTHORNE RC, G3SRA, G2HR, G8CSA. Meets at the Chingford Adult Education and Community Centre, Friday Hill House, Simmons Lane, Chingford, London E4 6JH. Details from Dave Christy G0KHC. Tel: 0208-504 2831.

MITCHAM & DISTRICT ARS. Meets at the A.T.C. Hub, Commside Walk, Mitcham, Surrey CR4 4HC. Details from Mr M. Knott G0WCR.

SOUTHGATE RC, G3SFP. Meets at the Windmores Hill Cricket Club, Firs Lane, London N21 3ER. Details from Mr D.F. Berry G4DFB.

ST. DUNSTONS COLLEGE ARS, G4SDC. Details from Sam Kennard G4OHX. Tel: 0181-690 1274.

SURREY RADIO CONTACT CLUB, G3SRC. Meets at the T.S. Terra Nova, 34 The Walklons, Croydon, Surrey. Details from Maurice Fagg G4DDY. Tel: 0206-669 1480.

WEST LONDON ARS, RS95569. Details from Robin Clay G0VJL.

WHITTON ARC, G0MIN. Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Clabon G0OFN. Tel: 0208-894 9131.

HERTFORDSHIRE

BISHOPS STORTFORD ARS, G5ZG. Meets at the Royal British Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge G0PQF. Tel: (01279) 506933.

DACORUM ARTS, G7RHH, G0MHH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TCD. Tel: (01442) 211925.

HODDSDON RADIO CLUB, G0TSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3UJN. Tel: 0208-292 3678.

MIMRAM CONTEST GP, M0ABC. Details from Alan Holdsworth G800. Tel: (01707) 392950.

RADIO SCOUTING TEAM, G6ZST. Meets at Tolmers Scout Camp, Tolmers Road, Quibey, Herts EN6 4JS. Details from Mill Lvens G2CXB. Tel: (01992) 558493.

STEVENAGE & DARS, G3SAD. Meets at the Stevenage Day Centre, Chells Way, Stevenage, Herts SG2 0LT. Details from Peter Bell 2E1CRK. Tel: (01462) 674505.

VERULAM ARC, G3VER, G3VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Crane G3PMF. Tel: (01923) 262180.

VERULIM (ST. ALBANS) RADIO CLUB. Meets at the RAFA, New Kent Road, off Marlborough Road, St. Albans, Herts. Details from Ralph G1BSZ. Tel: (01923) 265572.

WELWYN & HATFIELD ARC, G3WGC. Meets at the Royal Naval Association, Black Fan Road, Welwyn Garden City, Herts. Details from Dean Jackson G7PHF. Tel: (07937) 550649.

SURREY

BENTLEY ARC, G0VZS. Details from Derek Gilbert G0NFA.

CATERHAM RG, G0SCR. Details from Mr P.N. Lewis G4APL.

COULSDON AMATEUR TRANS. SOC, G4FUR. Meets at St. Swithuns Church Hall, Grosvenor Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZJ, G7DOR. Details from John Greenwell G3EAT. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meudon Avenue, Farnborough, Hants. Details from M.D. Hearsay G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G6GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitnour G0SWE.

KINGSTON & DARS, G3XIN. Details from Mrs Mary Ashdown G0BQV.

REGATE ATS, G5UJ, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

SUTTON & CHEAM RS, G2GP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0BWW. Tel: 0208-644 9945.

THAMES VALLEY ARTS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Gigg's Hill, Thames Ditton, Surrey. Details from Cor. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBORNE & DARS, G3WHM. Meets at St. Andrews Church Hall, Herbert Road, Wimborne, London. Details from Jim Bell. Tel: 0208-874 7456 or E-mail: james@bell0144.finet.net.uk

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON RADIO CLUB, G4GQR. Meets at Valance Community Centre, Sackville Road, Junction of Connaught Road, Hove. Details from Hon. Sec G0RNS. Tel: (01273) 699104.

CROWBOROUGH DARS, G0ORW. Meets at the Plough & Horses, Walshes Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was G83VX. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

HASTINGS ELEC. & RC, G6H, G1JHH, G5LL. Meets at the William Parker School, Parkstone Road, Hastings, East Sussex. Details from Peter Firmin G0FUU. E-mail: peter.firmin@virgin.net or visit www.g4cus.freeweave.co.uk

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4DRV. Tel: (01323) 728479.

