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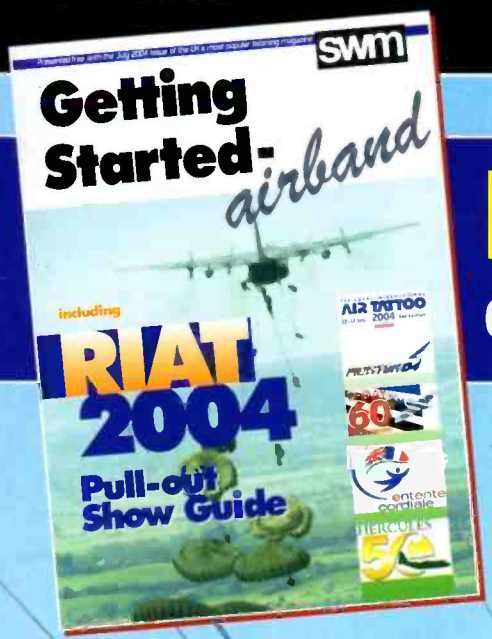

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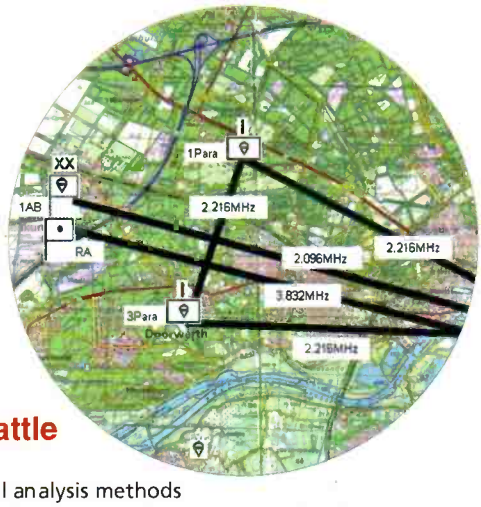

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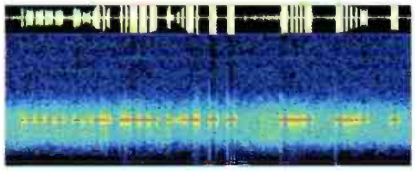

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Regular Columns

FREE with this issue

cover subject: Intriguing h.f. communications. Numbers Stations abound.
Pic. Paul Beaumont.

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

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Binders are also available (each binder takes one volume) for £6.50 plus £1.75 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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ED's comments

Welcome to a feature filled issue of *SWM*. It's been a busy month with the Editorial Offices frantically buzzing. I'd like to offer thanks to everyone who's been involved in putting together both the main magazine and *Getting Started*, with a special well done to **Bob Kemp** who's made a fine job of designing the supplement.

I approached the organisers of RIAT 2004 to discover whether they would be interested including a short form Show Guide with this July issue of *SWM*, they were, as you can tell, most co-operative, supplying lots of information and many superb photos. Sadly, as always, there wasn't enough space available to use everything. I'm most pleased with the final result and I hope that you too will find it to your liking.
Here are some interesting Tattoo facts that didn't get used in the Supplement, so I'll share them with you now.

- The aircraft travelling the farthest to be at RIAT 2004 will be a Royal New Zealand Air Force C-130H from 40 Sqn which will join celebrations to mark the 50th anniversary of the 'Herk'.
- The participation of the Italian Air Force EF2000 will be the first time this aircraft has displayed in the UK.
- The two-seater Supermarine Spitfire T IX, which will be taking part in the special 60th anniversary of D-Day tribute, was the star of the recent 'Channel Four' series *Spitfire Ace*.
- Organisers are planning a special tribute in honour of Mr Paul Bowen, director and co-founder of the Royal International Air Tattoo, who died in May.
- The smallest aircraft taking part in the flying display will be the Slingsby Firefly.
- Among the guests at the Tattoo will be pilot Polly Vacher MBE, who returned to the UK in April after nearly a year of flying solo around the world. Polly was helping to raise money for the Royal International Air Tattoo's Flying Scholarships for the Disabled charity.
- The largest aircraft taking part in this year's Tattoo will be the USAF C-5B Galaxy.

In previous years, my plans to attend the RAF Fairford based event have been thwarted. This year will be different and I'm committed to getting there to enjoy the action, although I'm not sure which day I'll be there yet. If you spot me, please say hello, I'll have a 2m radio with me and I'll be monitoring 145.500MHz, so perhaps we'll meet up on air. I look forward to seeing lots of *SWM* readers on either 17 or 18 July.

KPH On Air Once Again

Due to *SWM* production schedules, the fifth annual event that has become known as the *Night of Nights*, historic Morse code radio station KPH is due return to the air in commemoration of the last commercial Morse message sent in the USA, after I complete this piece, but before the magazine is printed. As a keen utility listener I'll be listening out, but by the time you read this, the activities will be over and done.

KPH, the ex-RCA coast station located north of San Francisco, should have returned to the air for commemorative broadcasts on 13 July at 0001, five years and one minute after the last commercial Morse transmission in the USA. These on-the-air events are intended to honour the men and women who followed the radiotelegraph trade on ships and at coast stations around the world and made it one of honour and skill.

Transmissions were expected to continue until at least 0700.

For this fifth annual *Night of Nights* one frequency for the equally historic coast station KFS may have possibly be activated. The enthusiastic team were working to repair the antenna needed for the KFS transmission.

Veteran Morse operators, including former KPH staff members, were due to be on duty at the receiving station at Point Reyes, CA listening for calls from ships and sending messages just as they did for so many years before Morse operations were shut down.

The transmitters are located 29km south of Point Reyes in Bolinas, CA at the transmitting station established in 1913 by the American Marconi Co. The original KPH transmitters, receivers and antennas will be used to activate frequencies in all the commercial maritime h.f. bands and on m.f. too.

KPH will have transmitted on 4.247, 6.4775, 8.6420, 12.8085, 17.0168 and 22.4775MHz on h.f. and 500 and 426kHz on m.f.

If KFS was activated, transmissions would have been be on 12.6955MHz.

KPH, and KFS if activated, will send traffic lists, weather and press broadcasts as well as special commemorative messages, many of which will be sent by hand. At other times the KPH and KFS 'wheel' will be sent to mark the transmitting frequencies.

Reception reports should be sent to: **Ms. DA Stoops, PO Box 381, Bolinas, CA 94924-0381 USA.** Denice is a former KPH operator and was the first female telegrapher hired at the station.

The KPH event is run by The Maritime Radio Historical Society in co-operation with the Point Reyes National Seashore, part of the National Park Service.

Further information may be found on the Maritime Radio Historical Society Web site at **www.radiomarine.org** or by contacting Richard Dillman, Tel: **001 415-990-7090** E-mail: **ddillman@igc.org** or Tom Horsfall, Tel: **001 510-237-9535** or E-mail: **wa6ope@hotmail.com**.

Did you hear either station on air?

Wouldn't it be great if Portishead Radio were to be resurrected for a similar event?

Vy 73 Kevin

QSL

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

Dear Sir

Ronald Evans (*SWM* February 2004 issue) genuinely has my sympathy. Since I was fourteen I have tinkered with soldering tags, terminals and paxolin - the magic has never left me and I'm well past three score and ten. Particular memories...in 1938 or thereabouts, a local boy wrote to *PW* to say he'd received Pitcairn Island on an 0-V-0 - that 0-V-0 probably had a second-hand PM2HL 2V triode that a local dealer had given him.

In later years, at sea, my 'chief' Dan O'Leary, 1st R/O of P&O's MV *Carthage* spoke of the challenge of raising Portishead Radio from Sydney Harbour on crowded calling frequencies with moderate power, wireless telegraphy, especially QRP is an art form. Wired communications...E-mail and so forth...that's a different ball game altogether. Is it fair to say Ronald has missed the point and lost the plot? No, it isn't. Perhaps it's part of the generation game?!

P. Robinson G3MGJ
Stratford on Avon

topqsl

Dear Sir

I have to respond to the letter in the February issue of *SWM* regarding the content of this magazine and the 'future' of radio. Oh dear!

First of all, let's put things into perspective. Radio, in all its forms, is enjoyed by millions of people, who can be divided into two categories:- Enthusiasts: This often includes people who install massive antenna systems and winkle every last microvolt from the ether from very long distance stations. They are often known as radio amateurs, DXers and so on. It can also include people who prefer to listen to radio for many hours, over and above many other types of pastimes. These people are often very good at remembering frequencies, station locations, channel numbers, brands, formats, program schedules and so on. They often go to great lengths to do this, with big antennas, expensive and sensitive radios and so on, just like their DXing friends. They will even buy big expensive PCs and listen to little known stations via the Internet - because that is what interests them.

Radio enthusiasts like to challenge and harness new technologies and maybe even experiment with the science behind radio. Some of them even lovingly hold on to old radio technologies and have little personal museums of ancient radio relics. Radio enthusiasts are often collectors of radio memorabilia, QSLs, photos and so on. They trawl through radio information websites and magazines for the latest news and views. These people could be some of those that make up the 2% who show up in RAJAR figures as listening to 'other' radio stations.

Ordinary Members Of The Public. This includes the vast majority of the people of this world who take radio as it comes, provided it appeals to their taste and needs. Ordinary members of the public, like radio enthusiasts, harness new technologies - but often only when those technologies come cheap and are viable replacements for or can co-exist with what they already have, i.e. DVD, satellite, CDs - and, more increasingly, DAB radios (as DAB radios get cheaper - more 'ordinary' people are buying them.

Unlike radio enthusiasts, ordinary members of the public care little about station memorabilia and so on. They are not so good at remembering frequencies, station locations, formats, program schedules, etc. They are likely to listen to only a small number of radio stations, whenever they have time, provided that their other interests don't get in the way.

Unfortunately, some radio enthusiasts become so opinionated over certain aspects of their hobby that they often take leave of their senses. They develop opinions regarding radio for which the ordinary members of the public certainly would not have and care not a jot about.

A very good example of this is sound quality of DAB. Radio enthusiasts moan and groan - but many of them will then go and listen to a virtually unheard of station, streaming at 32K on the Internet, which sounds considerably worse than DAB.

Meanwhile, the many friends of mine (who are ordinary members of the public) that I have demonstrated DAB to, using my DAB car stereo, have **all said** how wonderful DAB sounds, even when compared to f.m. Well, it's their ears - or are they deaf and fickle?

Also, I am often told that the future of radio listening is via broadband, 3G mobile 'phones, systems similar to satellite navigation systems and so on. To many radio enthusiasts, the 100 year old concept of listening to radio via a radio set in the future seems almost inconceivable.

Reality check: Members of the public already get confused over analogue f.m. and a.m. and having to remember frequencies and positions of radio stations on their radio dials. To believe that the 'future' of radio means that most people will listen via mobile 'phones, TVs, Internet and so on, in preference to a radio set, is utter nonsense. We radio enthusiasts might want to do that - but the public will not. They have just about grasped listening to some radio via their TV set - but it is exceedingly doubtful if they will go to much greater lengths.

As for broadband streaming possibly being a 'successor' to analogue and DAB ... talk sense, will you! For every person that listens to radio via the Internet, it requires a single stream. So, for example, if Radio Clyde switched off its a.m., f.m. and DAB transmitters and chose to broadcast on broadband - in order to reach people within their TSA, they would need up to 1.8 million separate streams! You would then have to expect the public, including frail old grannies and technophobes to know how to access those streams and listen via their PCs or 3G mobile 'phones. How ridiculous.

Radio is radio. It always will be - though in the future we will have multi-platforming, giving us access to some stations using mediums other than radio sets. However, radio sets, especially DAB because of its fantastic ease of use, will be the dominant radio medium. A DAB radio is one of the easiest and user friendly electronic device around just now - and anyone I know who owns a DAB radio has said how wonderfully simple it is to use.

As for the future of radio itself, we will see much less in the way of frequencies and numbers appearing on radio displays. Instead we will see station names and other information. That includes DAB for local broadcasting and DRM for long distance broadcasting.

This is also likely to be the case for utility services, who will probably carry text idents that will appear on specially adapted radios - or, as is already the case, they will become encrypted and will only be accessed by people who need to access them - and many of those people will not even need to tune in or know a frequency, they would simply switch on the transceiver.

As for the content inside *PW* and *SWM*, you should carry on as normal, until all broadcast stations go digital and all other types of broadcast become encrypted and inaccessible. The only things that I see changing is how many numbers of frequencies you list, which is highly likely to be far fewer. Yours living in the real world.