THE QRZ ARG OF SUSSEX, G63VX. Meets at the Coach Station, Watling Road, Eastbourne. Details from Stuart Constable M0CWW. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER ARC, G0ARC. Meets at the Village Hall, Withern, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

BASINGSTONE ARC, G3TOR, G6JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJJ.

FAREHAM & DARS, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 236397.

HIGHFIELD PARK RC, G4WD. Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01734) 225019.

HORNEAVE & DARS, G4FRS. Meets at Loveclan Village Hall, Loveclan Lane, Loveclan, Hants. Details from Stuart Swan G0FYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, G0VR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

SONY BROADCAST ARC, G4SZZ. Accredited C&G RAE centre. Meets at Sony Sports & Social Club, Priestley Road, Basingstoke. Details from Stephen Harding G4JGS. Tel: (01256) 55011.

SOUTH HAMPSHIRE INT. TELE SOC., G3DIT. Meets at G3JZV's QTH, space is limited. Details from Rev. T.R. Mortimer G3JZV. Tel: (02392) 649254.

SUBMARINE ARC, G3BZJ. Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PPH. Tel: (01329) 233886.

THREE COUNTIES ARC, G4HWR. Meets at the Bramshott Parish Inst. & Club, Hestley Road, Liphook, Hants. Details from Darnian Kamm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LUG. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields Horse Country Cant, Newham Road, Binstead, Isle of Wight. Details from Mr P. Bebody.

ISLE OF WIGHT RS, G3SKV. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bembridge. Details from Ian Reeves G4ZFQ. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, G0BRA. Meets at St. John's Church Social Club, South Bar, Banbury, Oxon. Details from Mr R.S. Marsden G1VSY. Tel/FAX: (01295) 253509.

HARWELL ARS, G3PA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LD. Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BL. Tel: (01865) 247311.

VALE OF WHITE HORSE ARS, G5RP, G4WVH, G0WH. Meets at The Fox, Stevenston. Details from Ian White G3SEK. Tel: (01235) 531559.

WEST SUSSEX

CHICHESTER ARC, G2NM. Meets at the St. Pancras Hall, Chichester. Details from Graham Swann G0WSD.

CRAWLEY ARC, G3WSC. Meets at the Tilgate Forest Rec. Centre, Hut 1B, Tilgate Forest, Crawley, West Sussex. Details from Keith Farrow G8XZ. E-mail: keith.farrow@btinternet.com

HORSHAM ARC, G4HRS. Meets at the Guide Hall, Denne Road, Horsham, West Sussex. Details from Alister Watt G3ZBU. Tel: (01403) 253432.

MID SUSSEX ARS, G3ZMS. Meets at Marie Place, Laylands Road, Burgess Hill, West Sussex. Details from Mr C. Chivis 2E1DCP. Tel: (01444) 244689.

T.S. VINDICATRIX ASN, G0WVB. Details from Don Still G0OCC.

WORTHING & DARS, G3WDR. Meets at the Lancing Parish Hall, South Street, Lancing, West Sussex.

WORTHING & DISTRICT VIDEO RG, G63VR. Details from the Treasurer. Tel: (01903) 211919 (w).

WILTSHIRE

CHIPPENHAM & DARS, G3VRE. Meets at the Sea Cadet HQ, Chippenham. Details from Jon Ange G4LZ. Tel: (01249) 462610.

SWINDON & DARS, G3FEC. Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Don Forrest M0ACM.

TROWBRIDGE & DARS, G2BOY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wills. Details from Ian Carter G0GRI. Tel: (01225) 864698.

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTOL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingwood, Bristol. Details from Dave Brendry G7BYN.

GORDANO ARC, G6BRG. Meets at The Ship, Redcliffe Bay, Porthead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NORTH BRISTOL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Braemar Road, Northville, Bristol. Details from David Cawon G0GHM. Tel: (01275) 790448.

Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Details from Ron Middleton G7LJG. Tel: (01282) 852585.

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Valley Road, Exeter. Details from Ray Donno G3YBK.

EXMOUTH ARC, G0XRC. Meets at The Scout Hut, Marpool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARG, G0AXC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Harrison G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterleaf Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

PLYMOUTH RADIO CLUB, G8PRC, G3PCRC. Meets at the Welbeck Manor Hotel, Sparkwell, on the 1st & 3rd Tuesdays of the month. Details from Frank Russell G7LUL. Tel: (01752) 263222 or E-mail: frank@foxonzero.fsnet.co.uk

TORBAY ARS, G3NIA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Olway G3RMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UQP. Details from Alan Santillo G0XAW.

DORSET

BLACKMORE VALE ARS, G4RBV. Meets at Shaftesbury Club for Young People, Coppice Street, Shaftesbury, Dorset SP7 8PF. Details from Mr A. Marmot G0SFL. Tel: (01258) 860741.

BOURNEMOUTH RS, G2BRS. Meets at the Kinross Community Centre, Kinross, Bournemouth, Dorset. Details from Chris R. Ellis M5AGG, Broken Ridge, Fir Tree Close, St. Leonards, Ringwood, Hants BH24 2QW. Tel: (01202) 893126.

CHRISTCHURCH ARS, G0MUD. Meets at the Siemens Plessey Sports & Social Club, Grange Road, Somerford, Christchurch, Dorset. Details from Mr K.P. Harris G7WSN. Tel: (01202) 484892.

FLIGHT REFUELLING ARS, G4RFR. Meets at the Flight Refuelling Social Club, Merley, Wimborne, Dorset. Details from Martin Axon 2E1DFZ. Tel: (01202) 693334.

POOLE RS, G4FRS. Meets at the Bourneham & Poole CFE, Constitution Hill Site, Poole, Dorset. Details from Phil Mayer G0KKL. Tel: (01202) 700903.

PORTLAND ARC, G0VOP/G7VQP. Meets at Clifton Hotel, Grove Road, Portland. Details from Kerry Morris G1WVK. Tel: (01305) 785951.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickering, Weymouth, Dorset. Details from John Rose M0BQO. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLL. Meets at Kings Arms, Langton Matravers, Dorset. Details from Peter Wakefield M1WCH/M3WCH. Tel: (01929) 424413.

WESSEX AMATEUR WIRELESS CLUB, G1WAW. Details from Ken Powell G1JNG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, G1JDMC. Meets at the German Signal Station, Rue Basal, La Moye, St. Brelade. Details from Mrs Anne Mourant M0BHU. Tel: (01534) 734048.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCCS. Details from Craig Douglas G0HDJ. Tel: (01995) 71131.

TAUNTON & DARS, G3QZW. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewarth M0CIF.

WEST SOMERSET ARC, G0OWX. Meets at the West Somerset Community College, Minehead, Somerset. Details from Robert Bonar G1ONN/M3ONV. Tel: (01643) 863462.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingersh G0EYW. Tel: (01983) 370506.

YEovil & DARS, G3GMH, G8YED. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3C0D. Tel: (01935) 425669.

ESSEX

BRAINTREE & DISTRICT AMATEUR RADIO SOCIETY, G3XG. Meets at the Baintree Hockey Club, Church Street, Bocking, Braintree. Details from John M5AUB. Tel: (01787) 460947.

CHELMSFORD ARS, G0MWT. Meets at the Marconi Social Club, Beehive Lane, Chelmsford, Essex. Details from David Bradley M0BQC. Tel: (01245) 602838. E-mail: cars@omwt.org.uk

CLACTON RADIO CLUB, G3CRC. Details from Mr D. Fitzpatrick M0CHL.

COLCHESTER ARS, G3VCO. Meets at the Colchester Institute, Sheepen Road, Colchester. Details from Frank R. Howe G3PJ. Tel: (01206) 851189.

DENIG HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G8UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Bradstone G7UFF. Tel: (01279) 832700. FAX: (01279) 864973.

HARWICH ARC, G0GRH. Meets at the Park Pavilion, Barrack Lane, Harwich. Details from Eugene Kraft G4FTP.

LOUGHTON & EPPING FOREST ARS, G4QNP. Details from Marc Litchman G0T0C. Tel: 0208-502 1645/(07803) 023501.