Arthur Grainger
Lanarkshire
Scotland

Drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

Dear Sir
Firstly, thanks for a wonderful magazine, which I get monthly from my local newsagent who puts my copy aside for me, which in turn brings me to the reason for putting fingers to keyboard.

On asking for my January 2003 copy of *SWM*, the girl in the newsagents started searching through her box of reserved magazines. After going through them, she admitted that it may have been overlooked this month, to which I replied, "Could I have a look?" she said "Certainly" and after getting halfway through them all, I pulled out my copy of *SWM* to which she replied "Oh! I thought it was a swimming magazine" *SWM*/SWIM, very close I thought!".

Now here's the icing on the cake! Whilst removing my *SWM* from my locker to read at dinner time at the work's QTH only today I might add, one of the Electricians who I work with is a keen amateur swimmer and on seeing the front cover of my magazine said "I didn't know you were into swimming as well!". I had to explain to him the exact nature of the magazine and he was also in agreeance with me about the *SWM* logo on the front cover looking remarkably like SWIM.

I wonder if anybody else has had similar experiences with the front cover logo?
Paul Burnett G1DAT
Eston
Cleveland

*I hope our Art Dept. are reading! - **Ed.***

Dear Sir
I have just renewed my subscription to *Short Wave Magazine* - for one year only - on the strength of the selection of the 'Top QSL' in the February edition, that is the letter from Ronald Evans, and the editorial reply, in which you asked for readers' views on that letter.

My subscription was about to lapse because like Mr Evans I have moved my listening from short wave to Internet radio. My Grundig Satellit 800 with the supplied internal antenna gave me reasonable service though an external antenna would, no doubt, have improved that dramatically. But I already had the PC and relevant connections, to listen to Internet radio. This was a huge improvement over my short wave system. Mr Evans is right - Internet radio is, so far, so much better, with clearer and more stable reception.

It might not be so portable yet, but I suspect it will only be a matter of a short time before that issue is solved satisfactorily. If your coverage of Internet radio improves and expands I will renew my subscription further; if it does not, the subscription will really lapse next time. So, it is up to you.
B A Reed
Hook
Hants

*SWM exists to reflect the interests of radio monitoring enthusiasts. That's our sole raison d'étré. I look forward to you remaining as a reader! - **Ed.***

Dear Sir
I've just read your article on Remote Radio in the May edition of *SWM*. What an excellent idea! I know there is a little bit of anti-computer sentiment within the readership, including previous comments made by myself; but this is using computers to control real radios. I've now got a distribution of Linux to install on the PC I use for my PCR1000, so hopefully I too will have a node up and running within a week or two. Thank you for making us aware of the opportunity and thanks to Kelly Lindman for getting it up and running.
Phill Gardiner G8YLX
Cowes

Dear Sir
'Ol Sol and its effect on radio propagation'. What an excellent article ruined by gaudy presentation that makes it difficult to read and detracts from its quality - very poor.
R.E. Parkes G3REP
Steyning
W. Sussex

Is there something you want to get off your chest?

Do you have a problem fellow readers can solve?

Air your views on these pages!

Dear Sir
I was somewhat bemused by the letter from Ronald Evans (*SWM* Feb 2004). Surely the whole point of reading a magazine like *SWM* is you are interested in h.f. (and other) communication.

As a reader of 60+ who was weaned on valves, but by virtue of working in a technical environment has been obliged (willingly) to keep up with technology, I welcome the broad coverage of subjects included in *SWM*. There are several which I do not pursue personally, but still like to be informed of.

I can understand Mr Evans' frustration regarding his reception problems and in his situation the Internet would seem the appropriate solution, but to suggest we all use it is rather 'over the top'. Just think, assuming we could afford it, we would all run a power-hungry PC, connected presumably by broadband, to an already groaning network. Whatever happened to energy conservation?

In a world ever more demanding of information surely we should be using all available means to provide it. Although many s.w. broadcasters have forsaken the bands, I would like to hope that Digital Radio Mondial, recently featured in *SWM*, might reverse this trend. As for obliterating the h.f. bands by using power lines for data transmission, what a waste.

I am reminded of my days building test equipment. I would use a few micro switches and a handful of discrete components, while the younger members would manage to incorporate a microprocessor. We both achieved our objective, but at what cost?

So as an oldie, who still hankers after the days when you waited with baited breath for the filaments of your valves to reach operating temperature and for those far off stations to waft through the headphones, please include some nostalgia in *SWM* as well as keeping me up-to-date. Yes I do use a PC, take digital photos, use the Internet and thoroughly enjoy it all, so carry on chaps, you are doing a grand job.
Geoff Allgood
Royston
Herts

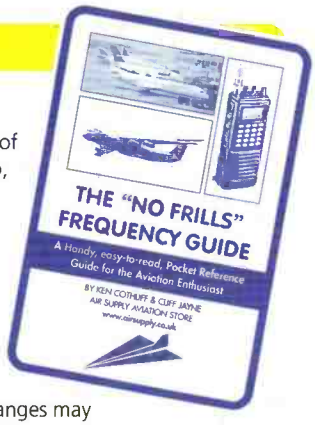
Leicester Amateur Radio Show ON!

It has come to the notice of the Leicester Show organisers that rumours are circulating again saying that this year's show has been cancelled, but this is not the case! The Leicester Amateur Radio Show **is not cancelled** and the show date of **1 and 2nd October** is correct.

The date has been changed from previous years because the Exhibition Manager at Donington Park International Convention Centre did not want parking problems on the weekend of the SuperBikes event (17, 18 and 19th September). The Amateur Radio Show also had to fit in with the fact that the Exhibition Hall is used for car auctions during the week and therefore a small section of the car parking area has been fenced off as a secure compound for the car auction people.

The organisers apologise for any inconvenience caused by the date change and look forward to welcoming visitors and traders to this year's event. Further information regarding the event can be found at **www.lars.org.uk**

SWM At RIAT 2004



Short Wave Magazine advertiser and specialist aviation supplier **Air Supply** have just agreed to ensure that they have a supply of *SWM* on their stand at this year's Royal International Air Tattoo, RIAT 2004 held 17 & 18 July. Additionally, Ken Cothliff, Air Supply's owner is pleased to offer *SWM* at the shows listed here.

Air Supply have a long history of supplying the aviation and airband enthusiast with radios and much more. One of their popular items is *The 'No Frills' Frequency Guide*. A cost effective pocket reference for the aviation enthusiast. Priced at a modest £4.95, this guide contains all the frequency information to get you going with both civil and military frequencies covered.

This Air Show list is complete based on information received and changes may follow, so all dates should be checked.

June 25-27	Goodwood Festival of Speed	August 12-15	Eastbourne Air Festival
June 26-27	Waddington Air Show	August 21-22	Yorkshire Air Show - Elvington
July 4	Shuttleworth Summer Air Display	August 21-22	DH Moth Rally - Woburn
July 9-11	PFA Rally - Kemble	August 26-27	Clacton Air Show
July 10-11	Flying Legends - Duxford	August 28-29	Shoreham RAFA Air Show
July 10	Festival of Flight - East Fortune	September 4-5	IWM Airshow - Duxford
July 17	Shuttleworth Evening Air Display	September 5	Shuttleworth Autumn Air Display
July 17-18	International Air Tattoo - RAF Fairford	September 9	Jersey Intl. Air Show
July 19- 25	Farnborough International 2004	September 11	RAF Leuchars Air Show
July 23-25	Helidays - Weston Super Mare	September 12	Kemble Jets Show
July 24-25	Sunderland Intl. Air Show	September 18	RN Open day - Yeovilton
July 29-30	Lowestoft Air Show	September 18-19	Biggin Hill Air Show
August 1	Shuttleworth Air Pageant	October 10	Duxford End of Season Air Show
August 6-8	Isle of Man Air Rally		

If you are in the vicinity, then call in at Air Supply's stand, visit the shop or just call. Air Supply are located at **97 High Street, Yeadon, Leeds LS19 7TA** Tel: **0113 250 0119** or E-mail: **ken@airsupply.co.uk** Their website is **www.airsupply.co.uk**

Aviation World Mourns Air Tattoo Co-Founder's Death

Paul Bowen, co-founder of the Royal International Air Tattoo (RIAT) - Europe's largest Airshow - died on 18 May after a six-month battle with lung cancer. Mr Bowen, 57, from Marston Meysey in Wiltshire, founded the Tattoo with his friend and colleague Tim Prince in 1971 whilst they both worked as air traffic controllers at the then A&AEE Boscombe Down.

The Tattoo was held at North Weald airfield in aid of RAFA. From 1973 to 1985 the Tattoo took place at Greenham Common, near Newbury, moving to RAF Fairford in Gloucestershire in 1985 when a unique formation of Concorde flying with the Red Arrows celebrated the arrival of the Airshow at its new home.

A natural showman, Mr Bowen was the driving force behind its growth into the world's largest military airshow, last year attracting more than 160,000 spectators and in excess of 500 aircraft from around the globe. His irresistible charm and persuasive style won him many friends and allies and he quickly developed an unrivalled network of contacts in the aviation world. These included military air chiefs, pilots, air attaches and civilian aircraft operators as well as many legendary aviators including Brian Trubshaw and Gp Capt Sir Douglas Bader.

A highly charismatic man, he motivated a team of 4,000 Tattoo volunteers - many former and serving RAF personnel and aviation professionals - to turn up each year and share his dream. In planning RIAT's annual flying programme, he regularly reached for the stars and in doing so often achieved the impossible with aerial displays never before seen in Europe.

Most memorable was RIAT's emotionally-charged VE-Day tribute in 1995 that involved more than 60 historic aircraft. Recently, even as his health began to fail, he was busy plotting something bigger and better than 2003's show-stopping joint flypast by the Red Arrows and a USAF F-117A stealth bomber. And when resources at the RAF Benevolent Fund became stretched, he helped launch the Battle of Britain Appeal (1989-1990), which raised in excess of £20 million for the charity.

● Mr Paul Bowen (pictured right) with The Rt Hon the Lord Barber of Wentbridge, a previous chairman of the RAF Benevolent Fund and former Chancellor of the Exchequer, at the IAT in 1994.

Paul Bowen was born on 18 February 1947 in Bath, Somerset. He was a pupil of Forest School, Snaresbrook. From 1966 to 1969 he trained at the College of Air Traffic Control and as an Air Traffic Control Officer Cadet with National Air Traffic Services, gaining all CAA ATC licences. He also obtained a Private Pilot's Licence after flying training at Marshall Aerospace of Cambridge. He worked with the National Air Traffic Services at A&AEE Boscombe Down from 1969 to 1978. Between 1976 and 1986 he held a commission with RAFVR (Intelligence Branch).

RIAT chief executive Tim Prince said he had lost not only an inspirational colleague but a great friend. "Paul's energy and determination to succeed combined with his insatiable passion for aviation made the Royal International Air Tattoo what it has become today. He was quite simply the heart of the Tattoo. RIAT is very much a family affair - a 4,000-strong family of volunteers, supporters and staff who are committed to staging a world-class event each year. Today, that family has lost its 'father'."

communiqué

July Talk

On Tuesday 6 July, the **Chelmsford ARS** are holding a talk by Les Sayer about his WWII experiences as a Radio Operator and Rear Gunner in 'Stringbags', which were flown from Aircraft Carriers. The meeting will be held at the Marconi Social Club, Beehive Lane, Great Baddow. Doors open at 1915 for a 1930 start. There will be a bar along with ample free parking. Contact **George G3UTC** on **(01277) 622707**, E-mail: **info@g0mwt.org.uk** or check out the club's website at **www.g0mwt.org.uk**

Icom Announce Major Sponsorship

Icom (UK) Ltd. are pleased to announce the major sponsorship agreement with the **Royal Cork Yacht Club**, the oldest yacht club in the world and its famous biennial regatta, Cork Week. In a move that further enhances the Icom brand name, Icom have now become the official radio communication supplier for the club and the event which has the reputation of being one of the friendliest and most sociable regatta's in the world.

- Jon Brooks, Marine Dealer Manager of Icom (UK) Ltd. presenting an IC-M1EuroV to Peter Crowley, Admiral of the Royal Cork Yacht Club.

Icom will be supplying the Yacht Club with three IC-M401 compact fixed v.h.f. radios and 42 of its flagship hand-held v.h.f. radio - the IC-M1EuroV, which is used by government bodies around the world. These radios will be in daily use throughout the event.

The club's fleet of Rigid Inflatable Boats (RIBs) will be given the important task of controlling all yacht movements. Onshore 40 IC-F3GS commercial radios will be used to assist staff in organising the expected thousands of people who attend the event. In addition, Icom will also be supplying a wide range of accessories.

The Royal Cork Yacht Club is the oldest yacht club in the world having been founded in 1720. It has grown to be one of the World's leading Yacht Clubs and is the organiser of the biennial Cork Week (held this year between **10-16th July 2004**), which is widely regarded as Europe's premier sailing event. The club will host a series of races involving up to 600 yachts from 12 countries with up to 5000 competitors.

Jon Brooks, Marine Dealer Manager of Icom (UK) Ltd. said, "I am pleased that Icom's strong brand name is being associated with such a prestigious club and event. I look forward to this year's event and I am certain that our equipment will contribute to the success of one of the world's premier sporting events".

Ever Expanding Nevada

No, not the state, but **Nevada**, the Portsmouth based retailer, distributor and manufacturer of amateur radio equipment. Nevada have purchased a 12,000 sq ft warehouse just across the road from their current distribution centre at Farlington in Portsmouth.

Mike Devereux G3SED, MD, has ambitious plans for the new warehouse, "with the acquisition of a second warehouse" he says "we have the opportunity to offer the UK's largest ever display of amateur radio equipment under one roof. We will have h.f. beams fully assembled with masts, towers and wire antennas all on show inside the warehouse". Mike has been busy sourcing new products for the company to both stock and to manufacture under the Trident and Palstar brand names.

- The New Nevada warehouse with MD Mike Devereux G3SED in the foreground. L-R in the background are John Gordon (Amateur Sales) and Phil Jefferies (Commercial Manager) showing off the size of the building!

Nevada have also just released new catalogues for Scanners and for CB radio, plus their new Amateur radio catalogue will be ready shortly. They are planning a huge open day in November to showcase the new facilities and more details can be found on their website - visit **www.nevada.co.uk**

Summer Edition

The Summer 2004 edition of *Broadcasts in English* is now available from the **British DX Club**. The 32-page booklet was compiled by Dave Kenny and includes details of all known international broadcasts in English on short wave and medium wave for the Summer (A04) schedule period. It is in time order throughout and covers all target areas. Transmitter sites are listed where known and it also includes a guide to DX and Media Programmes plus schedules for WorldSpace and World Radio Network for Europe.

Copies are available at the following prices (postage included): United Kingdom - £2; Overseas - six International Reply Coupons; five Euros or five $US. UK cheques/ Postal Orders should be payable to British DX Club.

The British DX Club can now accept Paypal payments from overseas - please E-mail for details. Payments in $US or Euros are only accepted in cash. All orders/enquiries to: British DX Club, **126 Bargery Road, Catford, London SE6 2LR** or visit **www.bdxc.org.uk**

Copies of the new edition of *Radio Stations In The UK* are still available for £3 - please see the BDXC website for details.

New Addition

Herne Bay has just gained a new addition to its skyline. A team of amateur radio enthusiasts updated **Icom (UK) Ltd.**'s antenna system. This new installation will further enhance the operation of Icom's amateur radio operating equipment in its 'shack' - a major haunt for most of the staff in the company.

The new system has a Unity Gain Collinear, two diamond X-5000 verticals and a four-band hybrid quad antenna for h.f. and 6m and new feeder cable.

The work was done by **John Turner G0KFO** (Amateur Product Specialist), **Don Turner G4TKR** (General Manager), **Brian Didmon G4RIS** (IT Support), **Jerry Kelk G4JMP** (IT Manager), **Chris Ridley G8GKC** (Service Engineer), **Colin Turner G6OEY** (Technical Support Specialist) and **Peter Broadhurst M3GQJ** (Warehouse Manager). The job took just seven hours over two days to complete.

John Turner said, "The whole upgrade is definitely having an impact on the wide range of operating equipment in the Icom shack". However, **Roger Diamond**, Advertising Designer for Icom (UK) Ltd. said, "I still can't get Radio 4".

Rechargeable Batteries

Users of portable equipment such as scanners, MP3 and CD players, Minidiscs and Pocket Digital Players will welcome the launch of the first ever range of rechargeable batteries created specifically for their portable audio systems. Today the Audio range is introduced by Uniross, the world's leading manufacturer of rechargeable batteries.

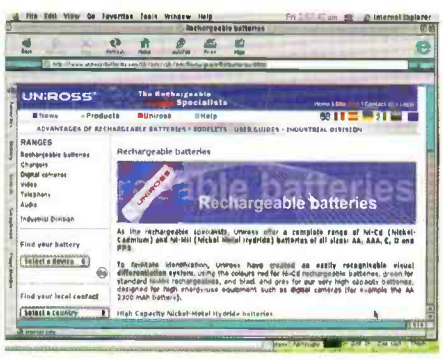
The six battery sizes and a slim, compact, light and universal charger meet the needs of 80% of the portable audio market. Owners of portable products can now switch to Audio rechargeable batteries, many of which are more powerful than their use once counterparts.

Each of these batteries can be recharged up to 1000 times. The large number of recharge cycles means great savings over throw-away batteries.

Until now, sales of portable audio have outstripped the supply of suitable replacement batteries. When original batteries in systems such as Aiwa, Sharp, Sony and other makes run out, finding replacements can be difficult and throw-away batteries are more expensive.

Now, just pop out dead batteries, pop in new Audio charged up rechargeables and the pop music goes on for longer. Batteries recharging time takes between 2.5 to 4 hours, depending on battery size and capacity and means no more hunting around the shops for replacements. The charger is intelligent so knows when your batteries are fully charged. Another great feature is that the charger can run on all mains between 110 and 240V, so is ideal for the globe trotting music lover, who can use it anywhere in the world.

Visit Uniross's website for further information about the company and its range of chargers, rechargeable batteries and industrial battery services - **www.uniross-batteries.com**



rallies

***June 27:** The West of England Radio Rally is to be held at the 'Cheese & Grain', Market Yard, Frome, Somerset, from 1000 till 1600. There will be a large number of traders who supply Amateur Radio, electronics and home computer equipment, giving visitors the opportunity to view the latest communications technology before buying at competitive prices. Other features include plenty of hard surfaced parking (free on a Sunday!), licensed bar and cafe. Frome is a picturesque old town, with interesting shops and pubs nearby. Easy access for disabled visitors. More details from **Shaun O'Sullivan G8VPG**, Rally Manager, on **(01225) 873003** weekday office hours, **(01225) 873010** 24hr FAX, E-mail: **rallymanager@westrally.org.uk** or visit **www.westrally.org.uk** for updated information.

July 4: The York Radio Rally is to be held at York Racecourse. There will be free parking, refreshments, trade stands and lots more. Doors open between 1015 and 1030. More information from **Alex Williamson** on **(01904) 423871** or **(01937) 832139**.

July 4: The Milton Keynes Amateur Radio Society are holding their Annual Rally at St. Paul's School, Chaffron Way, Leadenhall, Milton Keynes. Doors open at 0900 and talk-in will be on 145.550 and 433.550MHz. The rally is located three miles from J14 on the M1 and 0.5km from the local Maplin store. More information at **rally@bletchley.net** or from **Malcolm Bay M0MBO** on **(01525) 874075**. Additional information also from **www.mkars.org.uk**

July 10: The Cornish Radio Amateur & Computer Rally is to be held at Penair School, Truro. Doors open at 1030. There will be trade stands, a Bring & Buy, refreshments and more. Further information from **John** on E-mail: **g4ijy@dsl.pipex.com** or **Ken** (Rally Organiser) on E-mail: **jtarry.freeserve.co.uk**

Calling All IC-703 Owners!

Icom (UK) Ltd. have informed the *SWM* Newsdesk that they have a limited quantity of Icom IC-703 logbooks available to those customers who have purchased IC-703 transceivers. Each book is A5 size with an attractive cover.

If you would like one of these excellent logbooks, simply contact Icom Marketing with the serial number of your IC-703 (this can be found on the back of the radio by the antenna socket) together with your name, address and telephone number. Upon receipt of this information, you will receive a logbook via post.

Please note, however, that these logbooks are available on a first come, first served basis and that this promotion is only open to residents in the UK and Eire who have purchased Icom UK imported IC-703 transceivers. Icom can be reached at **Unit 9, Sea Street, Herne Bay, Kent CT6 8LD, Tel: (01227) 741741, FAX: (01227) 741742** or visit **www.icomuk.co.uk**

Lighthouse Weekend

The **Scarborough Special Events Group** will be active as **GB1SCA** from the lamp room at the top of Scarborough Lighthouse during International Lighthouse Weekend on the **21-22nd August**. The event will also commemorate the 100th Anniversary of the building of Scarborough lighthouse in 1904.

The group have received permission from Yorkshire Marine artist Jack Rigg to reproduce a painting of Scarborough lighthouse as a souvenir QSL to commemorate this special occasion. QSLs can be sent via the bureau or direct via club call G0OOO, s.w.l. reports will be very welcome. This event will mark the end of the group's 2004 season of special events.

More details from **Roy Clayton G4SSH, Chairman, 9 Green Island, Irton, Scarborough YO12 4RN, Tel: (01723) 862924.**

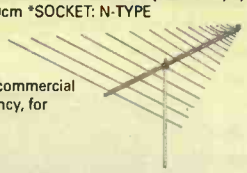
SCANNER BASE VERTICALS

SUPERSCAN STICK I (WIDEBAND) .....**£29.95** PLUS £6.00p+p
*FREQ:0-2000 MHZ *LENGTH:100cm *SOCKET:SO239 *RADIALS: 3X17cm
SUPERSCAN STICK II (WIDEBAND) .....**£39.95** PLUS £6.00p+p
*FREQ:0-2000 MHZ *GAIN:3.00dB OVER SSSI *LENGTH:150cm
*SOCKET:SO239 *RADIALS: 3X50cm
These two superb fibreglass external wideband antennas have capacitor loaded trapped coils to give maximum sensitivity to even the weakest of signals. No wonder they are best selling verticals !!!
AR-30 (AIR BAND) .....**£39.95** PLUS £6.00p+p
*FREQ:CIVIL & MILITARY AIR *GAIN:3.0/6.0dB *LENGTH:100cm
*SOCKET:SO239 *RADIALS:3X17cm
AR-50 (AIR BAND) .....**£49.95** PLUS £6.00p+p
*FREQ:CIVIL & MILITARY AIR *GAIN:4.5/7.0dB *LENGTH:150cm
*SOCKET:SO239 *RADIALS: 3X50cm
These dedicated fibreglass external antennas are pre-tuned for both air band frequencies.
Get the gain and don't miss take off !!
X1-HF VERTICAL (DEDICATED HF) .....**£49.95** PLUS £6.00p+p
*FREQ:1-50 MHZ *LENGTH:200cm *SOCKET:SO239 *RADIALS:NONE
This HF vertical antenna incorporates helical traps and is an ideal alternative to a long wire

DISCONE BASE ANTENNA

STANDARD DISCONE (WIDEBAND).....**£29.95** PLUS £6.00p+p
*FREQ:25-1300 MHZ *LENGTH:100cm *SOCKET:SO239 *RADIALS: 16
SUPER DISCONE (WIDEBAND).....**£39.95** PLUS £6.00p+p
*FREQ:25-2000 MHZ *GAIN:3.00dB OVER STANDARD *LENGTH:140cm
*SOCKET:SO239 *RADIALS:16
HF DISCONE (WIDEBAND/HF SENSITIVE).....**£49.95** PLUS £6.00p+p
*FREQ:0.05-2000 MHZ *LENGTH:185cm *SOCKET: SO239 *RADIALS: 16
ROYAL DISCONE 2000 (WIDEBAND/STAINLESS)..**£49.95** PLUS £6.00p+p
*FREQ RX:25-2000 MHZ FREQ TX: 50-52 144-146 430-440 900-986 1240-1325 MHZ *LENGTH:155cm GAIN:4.5dB OVER STANDARD *SOCKET:N-TYPE *RADIALS:16
The discone has been around for over 40 years and is generally recognised as the original and probably the best all round scanner antenna. Chose the best one for your station or call us for advice.