SOUTH ESSEX ARS, G4RSE. Meets at the Paddocks, Long Road, Carvey Island, Essex. Details from Mrs Betty Maynard G8LJO. Tel: (01268) 695474.

SOUTHEND & DRC, G5QK. Meets at the Alexandra Yacht Club, Clifton Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TMM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARS, G4SLH. Meets at the St Joseph Parish Rooms, Scrutton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 671238.

VANGE ARS, G3YCW. Meets at the Barnstable Community Centre, Basidon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606.

KENT

BREDHURST RX & TX SOC., G0BRK. Meets at Rock Avenue Working Mens Club, Rock Avenue, Gillingham, Kent. Details from Mr T.M. Wheeler G7MIM.

CRAY VALLEY RS, G3RCV, G1RCV. Meets at the Progress Hall, Admiral Seymour Road, Etham, London SE9. Details from Bob Treacher BR532525 via www.crs.org

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammar School for Boys, Astor Avenue, Dover. Jim Cairns M18KH. Tel: (01304) 852773.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Heme Bay, Details from Paul Nicholson G3WJF. Tel: (01227) 743070. FAX: (01227) 742288.

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AKA.

HOME COUNTIES ATV GRC, G6HCT. Meets at the Binfield Club, Binfield (near M4/J10). Details from Mr A. Brooker G4WAZ.

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Melrose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

MEDWAY ARTS, G5MMW, G8MMA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walkerslade, Chatham. Details from Mr J. Hale G3FTH.

NORTH KENT RS, G4CW. Meets at The Pop-in-Parlour, Graham Road, Bexleyheath, Kent. Details from Mr A.V. Friebens G8MLQ. Tel: (01474) 365694.

SHALE ARS, G4SRC, G6SFR. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 665559.

THE MORSE CLUB, G3OXE. Meets at The Five Wents Memorial Hall, Swanley/Hexable Road, Details from Ken M3CZA. Tel: 0206-306 3544.

WEST KENT ARS, G3WKS. Meets at the St. Marks School Hall, Tunbridge Wells, Kent. Details from Malcolm Sheppard G4FWG. Tel: (01892) 652272.

NORFOLK

ANGLIA TELEVISION ARS, G0XV. Meets at Anglia TV, Norwich NR1 3JG. Details from Jim Bacon G3YLA. Tel: (01603) 615151.

GREAT YARMOUTH RS, G3YRC. Meets at the Bradwell Community Centre, Bradwell, Great Yarmouth, Norfolk. Details from Mr A.D. Bestford G3NHU.

GRESHAM'S SCHOOL ARC, G3P3K. Details from Rev. R.N. Myerscough G3P3K.

KINGS LYNN ARC, G3KYZ. Details from Derek Franklin G0MQL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Waldman G0VZD. Tel: (01953) 604769.

NORTH NORFOLK ARC, G8ZMC. Details from Tony Smith G4FAL. E-mail: g4fal@connectfree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TO. Meets at the Culford School Cullford, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT.

FELDESTONE & DARS, G4ZFR. Meets at the Orwell Park School, Nacton, Near Ipswich. Details from Paul Whiting G4YQC. Tel: (01473) 642595.

FRAMLINGHAM COLLEGE ARC, M0CBB. Tel: (01728) 727232.

IPSWICH RADIO CLUB, G4IRC. Meets at the Golden Hind, Nacton Road (3rd Wednesdays at The Hollies, Bucklesham Straight Road), Ipswich. Details from Keith Gaunt G7OY. Tel: (01394) 420226.

LEISTON ARC, G6XFS. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattmole M3MIG. Tel: (01728) 746044.

LOWESTOFT DRS, G3JRM. Meets at The George Barrow Hotel, Oulton Road, Lowestoft. Details from Phil Holden G0JSG. Tel: (01502) 585448.

MARTLESHAM RS, G4MRS. Meets at the BT Laboratories, Mardesham Heath, Ipswich, Suffolk. Details from Darren Hatcher. Tel: (01473) 644475.

SUDBURY & DRA, G0SW, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Sudbury, Suffolk. Details from Bryan Pantom G1TWW.