BEAM ANTENNAS



MLP-32 (LOG PERIODIC) .....**£99.95** plus £6.00p+p
*FREQ:100-1300 MHZ TX & RX *GAIN:11-13dB *LENGTH:140cm *SOCKET: N-TYPE
MLP-62 (LOG PERIODIC).....**£169.95** plus £6.00p+p
*FREQ:50-1300 MHZ TX & RX *GAIN:10-12dB *LENGTH: 300cm *SOCKET: N-TYPE
These two beam antennas are sold mainly to our military & commercial customers. With an SWR 2:1 or better over the whole frequency, for performance it just doesn't get better.
AR300XL rotator for both antennas **£49.95** plus £6.00 P+P

GETTING RIGGED UP

5' SWAGED POLES
Heavy Duty Ali (1.2mm wall)
SINGLE 11/4" **£7.00**
SET OF FOUR 11/4" **£24.95**
SINGLE 11/2" **£10.00**
SET OF FOUR 11/2" **£34.95**
SINGLE 2" **£15.00**
SET OF FOUR 2" **£49.95**

CONNECTORS

PL259/9	**£0.75** each
PL259/6	**£0.75** each
PL259/7 for mini 8	**£1.00** each
BNC (Screw Type)	**£1.00** each
BNC (Solder Type)	**£1.00** each
N TYPE for RG58	**£2.50** each
N TYPE for RG213	**£2.50** each
SO239 to BNC	**£1.50** each
PL259 to BNC	**£2.00** each
N TYPE to SO239	**£3.00** each

HI-SPEC COAX CABLE

RG58	6mm standard	**£0.35** per mtr
RG58	6mm mil spec	**£0.60** per mtr
RF mini 8	7mm mil spec	**£0.85** per mtr
RG213	9mm mil spec	**£0.85** per mtr
RH200	9mm mil spec	**£1.10** per mtr

(Phone for 100 mtr discount price)

GOING MOBILE

G.SCAN II MOBILE (WIDEBAND) .....**£24.95** PLUS £6.00P+P
*TYPE: TWIN COIL *FREQ:25-2000 MHZ *LENGTH: 65cm
*BASE:MAGNETIC *CABLE: 4m WITH BNC

SKYSCAN MOBILE (WIDEBAND).....**£19.95** PLUS £6.00 p+p
*TYPE:4 WHIPS *FREQ:25-2000 MHZ *LENGTH:65cm
*BASE:MAGNETIC *CABLE:4m WITH BNC
Don't loose those signals while on the move, get high performance reception where ever whenever.

PORTABLE ANTENNAS

SKYSCAN DESKTOP (INTERNAL/WIDEBAND) .....**£49.95** PLUS £6.00 p+p
*TYPE:DISCONE STYLE *FREQ:25-2000 MHZ *LENGTH:90cm *CABLE:4m WITH BNC
TRI-SCAN III DESKTOP (INTERNAL/WIDEBAND) ....**£39.95** PLUS £6.00 p+p
*TYPE: TWIN COIL *FREQ:25-2000 MHZ *LENGTH: 90cm *CABLE:4m WITH BNC
SWP-2000 (GLASS MOUNT/WIDEBAND) .....**£29.95** PLUS £6.00 p+p
*TYPE: SUCTION MOUNT *FREQ:25-2000 MHZ *LENGTH:55cm *CABLE:4m WITH BNC
SWP-HF30 (GLASS MOUNT/DEDICATED HF).....**£39.95** PLUS £6.00 p+p
*TYPE:SUCTION MOUNT *FREQ:HF 0.05-30 MHZ *LENGTH: 80cm *CABLE:4m WITH BNC
MAX-5 ACTIVE (INTERNAL/EXTERNAL/WIDEBAND)**£49.95** PLUS £6.00 p+p
*TYPE: ACTIVE PRE-AMP *FREQ:25-1800 MHZ *GAIN: 14dB *LENGTH: 140cm *CABLE: 4m WITH BNC

Get the most from your scanner buy using one of our portable antennas and enjoy great performance without the need to erect an external one.

SHORTWAVE WIRE ANTENNAS

MWA-HF MKII (EXTERNAL DELUXE HF ANTENNA)
.....**£49.95** PLUS £6.00 p+p
*TYPE:WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH: 25M
*CABLE: 10m WITH PL259

MD37-SKYWIRE (EXTERNAL STANDARD HF ANTENNA)
.....**£39.95** PLUS £6.00 p+p
*TYPE: WIRE BALUN MATCH *FREQ:0-40 MHZ *LENGTH:25M
*CABLE:10m WITH PL259

LONG WIRE BALUN (ON ITS OWN) .....**£19.95** PLUS £2.00 p+p

Get the best from your HF receiver and get a long wire. Our own ferrite baluns give up to 2 "S" points greater signal than other similar baluns, with a smooth match over 40mhz.

HANDHELD ANTENNAS

MRW-100 (SUPER GAINER BNC) .....**£19.95** PLUS £2.00 p+p
*FREQ: 25-1800 MHZ *LENGTH:40cm *FITTING:BNC
MRW-210 (SUPER GAINER SMA) .....**£22.95** PLUS £2.00 p+p
*FREQ: 25-1800MHZ *LENGTH:40cm *FITTING:SMA

Going out? Don't miss out! Get a Super Gainer!!

SOMETHING EXTRA

MRP-2000 (ACTIVE WIDEBAND PRE-AMPLIFIER) .....**£49.95** PLUS £6.00 p+p
*FREQ:25-2000 MHZ *GAIN:14.0dB *POWER:9-15v *CABLE:1m BNC-BNC

MRP-137 (ACTIVE WEATHER SAT PRE-AMPLIFIER).....**£44.95** PLUS £6.00 p+p
*FREQ:137.5 MHZ *GAIN:25.0dB *POWER:9-15v *CABLE:1m BNC-BNC

UK SCANNING DIRECTORY (8TH EDITION)
.....**£19.50** PLUS £6.00 p+p

TURNSTILE 137 (DEDICATED WEATHER SATELLITE).....**£39.95** PLUS £6.00p+p
*FREQ:137.5 MHX *LENGTH:100cm *SOCKET:SO239 *RADIALS:4
For use with receiving weather satellite pictures.

LM&S

Long, Medium & Short Wave Bands

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

Listeners:-
A Ernie Strong, Ramsey, Cambs
B Bernard Curtis, Stalbridge
C Peter Pollard, Rugby
D Thomas Williams, Truro
E Sheila Hughes, Morden
F Michael and Louisa Wasley - Scottish Western Isles
G Simon Hockenhull, Bristol

As you can see, this month I have taken the opportunity to alter the presentation of the short wave listings - now broken down into hourly, bite-sized chunks. Depending on how you utilise the tables this may, or may not, assist you whilst trawling the bands. Where there have been multiple entries from several contributors I have pulled editorial rank and culled these down to one per hourly block. It's *your* column so let me know what you think, either way.

Incidentally, when sending your logs in, you need not worry if the columns are not in order. Microsoft *Excel* is a wonderful thing, and a couple of mouse clicks combine everyone's contributions in any order I wish. All I ask is that you note your columns in the order they appear in *SWM*; Frequency followed by time etc. Thanks.

Listeners:-
A Ernie Strong, Ramsey, Cambs
B Fred Wilmshurst, Northampton
C Peter Pollard, Rugby
D Francis Hearne
E Sheila Hughes, Morden
F Michael and Louisa Wasley - Scottish Western Isles
G Simon Hockenhull, Bristol
H Noel Cosgrave, Drogheda

Feedback

Bernard Curtis sent his usual comprehensive listings for inclusion in LM&S. Thanks, Bernard. He, along with others, has noticed the drop off in long distance reception on the lower frequency bands as the winter conditions decline and the hours of daylight increase. Of course the upside is better propagation on the higher bands for longer as the spring and then summer conditions take a hold.

Long Wave Table

kHz	Service	TX Location	Country	Power (kW)	Listener
153	Radio Romania	Brasov	ROU	1200	A* E*
153	RTA 1	Bechar	ALG	1000	A*
153	Deutschlandfunk	Donebach	D	500/250	A C D* E F G
162	France Inter	Allouis	F	2000/1000	A C D* F
171	Medi 1	Nador	MRC	2000	A G*
171	Belarussian Radio	Sasnovy	BLR	?	A
171	Radio Chechnya	Tbilisskaya	RUS	1200	A*
171	Radio Rossii	Bolsakovo	RUS	600	C E* G
177	Deutschlandradio Berlin	Zehlendorf	D	500	A C F G*
183	Europe 1	Saarlouis	D	2000	A C D* F
189	Rikisutvarpid	Gufuskalar	ISL	150	A* F G*
198	BBC Radio 4	Droitwich	UK	500	A C E F
207	RTM Network A	Azilal	MRC	400	A* G*
207	Deutschlandfunk	Aholming	D	500	A C D* F G*
207	Rikisutvarpid	Eidar	ISL	100	A* F G*
216	Radio Monte Carlo	Roumoules	F	1400	A C D* F G
216	Radio Rossii	Krasnoyarsk	RUS	150	A*
225	Polish Radio 1	Solec Kujawski	PDL	1000	A C D* E* F G*
225	Turkish Radio 4	Van	TUR	600	A
234	Armenian national radio	Gavar	ARM	500	A*
234	RTL	Junglinster	LUX	2000	A C D* F
243	Denmark Radio 1	Kalundborg	DNK	300	A C D* E* F G
252	RTE Radio 1	Clarkstown	IRL	500/150	A B C D* E F G
252	Algiers Radio 3	Tipaza	ALG	1500/750	C E* G*
261	Radio Rossii	Taldom	RUS	2500	A* C E* G*
270	Czech Radio 1	Uherske-Hradiste	TCH	650	A C E* F G*
279	Belarussian Radio 1	Sasnovy	BLR	500	A E* F G*

* = dark

Local Radio Table

kHz	Service	Svc area/TX site	kW	SWL
558	Spectrum	Crystal Palace	1	A B C G
603	Capital Gold	Littlebourne	0.1	A B C G
630	BBC 3CR	Luton	0.2	A B C D G
630	BBC Radio Cornwall	Redruth		G
657	BBC Radio Cornwall	Bodmin	0.5	G
666	BBC Radio York	York	0.5	A C
666	Classic Gold	Exeter	0.34	B G
729	BBC Essex	Manningtree	0.2	A B C G
738	BBC Hereford & Worcester	Worcester	0.037	A B C G
756	BBC Radio Cumbria	Carlisle	1	F
756	Magic Maldwyn	Newtown	0.63	B C G
765	BBC Essex	Chelsmford	0.5	A B
774	BBC Radio Kent	Littlebourne	0.7	A B
774	Classic Gold	Gloucester	0.14	B C D
792	Classic Gold	Bedford	0.275	A B C
801	BBC Radio Devon	Barnstaple	2	A C D F G
828	Classic Gold	Bournemouth	0.27	G
828	Classic Gold	Luton	0.2	A B C E G
828	BBC Asian Network	Wolverhampton	0.2	C G
837	BBC Asian Network	Leicester	0.5	A C G
855	BBC Radio Norfolk	Norwich	1.5	A B C
855	BBC Radio Lancashire	Preston	1	H
855	Sunshine 855	Ludlow	0.15	B C G
873	BBC Radio Norfolk	West Lynn	0.3	A B C G
936	Fresh AM	Skipton	1	A H
936	Classic Gold	West Wiltshire	0.18	A B C D
945	Capital Gold	Bexhill	0.7	A
945	Classic Gold	Derby	0.2	B C
954	Classic Gold	Torbay	0.4	D G
954	Classic Gold	Hereford	0.16	B C G
963	Asian Club	Hackney	0.95	A B C G H
972	Asian Club	Southall	1	A B C G
981	Star Country	Portadown	?	F
990	BBC Radio Devon	Exeter	1	D G
990	Classic Gold	Wolverhampton	0.09	B C D G
999	BBC Radio Solent	Fareham	1	G
999	Valleys Radio	Ebbw Vale	0.3	G
999	Classic Gold	Nottingham	0.25	A B C
1017	Classic Gold	Shropshire	0.63	A B C E G
1026	Downtown Radio	Belfast	1.7	F
1026	BBC Radio Jersey	Trinity	1	G
1026	BBC Radio Cambridgeshire	Cambridge	0.5	A B C G
1035	Easy Radio London	Crystal Palace	1	A B C E G
1035	BBC Radio Sheffield	Sheffield	1	A*
1107	Moray Firth Radio	Inverness	1.5	F
1116	BBC Radio Derby	Derby	1	A B C
1116	Valleys Radio	Ebbw Vale	1	D F G
1116	BBC Radio Guernsey	Rohais	0.5	G
1152	LBC	London	23.5	A* C
1152	Clyde 2	Glasgow	3.6	F
1152	Capital Gold	Birmingham	3	A B C D G
1152	Classic Gold Amber	Norwich	0.83	A C G*
1152	Classic Gold	Plymouth	0.32	G*
1161	Tay AM	Dundee	1.4	F
1161	BBC Southern Counties Radio	Bexhill	1	A
1161	Classic Gold	Swindon	0.16	A C D
1161	BBC 3 Counties Radio	Bedford	0.1	A B C
1170	Swansea Sound	Swansea	0.58	G
1170	Classic Gold Amber	Ipswich	0.28	A C G*
1170	Signal's Big AM	Stoke on Trent	0.2	A B C
1170	Capital Gold	Portsmouth	0.12	G
1242	Capital Gold	Maidstone	0.32	A C
1251	Classic Gold Amber	Bury St Edmunds	0.76	A C
1260	BBC Radio York	Scarborough	0.5	A
1260	Sabras Sound	Leicester	0.29	B C
1296	Radio XL	Birmingham	10	A B C F G
1305	Premier	London	0.5	A B C
1305	Capital Gold	Newport	0.2	C D
1323	Capital Gold	Brighton	0.5	F
1332	Classic Gold	Peterborough	0.6	A B C
1332	BBC Wiltshire Sound	Lacock	0.3	D
1350	Cambridge University Radio (RSL)	Cambridge	0.001	A
1359	Classic Gold	Coventry	0.27	B C
1368	BBC Lincolnshire	Lincoln	2	A B
1368	BBC Southern Counties Radio	Duxhurst	0.5	C E*
1386	Carillion - Hospital Radio (RSL)	Loughborough	0.001	A
1386	Anker Radio - Hospital radio (RSL)	Nuneaton	0.001	C
1413	Premier	London	0.5	A
1413	BBC Radio Gloucestershire	Berkeley/Bourton	0.5	B C D
1431	Classic Gold	Reading	0.14	A B
1449	BBC Asian Network	Peterborough	0.15	A B C D
1458	Sunrise	London	125	A B G
1458	BBC Asian Network	Birmingham	5	A C G
1458	BBC Radio Devon	Torquay	2	A* G
1485	BBC Radio Humberside	Hull	2	A*
1485	BBC Radio Merseyside	Wallasey	2	F G
1485	Clasic Gold	Newbury	1	B C G
1485	BBC Southern Counties Radio	Brighton	1	G
1503	BBC Radio Stoke	Staffordshire	1	B C E* F G*
1521	Classic Gold	Reigate/Crawley	0.64	A* B E* F H*
1530	Capital Gold	Worcester	0.52	B C G
1530	BBC Radio Essex	Southend	0.15	A*
1548	Capital Gold	London	97.5	A B C
1548	Forth 2	Edinburgh	2.2	F
1557	Classic Gold	Northampton	0.76	A B C F G*
1557	Capital Gold	Southampton	0.5	C G
1566	County Sound	Guildford	0.8	B C E G*
1566	BBC Somerset Sound	Taunton	0.6	D G
1575	Stoke Manderville Hospital Radio (RSL)	Stoke Manderville	0.001	A B H*
1584	BBC Radio Nottingham	Nottingham	1	A* B E*
1584	BBC Hereford & Worcester	Woofferton	0.3	C F G
1584	Tay AM	Perth	0.21	F
1584	Turkish Radio	London	0.2	G*
1602	BBC Radio Kent	Rustall	0.25	A B C G*
1602	Desi Radio	Southall	0.07	B

* = dark

Medium Wave Table

kHz	Service	Location	Country	kW	Listener
531	RTA 1	Ain-El-Beida	ALG	600/300	A* G*
531	Schweizer Radio	Beromunster	SUI	600	A* C E
531	Utvarp Foroyo	Akreburg	FRO	100	F
540	RTM	Tangar	MRC	300	A*
540	Radio Twee	Wavre	BEL	150	C E* G
549	Deutschlandfunk (DLF)	Thurnau	D	100	A* G*
549	UCB Europe	Dundalk	IRL	70	E* F
549	Belarussian Radio	Sasnovy	BLR	500	A*
558	RNE 5	Many	E	10-50	E
567	RTE Radio 1	Tullamore	IRL	500	A* C E F G
576	Sudwestrundfunk (SWR)	Muhlacker	D	100	A* C E* F G*
576	RNE 5	Barcelona	E	100	A* E*
585	RNE 1	Madrid	E	600	A* E* F G* H*
585	BBC Radio Scotland	Dumfries	G	2	E F H
594	HR Skyline	Frankfurt	D	250	A* E* G*
594	RTM Network A	Oujda	MRC	100	G*
594	Radio Renascenca	Muge	POR	100	A* C
603	France Info	Lyon	F	300	A* E* F G*
603	RNE 5	Seville	E	50	A*
603	BBC Radio 4	Newcastle	G	2	E* F
612	RTE 2	Athlone	IRL	100	E* G*
612	RNE 1	Vitoria	E	10	E*
612	RTM Network A	Sebaa-Ajoun	MRC	300	A* G*
621	ERTU Voice of the Arabs	Batra	EGY	1000	A*
621	RTBF 1	Wavre	BEL	300	A* C E* F G
621	RNE 1	Many	E	Oct-50	A* E*
630	RTT National Network	Tunis-Djedeida	TUN	600	E*
630	NRK Euuropakanalen	Vigra	NOR	100	E* F H*
639	RNE 1	Many	E	10-300	A* E* F G* H*
639	Czech Radio 2	Prague	TCH	1500	A* E* F G*
648	BBC World Service	Orfordness	G	500	A* C E* F G
648	RNE 1	Badojoz	E	10	E* H*
657	RNE 5	Madrid	E	50	A* E* G*
657	BBC Radio Wales	Wrexham	G	2	A C E* F G
657	Rai Uno	Napoli	I	120	A*
666	Sudwestrundfunk (SWR)	Rohrdorf	D	150	A* C E* G
666	RDP Antena 1	Lisbon	POR	10	A* E* G*
666	Lithuanian Radio 1	Sitkunai	LTU	500	A* E*
675	Arrow Classic Rock	Lopik	HOL	120	A* C E* F G
675	NRK Euuropakanalen	Rost	NOR	20	F
684	RNE 1	Seville	E	600	A* E* F
693	BBC Radio Five Live	Droitwich	G	150	A* C F
702	Radio Slovensko	Banska Bystrica	SVK	400	A*
702	Nord Deutscher Rundfunk (NDR)		D	5	E*
711	Radio Bleu	Rennes	F	300	A* C E* F G H*
720	West Deutscher Rundfunk (WDR)	Langenburg	D	85	E*
720	BBC Radio 4	Lisnagarvey	G	10	A* F
720	BBC Radio 4	London	G	0.75	G
720	RDP Antena 1	Porto	POR	10	G*
729	RNE 1	Many	E	10-100	E* F G*
729	RTE Radio 1	Cork	IRL	10	E* F G
738	RNE 1	Barcelona	E	500	G*
738	RFI	Paris	F	5	A* E*
747	Radio 747	Flevoland	HOL	400	A C E* F G H*
756	Deutschlandfunk (DLF)	Braunschweig	D	200	A C E* F G
765	Option Musique	Sottens	SUI	600	C E* F G H*
774	RNE 1	Many	E	20-100	A* E* F G* H*
774	ERTU Middle East Prog	Abis	EGY	1000	A*
774	BBC Radio 4	Enniskillen	G	1	E* F
783	MDR Info	Leipzig	D	100	F G E*
783	Radio Mirimar	Barcelona	E	50	A*
792	France Info	Limoges	F	300	A* C F G E*
792	Nord Deutscher Rundfunk (NDR)	Lingen	D	5	E*
792	BBC Radio Foyle	Londonderry	G	1	F E*
801	RNE 1	Many	E	10-20	A*
801	Bayern 1	Munchen-Ismaning	D	100	A* G* E*
810	Radio Scotland	Westerglen	G	100	A* C F G* E*
810	Radio Madrid	Madrid	E	50	A*
819	ERTU General Programme	Batra	EGY	450	A* G*
819	RAI Uno	Trieste	I	20	F G*
819	Radio Euskadi	San Sebastian	E	10	A* G*
819	Sud Radio	Toulouse	F	20	E*
828	Nord Deutscher Rundfunk (NDR)	Hanover	D	20/5	G* E*
837	France Info	Nancy	F	200	F G E*
846	RAI Due	Rome	I	60	G* E*
855	RNE 1	Murcia	E	300	F G* E*
864	La City Radio de Paris	Paris	F	300	A C F G E* H*
873	American Forces Network	Frankfurt	D	150	C G E*
873	SER	Zaragoza	E	25	E*
873	BBC Radio Ulster	Enniskillen	G	1	E*
882	COPE	Many	E	2-20	A*
882	BBC Radio Wales	Washford	G	100	A* C F E*
891	RTA 1	Algiers	ALG	600/300	A* G
891	Radio 538	Hulsberg	HOL	20	A E*
900	COPE	Many	E	5-25	A* F
900	RAI Uno	Milan	I	600	A* C G* E* H*
909	BBC Radio Five Live	Brookmans Park	G	150	A C F
918	Radio Slovenia	Domzale	SVN	600/100	G* E* H*
927	Radio Een/927 Live	Wolvertem	BEL	300	A C F G* E*
936	RNE 5	Many	E	10-20	A
936	Bremen Eins	Bremen	D	50/10	A* F E*
945	France Blue	Toulouse	F	300	A F G E*
954	Czech Radio 2	Brno	TCH	200	A* G* E*
954	Onda Cera Radio	Madrid	E	20	G* E* H*
963	YLE Radio	Pori	FIN	600	F G* E*
972	Nord Deutscher Rundfunk (NDR)	Hamburg	D	100	A C F G E*
981	RTA 2	Algeirs	ALG	600/300	A G* E*
990	Deutschlandfunk (DLF)	Berlin	D	100	A F G E*
990	Radio Bilbao	Bilbao	E	10	A G* E*
999	COPE	Madrid	E	50	A G*
1008	SER	Many	E	5	A G* E*
1017	Sudwestrundfunk (SWR)	Wolfsheim	D	100	A F G E*
1017	RNE 5	Many	E	10	E*
1035	Radio National	Porto Alto	POR	100	G* E*
1044	Radio San Sebastian	San Sebastian	E	10	A
1044	MDR Info	Dresden	D	20	A G E*
1053	Talksport	Droitwich	G	500	A C F E*
1062	Denmark Radio P3	Kalunborg	DNK	250	A F G*
1062	RAI Uno	Many	I	2-25	E*
1071	Euskadi Irratia	Bilbao	E	50	A G* E*
1071	Talksport	Clipstone	G	1	A C F E*
1080	SER	Many	E	5-10	A F E*
1089	Talksport	Brookmans Park	G	400	A C F E*
1098	Radio Slovensko	Nitra	SVK	50	G* E*
1098	RNE 5	Many	E	10-25	A E*
1107	Talksport	Lydd	G	0.5-2	A C E*
1107	American Forces Network	Bavaria	D	10	F G E*
1116	Radio Pontevedra	Pontevedra	E	5	A* E*
1125	Croatian Radio HR1	Deanovic	HRV	100	G*
1125	BBC Radio Wales	Llandrindod Wells	G	1	A* F G E*
1125	Radio 21	Houdeng	BEL	10	A* C G* E*
1134	Croatian Radio HR1	Zadar	HRV	600	A* C F G* E*
1134	COPE	Many	E	2-5	A*
1143	American Forces Network	Many	USA/D	1-10	C E*
1143	COPE	Many	E	2-5	A* E*
1143	Mayak/VO Russia	Bolshakovo	RUS	150	F
1152	RNE 5	Many	E	10-20	E*
1179	Swedish Radio 1	Solvesborg	S	600/300	A* C D* F G* E* J
1188	VOA/RFE	Marcali	USA/HNG	500	F G* E*
1188	Radio Twee	Kuurne	BEL	5	E*
1197	VOA/RFE	Munich	USA/D	300/150	G E*
1197	Virgin Radio	Many	G	0.2-2	A C E*
1206	France Info	Bordeaux	F	300	A C F G* E*
1215	Virgin Radio	Many	G	0.32-200	A C F E*
1224	Radio Horizont	Vidin	BUL	500	E*
1224	COPE	Many	E	2	E*
1224	Radio Popular	San Sebastian	E	10	G
1233	Virgin Radio	Many	G	0.1-0.5	A C E*
1242	Virgin Radio	Many	G	0.5-2	A C F
1242	France Info	Marseille	F	150	G
1251	Radio 747	Hulsberg	HOL	10	E*
1260	SER	Many	E	5	E*
1269	Deutschlandfunk (DLF)	Neumunster	D	300	C F G* E* H*
1278	France Blue	Strasbourg	F	300	C G E*
1287	Radio Lleida	Lleida	E	10	E*
1296	COPE	Valencia	E	20	G
1296	BBC World Service	Orfordness	G	500	E*
1305	RNE 5	Many	E	10-25	E*
1314	NRK Euuropakanalen	Kvitsoy	NOR	1200	C F G* E* H*
1323	Voice of Russia	Wachenbrunn	RUS/D	800/150	C F E*
1332	RAI Uno	Rome	I	300	F G* E*
1341	BBC Radio Ulster	Lisnagarvey	G	100	C F G*
1359	RNE3	Madrid	E	600	E*
1368	Manx Radio	Douglas, IOM	G	20	F G E* H*
1377	France Info	Lille	F	300	C F G* E*
1386	Voice of Russia	Bolshakovo	RUS	1200	C E*
1386	China Radio Int'l	Kaunus	CHN/LTU	750	G*
1395	Radio 10 FM	Trintelhaven	HOL	120	F E*
1395	TransWorld Radio	Ftakke	MCO/ALB	1000	E* H*
1404	France Info	Brest	F	20	G* E*
1413	RNE 5	Many	E	5-10	E*
1422	DLF	Heusweiler	D	1200/600	C F G* E*
1440	China Radio Int'l	Marnach	CHN/LUX	1200/300	B F J
1440	RTL	Marnach	LUX	1200/300	C E*
1440	Saudi Radio Gen Prog	Dammam	ARS	1600	E*
1449	BBC Radio 4	Redmoss	G	2	C F E*
1449	RAI Due	Squinzano	I	50	E*
1467	TransWorld Radio	Romoules	F	1000	E* J
1476	Radio 1476	Vienna	AUT	60	C D* G E* H*
1494	Voice of Russia	Krasnyy-Bor	RUS	600	E*
1494	France Info	Clermont-Ferrand	F	20	G E*
1503	VIRI Sarasarye	Ardabil	IRN	?	E*
1512	Radio Nederland	Wolvertem	BEL/HOL	300/25	B
1512	Radio Een/RVI	Wolvertem	BEL	300/25	F E* J
1530	Vatican Radio	Vatican City	CVA	150/450	C G
1539	Evangeliums Rundfunk	Mainflingen	D	700/120	C F G* E* H*
1557	France Info	Nice	F	300	F G*
1557	Relays	Kaunus	/LTU	150	G*
1575	RAI Uno	Genova	I	50	G* E*
1575	SER	Many	E	5	E*
1593	VOA	Kuwait	USA/KWT	150	E*
1602	Radio Vitoria	Vitoria	E	25	F E*
1611	Vatican Radio	Vatican City	CVA	100	C G* E*