SUFFOLK DATA GROUP, G87MM. Details from Peter Pryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYO

CONWAY VALLEY ARC, GW6TM. Meets at the Studio, Penrhos Road, Colwyn Bay, Clwyd. Details from Mr R.W. Evans GW6PWK. Tel: (01745) 855068.

HALKYN & DARS, GW3HRG. Details from Mr D. Austin GW3D4G.

NORTH WALES RS, GW0NWR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Clwyd. Details from Ted Shpton G0WDSJ. Tel: (01745) 336939.

WREXHAM ARS, GW4WAM. Meets at the Community Centre, Mesagwyn Road, Wrexham. Details from Mr P. Moran GW0WER.

GWYNEDD

MEIRION ARS, GW4LZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gerwise Chavasse GW4URJ. Tel: (01341) 421028.

PORTHMADOG & DARS, GW0AM. Meets at The Yacht Club, The Harbour, Porthmadog, Gwynedd. Details from Mr G. Cadwaladr MW1DFN.

THE DRAGON ARC, GW4TTA. Meets at the Ebenezer Church Hall, Lon Foel Craig, Llanfaiwl, Isle of Anglesey. Details from Stewart Rolfe GW0EJF. Tel: (01248) 362229.

POWYS

POWYS ARC, GW4HVN. Meets at the ATC HQ, Park Lane, Newtown, Powys. Details from Mrs Jean Brown 2W1CEZ. Tel: (01686) 640814.

SOUTH WALES

DYFED

ABERPORT YMCA, GW4SZV. Meets at the Hut B17, The Airfield, Aberport. Details from Mr G. Carnther GW4HQJ. Tel: (01239) 811205.

ABERYSTWYTH & DARS, GW0ARA. Meets at the Scout Hut, Plasrug Avenue, Aberyystwyth. Details from John Woodward GW6IDK. Tel: (01970) 890657.

CARMARTHEN ARS, GW4YCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynw Road, Llanllunard, Carmarthen SA31 3BS. Details from Mr W.D. Hughes GW4ZML. Tel: (01267) 231359.

CLEDDAU ARS, G0WYG. Details from Trevor Perry GW4XQK. Tel: (01646) 600725.

LLANELLI ARS, GW0EZO. Meets in the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones GW0KZK. Tel: (01554) 820207.

PEMBROKESHORE RS, GW0EIE. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones MW0CAB. Tel: (01437) 763028.

GWENT
ABERGAVENNY RS, GW4GFL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes GW0DYQ. Tel: (01633) 483186.

BLACKWOOD & DARS, GW0GW. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans GW0FTI. Tel: (01495) 225178.

EBBW VALE COLLEGE RS, G0WIM. Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden GW0HCN. Tel: (01496) 305192.

NEWPORT ARS, GW4EZW. Meets at the Brynglas Community Centre, Brynglas Road, Newport, Gwent. Details from Paul Nicholas.

PONTYPOOL ARS, GW3RHH. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith GW0OZL.

MID GLAMORGAN

BRIDGENO & DARS, GW4LNP. Meets at the Club Bymrynny, Bymrynny, Bridgend. Details from Alan Hulmes. Tel: (01656) 721574.

HOOVER (MERTHYR) ARC, GW3ROB. Meets at the Hoover Sports Pavilion, Hoover Ltd., Pentrebach, Merthyr Tydfil, Mid Glamorgan. Details Robert Cummings GW0FVG.

MID GLAMORGAN ARC, MW0CNA. Meets at Aberkenfig Sports & Social Club, Details from Myrlyn Carey GW4VSE. Tel: (01656) 734668.

SOUTH GLAMORGAN

BARRY ARS, GW3WKL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Norman GW4BVJ. Tel: (01446) 738756.

HIGHFIELDS ARC, GW4LFO. Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

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Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: g3wgm@amsat.org or visit www.uk.amsat.org

British Amateur Radio Teledata Group (BARTG - G4ATG, GB2ATG)

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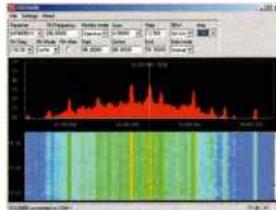
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