* = dark

Listeners:-

A Ernie Strong, Ramsey, Cambs
B Bernard Curtis, Stalbridge
C Peter Pollard, Rugby
D Thomas Williams, Truro
E Eddie McKeown, Newry
F Michael and Louisa Wasley, Scottish Western Isles
G Simon Hockenhull, Bristol
H Noel Cosgrave, Drogheda
I Clare Pinder, Appleby

Bernard, and **Sheila Hughes** are happy to pass on the news that Radio Slovakia International, threatened with almost immediate closure, has at least been granted a temporary reprieve while 11th hour discussions are still underway.

Peter Pollard reminded me of a neat trick to help pick apart and identify stations on some of the medium wave channels, occupied by two or more of the 'Gold' format stations. Whilst in programme, these stations all sound very similar to one another, and in some cases, actually carry the same programme content. Until the commercials kick in. When these are played out you won't have to wait very long before you hear mention of a town or area that will enable you to ascertain which station you're listening to. Top tip.

In addition to sending in his monthly report, **Thomas Williams** mentions that, over the years, he's actually featured in the output of a number of stations. As well as contributing to a 'phone-in on Radio Nederland's late-lamented *Happy Station*, Thomas produced a cassette for Swiss Radio about life in his locality, played in full and repeated several times through the schedule. These, and a ten-minute slot on Radio Finland undoubtedly give Thomas celebrity status!

Simon Hockenhull was among those who

Tropical Band Table

MHz	UTC	Service	Country	Listener
3.200	0405	Trans World Radio	MCO/SWZ	H
3.210	0445	WWCR, Nashville	USA	A H
3.223	0135	All India Radio, Simla	IND	H
3.240	0410	Trans World Radio	MCO/SWZ	H
3.250	0655	REE	E/CTR	H
3.255	2120	BBC World Service	G/AFS	A E F H
3.279	0430	La Voz Del Napo	VEN	A H
3.306	0210	Zimbabwe Broadcasting	ZWE	H
3.315	2359	All India Radio, Bhopal	IND	E H
3.320	2120	SABC Meyerton	AFS	A H
3.345	0415	Channel Africa	AFS	A H
3.350	0500	Radio Exterior Espana	CTR	A D
3.910		UNID	IRL	J
3.915	2100	BBC World Service	G/SNG	A D E F H
3.950	2339	PBS Xinjiang	CHN	E H
3.955	2100	Radio Korea Int	KOR/G	A C D J
3.955		Radio Taiwan Int	TWN/G	J
3.965	1815	Radio Taiwan Int	TWN/F	B E F
3.965	1832	Radio France Int	F	E
3.975	1910	Radio Budapest	HNG	E F I
3.995	0435	Deutsche Welle	D	A C D F
4.005	2130	Vatican Radio	CVA	A E F I
4.010	0030	Kyrgyz Radio	KGZ	I
4.190	2255	CNR Minority Prog	CHN	H
4.330	1850	PBS Xinjiang	CHN	H
4.460	2130	China Radio 1	CHN	A H
4.500	1855	PBS Xinjiang	CHN	H
4.750	0030	PBS Xizang	CHN	H
4.760	0220	All India Radio, Port Blair	IND	H
4.760	0245	ELWA	LBR	H
4.770	2050	FRCN Kaduna	NIG	A F H I
4.775	0125	All India Radio, Imphal	IND	H
4.775	0445	Trans World Radio	MCO/SWZ	H
4.783	2310	RTM Bamoko	MLI	H
4.785	0035	Radio Caiari?	B	H
4.790	0125	All India Raio, Chennia	IND	H
4.800	2050	CNR 1	CHN	I
4.800	2240	CPBS 2 Beijing	CHN	A F G H
4.800	0120	All India Radio, Hyderabad	IND	H
4.805	0135	Radio Dif Do Amazonas	B	H I
4.815	0145	Radio Difusora Londrina	B	H
4.820	2100	Xizang Lhasa	CHN	A C F G H I
4.825	0135	Radio Cancao Nova	B	H
4.830	2250	Radio Ulan Bator	MNG	H
4.830	0130	All India Radio, Jammu	IND	H
4.835	2110	RTM Bamoko	MLI	A C E F G H I
4.840	0215	All India Radio, Mumbai	IND	H I
4.845	2115	ORTM Nouakchott	MTN	A C E F G H J
4.845	0205	Radio Cultura Ondas Tropicas	B	H
4.860	1830	All India Radio, Delhi	IND	H
4.865	0135	Radio Alvorado	B	H
4.875	0420	Radio Dif Roraima	B	H
4.880	0115	All India Radio, Lucknow	IND	H
4.885	0125	Radio Dif Acreana	B	H
4.885	0500	Radio Clube Do Para	B	A F H
4.890	0625	Radio France Int'l	F/GAB	H
4.895	2229	All India Radio, Kurseong	IND	F H
4.895	2245	Radio Ulan Bator	MNG	H
4.895	0125	Radio Bare Manuas	B	H
4.905	2229	Xizang Lhasa	CHN	F H I
4.910	2230	Radio Zambia	ZMB	H
4.910	0130	All India Radio, Jaipur	IND	H
4.915	0120	Radio Anhanguera	B	H
4.915	0120	Radio Difusora, Macapa	B	H
4.915	0515	GBC 1 Accra	GHA	A E F H I
4.920	2115	Xizang Lhasa	CHN	A F H I
4.920	0120	All India Radio, Chennia	IND	H
4.925	2255	RRI Jambi	INS	H
4.925	0230	Radio Educacao Rural	B	H I
4.930	2050	Turkmen Radio	TKM	F
4.930	2120	All India Radio, Shimla	IND	A
4.945	0040	Emissora Rural	B	H
4.950	2055	Voice of America	USA/STP	C F H J
4.950	0205	All India Radio, Srinigar	IND	H
4.955	0025	Radio Cultural AmAUTA	PRU	H
4.960	0135	Radio Cima 100	DOM	H
4.960	0510	All India Radio, Ranchi	IND	A H
4.965	0125	Christian Voice Radio	ZMB	H
4.975	2053	Radio Uganda, Kampala	UGA	F H
4.980	2355	PBS Xinjiang	CHN	E H
4.985	2345	Radio Brasil Central	B	H I
4.990	2310	Hunan PBS	CHN	H
5.005	0115	Radio Nepal	NPL	H
5.009	2005	RTM Malagasy	MDG	H
5.010	0125	All India Radio, Thiru'puram	IND	H
5.015	2149	Turkmen Radio	TKM	I
5.015	0525	WBCQ, Maine	USA	A
5.025	2355	Radio Horizonte	PRU	I
5.025	0058	Radio Rebelde	CUB	G H I
5.025	0520	Radio Uganda	UGA	A H
5.030	2059	Radio Burkina	BFA	F H I
5.030	2255	China National Radio 1	CHN	H
5.030	0220	University Network	USA	H I
5.035	0120	Radio Aparecida	B	H
5.040	0115	All India Radio, Jepore	IND	H
5.040	0250	PBS Fujian	CHN	H
5.050	0035	PBS Guangxi	CHN	H
5.050	0415	WWRB, Manchester	USA	H
5.060	0030	PBS Xinjiang	CHN	H
5.070	0515	WWCR, Nashville	USA	A G H
5.085	0056	WWRB, Manchester	USA	G H
5.105	0045	WBCQ, Maine	USA	G H
5.240	1850	Xizang TB Lhasa	CHN	H

DXers:-
A Vic Prier, Seaton
B Stan Evans, Herstmonceux
C Robert Hughes, Liverpool
D Thomas Williams, Truro
E Simon Hockenhull, Bristol
F Eddie McKeown, Newry
G Michael Casey
H Jim Edwards, Wigan
I Noel Cosgrave, Republic of Ireland
J Clare Pinder, Appleby

have observed that Radio France International continues to use their 25.820MHz outlet following the seasonal plan change. It makes sense to keep this one on the air during the summer to take full advantage of the improved propagation I mentioned earlier.

Simon mentions interference from the ever-increasing number of DRM transmissions that have crept into the bands. He finds that Radio Yugoslavia (as-was) on **6.100** and Radio Budapest on **3.975MHz** are rendered unmonitorable owing to interference from nearby DRM broadcasts. Anyone else troubled by this? It will only get worse. Perhaps there should be bands dedicated solely to DRM. Have any of you actually got any kit to unravel digital radio on short wave? I'm lucky enough to have access to a DRM-enabled AOR AR7030 and I have to say, the audio is truly impressive for a long-distance transmission. It doesn't feel a bit like you've done battle with the ether, though, and I suspect many listeners of conventional short wave will give it the cold shoulder.

Simon rounds off by saying that the receiver that comes with the baby alarm he uses to monitor his son in the bedroom is susceptible to breakthrough from broadcast stations, particularly on the 9MHz band. Deutsche Welle and at least one other broadcaster have so far been 'logged'. Simon - are you absolutely sure this is interference on the baby alarm and not Hockenhull Jr. tuning in from the confines of his cot. Like father, like son?

One of Simon's receivers is the Target HF3. I invested in one of these, second-hand, a couple of weeks ago. For those of you who are not familiar, the HF3 is a 30kHz to 30MHz receiver providing reception of a.m., upper and lower sidebands and h.f. data modes. It's an extremely simple radio to operate. The front panel boasts just three rotary controls - tuning, clarifier (fine tuning) and volume - and four push buttons to select the mode and configure the ten memories. Retailing at around £160 this radio is not going to compete with the NRDs of this world, but for those confined to the stepped tuning found on most portables, the HF3 provides a cost-effective option for continuous tuning through the bands.

Clubs

Last time I promised to highlight some of the radio clubs you can join to enhance your enjoyment of the hobby, and this month we're taking a look at the Medium Wave Circle.

A timely E-mail from **Steve Whitt**, general editor of their monthly publication, *Medium Wave News*, describes the club's activities. Steve says, that the Medium Wave Circle is the "premier club dedicated to the radio enthusiast interested in medium and long wave radio. It serves as a hub for members to share their experiences, knowledge, news, views and ideas, and for nearly fifty years, has provided an invaluable link between novice and experienced enthusiasts, and between people from all over the planet".

Membership of the Circle is open to anyone with an interest in the radio spectrum between 100-1700kHz, and whether it's general listening, technical development or enthusiastic DXing, the club will surely offer something of interest.

You can write to the club, care of: **C. Rooms, 59 Moat Lane, Luton LU3 1UU**, or you can E-mail them at **contact@mwcircle.org** Alternatively, why not visit their website - **www.mwcircle.org** - where you can find out more and even download a sample issue of *Medium Wave News*. The copy I just had a look at included technical tips, book reviews, a propagation report, features on AFN in Europe, v.l.f. listening and spectrum pollution from Internet over power lines. Then there's the beacon and utility news, long and medium wave news and listings from around the world, RSL updates, pirate news...I could go on. Suffice to say, it's a thoroughly good read. Membership costs just £12 a year; half that if you opt for electronic delivery of the magazine. Next month we'll touch base with the **British DX Club**.

I had a nice letter from occasional contributor **Michael Wasley**. He and his daughter **Louisa** had fun surfing the airwaves

whilst parked up in the family Volvo at a number of beauty spots around the Scottish Western Isles. The in-car radio was pressed into use, with the Faroes romping in on **531kHz** and both Icelandic long wave outlets also logged. Back at the holiday cottage, Michael does some solo listening on a Grundig YB400. See the listings. It sounds like a wonderful part of the world. I have to admit that I've ventured no farther north than Edinburgh. Michael was planning to take a coastal steamer from Bergen to Kirkenes and hopes to get in some listening en-route.

Just time to 'introduce' you to regular contributor **Fred Elmhurst**. He was kind enough to send in a potted history. Fred is 75 years young, and has been married to Dorothy for the last 52 of them. Congratulations! Son David works out in Hong Kong whilst their daughter, Janice, teaches English out in Taiwan.

Fred trained in the Army as a High Speed Wireless Operator, then as a keyboard operator used taped RTTY, and also as an Instructor at the School of Signals. Whilst in Singapore he held the Amateur Radio call **VS1BJ** but let his interest in radio lapse when he entered 'Civvy Street' in 1954.

After leaving the Army, Fred then worked for a number of companies, including Plessey, as an estimator and then a Production Manager. Following retirement, the radio bug bit once more and Fred engaged in short wave listening - initially mainly Morse, but now to the broadcast bands.

Fred and Dorothy are both keen bowlers and like to get out and about, whenever possible.

Thanks for sharing this with us, Fred. It's always interesting to discover what makes our readers tick.

That'll do until next time. Your contributions, please, within ten days of the end of the month.

Short Wave Table

MHz	UTC	Service	Country	Lang	SINPO	SWL
0000-0100						
6.145	0010	Radio Japan	J/CAN	Eng	45444	MC
7.345	0010	Radio Prague	TCH	Eng	54445	BC
7.580	0005	WHRA, Greenbush	USA	Eng	54445	BC
9.445	0000	All India Radio, Bangalore	IND	Eng	44354	NC
9.450	0000	Radio Rossii, Bolshakovo	RUS	Rus	54444	NC
9.500	0000	Radio Australia	AUS	Eng	45343	NC
9.545	0040	Deutsche Welle	D	Ger	55545	SH
9.580	0006	IR of Serbia and Montenegro	FRY/BIH	Eng	44534	SH
9.600	0000	Radio Xinjiang, Urumqui	CHN	Man	45343	NC
9.845	0049	Radio Nederland	HOL	Eng	35333	SH
9.870	0042	ORF Radio Austria	AUT	Eng	45444	SH
0100-0200						
5.975	0110	BBC World Service	G/ATG	Eng	45534	SH
6.000	0100	Radio Havana	CUB	Eng	55555	NC
6.025	0105	Radio Japan	J/G	Eng	34433	SH
6.065	0155	WYFR, Okeechobee	USA	Eng	24443	MC
6.090	0159	Gene Scott's University Network	USA/AIA	Eng	45534	MC
6.175	0117	Voice of Vietnam	VTN/CAN	Eng	45443	MC
6.200	0102	Radio Prague	TCH	Eng	45534	SH
9.440	0100	Radio Slovakia Int.	SVK	Eng	45333	SH
0300-0400						
6.115	0312	Radio Podmoskovya	RUS	Rus	44443	MC
6.140	0315	Voice of Turkey	TUR	Eng	55445	MC
9.690	0312	China Radio Int.	CHN		33333	FH
9.880	0318	Voice of Russia	RUS		44444	FH
12.134	0330	AFRTS (u.s.b.)	USA	Eng	34553	JP
0500-0600						
7.230	0500	Radio Japan	J	Eng	44344	CP
7.507	0500	AFRTS	USA/PTR	Eng	45554	JP
9.355	0530	WYFR, Okeechobee	USA	Eng	44444	ShH
9.615	0505	Radio New Zealand Int.	NZL	Eng	34554	JP
15.415	0550	Radio Australia	AUS	Eng	23553	JP
13.855	0535	AFRTS (u.s.b.)	USA/ISL	Eng	34553	JP
0600-0700						
5.825	0655	WEWN, Birmingham	USA	Eng	44433	SE
5.890	0640	Vatican Radio	CVA	Eng	54544	SE
7.230	0645	Radio Japan	J/G	Eng	54433	SE
7.230	0645	Radio Japan	J	Eng	43333	EM
7.250	0635	Vatican Radio	CVA	Eng	54433	SE
7.355	0647	WYFR, Okeechobee	USA	Eng	35233	EM
7.580	0630	WEWN, Birmingham	USA	Eng	54444	ShH
9.615	0650	Radio New Zealand Int.	NZL	Eng	44333	SE
11.600	0638	Radio Bulgaria	BUL	Eng	44132	EM
11.740	0642	Vatican Radio	CVA	Eng	44333	EM
13.600	0630	Radio Sofia	BUL	Eng	54555	NC
13.600	0637	Radio Bulgaria	BUL	Eng	55455	EM
13.630	0605	Radio Australia	AUS	Eng	44444	ShH
15.120	0624	Voice of Nigeria	NIG	Eng	55444	NC
15.160	0625	Radio Australia	AUS	Eng	44433	SE
15.290	0605	Radio Farda	GRC	Far	45444	NC
15.415	0635	Radio Australia	AUS	Eng	45433	SE
17.750	0635	Radio Australia	AUS	Eng	43333	SE
17.860	0640	Deutsche Welle	D	Eng	44232	EM
0700-0800						
5.985	0723	Radio Vlaanderen Int.	BEL/D	Eng	35343	FW
6.140	0710	Deutsche Welle	D	Eng	55354	EM
9.870	0714	TWR	MCO	Eng	55555	EM
11.600	0715	Radio Prague	TCH	Eng	45555	FW
11.755	0730	YLE Radio Finland	FIN	Fin	55555	VP
11.765	0740	BBC World Service	AFS	Eng	32243	VP
13.610	0759	CPBS	CHN	Chi	23332	RI
13.650	0750	Swiss Radio Int.	SUI/D	Eng	35343	FW
15.105	0706	BBC World Service	G/ASC	Fre	33333	RI
15.110	0709	Radio Kuwait	KWT	Ara	33433	RI
15.120	0711	Voice of Nigeria	NIG	Eng	44344	RI
15.150	0720	Radio Romania Int.	ROU	Eng	43332	RI
15.160	0722	Radio New Zealand Int.	NZL	Eng	32332	RI
15.160	0755	Radio Australia	AUS	Eng	44444	GG
15.170	0726	Radio France Int.	F/AFS	Fre	24343	RI
15.180	0730	BBC World Service	G/OMA	Ara	24332	RI
15.195	0732	Radio Vlaanderen	BEL/RUS	Dut	33343	RI
15.205	0740	KTWR	GUM	Eng	43333	ShH
15.210	0734	Radio Korea Int.	KOR	Ger	24332	RI
15.240	0737	Radio Australia	AUS	Eng	24232	RI
15.260	0741	Radio Free Europe/Liberty	USA/MRC	?	34333	RI
15.290	0748	Radio Farda	USA/GRC	Far	44444	RI
15.445	0738	Swiss Radio Int.	SUI	Eng	45243	EM
15.460	0715	Radio Sweden Int.		Eng	34232	EM
15.545	0736	BBC World Service	G	Eng	44243	EM
15.565	0730	BBC World Service	G	Eng	22433	VP
15.605	0750	Radio France Int.	F/GAB	Eng	44433	SE
17.535	0750	Kol Israel	ISR	Heb	43333	VP
17.605	0730	Radio Japan	J/ATG	Jap	23322	VP
17.630	0720	Africa No. 1	GAB	Fre	34523	VP
21.780	0730	Voice of Russia	RUS	Eng	44333	ShH
0800-0900						
5.745	0830	WHRI, Noblesville	USA		44333	BC
5.825	0820	WEWN, Birmingham	USA		33323	BC
7.265	0800	Sudwestfunk	D	Ger	32232	VP
7.580	0820	WEWN, Birmingham	USA		54445	BC
9.370	0820	WTJC, Newport	USA		43334	BC
9.580	0805	Radio Australia	AUS	Eng	21231	RI
9.710	0835	Radio Vilnius	LTU	Eng	54544	SE
9.885	0800	Radio New Zealand Int.	NZL	Eng	35343	FW
9.930	0838	WYFR, Okeechobee	USA	Eng	24122	EM
11.765	0800	KNLS Alaska	USA	Eng	45243	EM
11.840	0830	KTWR	USA/GUM	Eng	44333	ShH
13.630	0830	Radio Australia	AUS	Eng	43334	BC
13.640	0811	Radio Sultanate of Oman	OMA	Ara	24232	RI
13.665	0814	UAE Radio, Dubai	RUS	Rus	44334	RI
13.720	0817	Radio Exterior Espana	E	Spa	42332	RI
13.720	0817	Voice of America	USA/MRA	Chi	31331	RI
13.730	0820	ORF Radio Austria	AUT	Ger	44344	RI
13.780	0822	Deutsche Welle	D	Ger	34333	RI
13.820	0825	Croatian Radio	CRO/D	Cro	34333	RI
13.830	0831	Croatian Radio	CRO	Cro	44444	RI
15.270	0815	Voice of Armenia	ARM	Eng	54444	SE
15.400	0805	BBC World Service	G/ASC	Eng	43333	SE
15.415	0832	Radio Australia	AUS	Eng	24121	EM
15.630	0830	Voice of Greece	GRC	Gre	55545	VP
19.010	0837	Voice of America	USA	Ara	45243	EM
21.465	0820	Radio Pakistan	PAK	Urd	44443	BC
21.770	0832	Swiss Radio Int.	SUI	Eng	25112	EM
0900-1000						
9.290	0915	Radio Caroline	G/LAT	Eng	55444	BC
9.370	0928	WTJC, Newport	USA	Eng	44433	TW
9.475	0927	WWCR, Nashville	USA	Eng	44444	TW
9.710	0936	Radio Vilnius	LIT	Eng	34333	TW
9.885	0924	Radio New Zealand Int.	NZL	Eng	34333	TW
9.895	0923	Radio Nederland	HOL	Dut	44444	TW
11.755	0933	YLE Radio Finland	FNL		44433	TW
11.880	0925	Radio Australia	AUS	Eng	34333	TW
13.685	0954	Voice Int.	AUS	Eng	33333	TW
13.720	0942	Radio Exterior Espana	E	Spa	44444	TW
13.730	0944	ORF Radio Austria	AUT	Ger	54444	TW
13.780	0932	Deutsche Welle	D		55555	TW
13.820	0948	Croatian Radio	CRO		44444	TW
13.840	0920	IRRS	I	Eng	35444	NC
15.120	0945	Voice of Nigeria	NIG	Eng	43433	NC
15.630	0953	Voice of Greece	GRC	Eng	44444	TW
17.510	0932	All India Radio	IND	Eng	44333	TW
17.515	0928	Vatican Radio	CVA		44333	TW
17.535	0930	Kol Israel	ISR	Heb	44444	TW
19.010	0925	Radio Free Asia	USA/CLN		45333	BC
21.465	0958	Radio Pakistan	PAK	Urd	44412	RI
13.855	0954	AFRTS (u.s.b.)	USA	Eng	55555	TW
1000-1100						
9.885	1013	Radio New Zealand Int.	NZL	Eng	34322	SH
9.970	1022	RTBF	BEL	Fre	34333	RI
13.675	1037	Voice of Russia	UAE	Eng	24331	RI
13.700	1007	Radio Nederland	HOL	Dut	44444	TW
15.020	1040	All India Radio	IND	Hin	45554	JP
15.575	1045	BBC World Service	G/CYP	Eng	35343	FW
17.485	1055	Deutsche Welle	D/KAZ	Ger	24422	RI
17.510	1057	All India Radio	IND	Eng	34333	RI
17.535	1059	Kol Israel	ISR	Heb	44434	RI
17.585	1030	Radio Japan	J	Eng	35322	SH
17.615	1004	Saudi Radio	ARS	Ara	33432	RI
17.835	1000	Radio Pakistan	PAK	Urd	44412	RI
17.895	1040	All India Radio	IND	Eng	43334	BC
21.495	1002	Saudi Radio	ARS	Ara	34433	RI
21.515	1006	BBC World Service	G	Per	34433	RI
21.530	1017	Radio Farda	USA/CLN	Far	44433	RI
21.565	1020	RTBF	BEL/D	Fre	24332	RI
21.570	1025	Radio Exterior Espana	E	Spa	23332	RI
21.580	1028	Radio France Int.	F	Fre	24332	RI
21.590	1050	The Overcomer Ministry	USA/D	Eng	15442	MC
21.605	1035	UAE Radio, Dubai	UAE	Eng	44344	RI
21.640	1039	Deutsche Welle	D/CLN	Ger	23332	RI
21.655	1043	RDP	POR	Por	24242	RI
21.670	1047	Saudi Radio	ARS	Mal	34433	RI
21.705	1050	Saudi Radio	ARS	Ara	54454	RH
21.715	1050	Voice of Turkey	TUR	Tur	32333	RH
21.760	1059	The Overcomer Ministry	USA	Eng	24332	RI
21.810	1002	Radio Sweden	S	Swe	34333	TW
21.820	1028	Radio Japan	J	Ita	34444	TW
1100-1200						
6.175	1145	Radio France Int.	F	Fre	55445	BC
9.885	1105	Radio New Zealand Int.	NZL	Eng	44333	SE
11.675	1134	Radio Nederland	HOL	Eng	24112	EM
11.700	1132	Radio Bulgaria	BUL	Eng	44243	EM
12.065	1133	Bible Voice Network		Eng	24222	EM
13.580	1122	Radio Prague	TCH	Eng	35555	FW
13.720	1120	Radio Exterior Espana	E	Spa	55555	RH
13.730	1120	ORF Radio Austria	AUT	Ger	43444	RH
13.745	1115	Radio Free Europe/Liberty	USA/G	Rus	32333	RH
13.770	1115	Voice Int.	AUS	Chi	32222	RH
13.780	1110	Deutsche Welle	D	Ger	44454	RH
13.830	1110	Croatian Radio	CRO	Cro	54454	RH
15.335	1105	RTM	MRC	Ara	54444	RH
15.415	1120	Radio Ukraine Int.	UKR	Eng	44333	EM
15.700	1131	Radio Bulgaria	BUL	Eng	55555	MC
17.515	1149	Vatican Radio	CVA	Eng	45444	MC
17.555	1100	BBC World Service	G	Ara	24322	RI
17.570	1102	Radio France Int.	F	Fre	44433	RI
17.580	1116	CPBS	CHN	Chi	34433	RI
17.595	1118	Radio Japan	J		43433	RI
17.605	1121	CPBS	CHN	Chi	43434	RI
17.640	1133	BBC World Service	G	Eng	35444	FW
19.010	1116	Voice of America	USA/CLN	Dar	45444	MC
21.500	1110	Voz Cristiana	CHL	Por	34443	MC
21.820	1100	Radio Japan	J/GAB	Jap	44444	RI
21.840	1120	Deutsche Welle	D	Ger	15411	SH
21.850	1112	Vatican Radio	CVA	Ita	34333	RI
1200-1300						
9.475	1250	Radio Australia	AUS	Eng	24111	EM
9.525	1249	Radio Polonia	POL	Eng	35343	EM
9.970	1254	RTBF	BEL	Fre	55354	EM
11.880	1248	Radio Australia	AUS	Eng	34122	EM
13.685	1252	Voice Int.		Eng	25332	EM
15.225	1246	Voice of Turkey	TUR	Eng	45444	EM
15.300	1235	Radio France Int.	F	Fre	25322	SH
15.405	1247	Voice of Turkey	TUR	Eng	41221	EM
17.795	1255	Radio Tashkent	UZB	Uzb	33343	RH
17.890	1255	Radio Free Europe/Liberty	USA/GRC	Rus	42333	RH
17.895	1250	Saudi Radio	ARS	Ara	43444	RH
19.010	1230	Radio Free Afghanistan	USA/?	?	35433	SH
21.530	1245	Radio Farda	USA/CLN	Ara	44454	RH
21.540	1242	Radio Exterior Espana	E	Spa	35533	SH
21.605	1245	UAE Radio Dubai	UAE	Ara	44344	RH
21.610	1247	Radio Exterior Espana	E	Spa	33422	SH
25.820	1243	Radio France Int.	F	Fre	55253	EM
13.855	1230	AFRTS (u.s.b.)	USA	Eng	45555	GG
1300-1400						
6.110	1355	Brother Stair	USA	Eng	55445	BC
6.140	1350	Oeutsche Welle	D	Eng	54445	BC
6.155	1340	ORF Radio Austria	AUT		54445	BC
12.095	1325	BBC World Service	G	Eng	35422	SH
13.580	1300	Radio Prague	TCH	Eng	55555	GG
13.830	1330	Croatian Radio	CRO	Cro	35333	SH
15.105	1330	Radio Romania Int.	ROU	Eng	43333	BC
15.565	1355	BBC World Service	G	Eng	34423	SH
17.560	1300	WHRA, Greenbush	USA	Eng	55445	BC
17.645	1305	Voice of Russia	RUS	Rus	43343	RH
17.735	1300	Tunisian Radio	TUN	Ara	54454	RH
17.775	1340	Radio Tashkent	UZB	Eng	34433	SH
17.800	1347	Radio Canada Int.	CAN	Eng	45555	FW
21.790	1300	Deutsche Welle	D	?	45534	SH
21.820	1350	Radio Australia	AUS	Eng	15421	SH
1400-1500						
9.400	1400	Radio Bulgaria	BUL	Fre	35323	SH
11.620	1452	All India Radio	IND	Eng	34232	EM
11.690	1405	Radio Jordan	JOR	Eng	54433	SE
12.075	1432	Radio Nederland	HOL/UZB	Eng	45343	FW
15.050	1405	All India Radio	IND	Hin	45554	JP
15.105	1453	Radio Romania Int.	ROU	Eng	24332	EM

MHz	UTC	Service	Country	Lang	SINPO	SWL
15.310	1410	BBC World Service	G/CLN	Eng	45554	JP
15.485	1457	BBC World Service	G	Eng	43333	EM
15.748	1403	Radio Sri Lanka	CLN	Eng	45554	JP
17.560	1443	WHRA, Greenbush	USA	Eng	35444	FW
17.630	1445	Africa No. 1	GAB	Fre	33233	RH
17.800	1402	Radio Canada Int.	CAN	Eng	25433	SH
21.605	1445	UAE Radio Dubai	UAE	Eng	44333	EM
21.660	1400	BBC World Service	G/CYP	Eng	25422	SH
1500-1600						
11.660	1506	Radio Australia	AUS	Eng	45243	EM
13.635	1510	Voice Int.		Eng	43233	EM
13.635	1525	Voice Int.	AUS	Eng	43333	ShH
15.310	1520	BBC World Service	G/THA	Eng	54454	RH
15.350	1520	Voice of Turkey	TUR	Tur	55555	RH
15.450	1520	Tunisian Radio	TUN	Ara	43444	RH
15.455	1520	Voice of Russia	RUS	Ger	54555	RH
15.555	1520	BBC World Service	G/CYP	Ara	32232	RH
15.565	1515	BBC World Service	G	Eng	32122	RH
15.585	1515	Radio Exterior Espana	E	Spa	54555	RH
15.605	1515	Radio France Int.	F	?	32232	RH
15.630	1510	Voice of Greece	GRC	Gre	54444	RH
15.670	1510	Radio Cairo	EGY	Ara	43222	RH
15.680	1515	Radio Free Asia	USA/DUSH	Chi	54344	RH
15.760	1505	Kol Israel	ISR	Heb	43343	RH
15.825	1505	WWCR - Nashville	USA	Eng	33222	RH
17.650	1533	WHRA, Greenbush	USA	Eng	35343	FW
17.780	1500	Channel Africa	AFS	Eng	32222	RH
17.790	1500	Voice of Turkey	TUR	Ara	54444	RH
21.570	1554	Radio Exterior Espana	E	Spa	45544	SH
21.605	1540	UAE Radio Dubai	UAE	Ara	54444	BC
21.660	1545	BBC World Service	G/CYP	Eng	55445	BC
1600-1700						
7.385	1650	Xizang, Lhasa	CHN	Eng	25432	MC
12.080	1632	Voice of America	USA/BOT	Eng	44554	JP
13.675	1625	UAE Radio, Dubai	UAE	Ara	44434	VP
15.160	1638	Radio France Int.	F/AFS	Eng	34553	JP
15.310	1630	BBC World Service	G/THA	Eng	32243	VP
15.395	1600	UAE Radio, Dubai	UAE	Eng	34333	VP
21.455	1600	WYFR, Okeechobee	USA	Eng	32343	VP
21.605	1615	UAE Radio, Dubai	UAE	Ara	54444	VP
5.765	1650	AFRTS (u.s.b.)	USA/GUM	Eng	35553	JP
1700-1800						
6.065	1730	Radio Sweden	S	Eng	55555	PP
6.295	1700	Reflections Europe (pirate)	IRL	Eng	55444	CP
7.160	1700	BBC World Service	G/THA	Eng	43323	VP
7.265	1741	Radio Polonia	POL	Eng	22222	EM
7.285	1741	Radio Polonia	POL	Eng	35343	EM
9.385	1740	KSDA/AWR	USA/GUM	Eng	32222	EM
9.760	1710	Voice of America	USA/GRC	Eng	43343	VP
9.845	1755	Radio New Zealand Int.	NZL	Eng	23553	JP
9.855	1738	Radio Cairo	EGY	Eng	42342	EM
9.925	1730	Radio Vlaanderen Int.	BEL	Eng	44344	CP
9.950	1745	All India Radio	IND	Hin	43343	VP
11.550	1745	Radio Ukraine	UKR		44444	PP
11.620	1745	All India Radio	IND	Eng	42333	VP
11.640	1730	Radio Vlaanderen Int.	BEL	Eng	44444	ShH
11.970	1700	Radio Japan	J	Eng	44333	CP
13.765	1739	Vatican Radio	CVA	Eng	44454	PP
15.255	1730	Voice of America	USA/G	Eng	55555	BC
15.265	1725	Channel Africa	AFS	Eng	54445	BC
15.310	1720	BBC World Service	G/THA	Eng	34433	SH
15.355	1700	Radio Japan	J	Eng	32222	CP
15.410	1717	Voice of America	USA/?	Eng	35444	SH
15.420	1719	BBC World Service	G/?	Eng	35433	SH
15.570	1748	Vatican Radio	CVA	Eng	55555	EM
15.580	1720	Voice of America	USA/?	Eng	45444	SH
15.685	1720	WEWN, Birmingham	USA		43334	BC
17.515	1747	Vatican Radio	CVA	Eng	55254	EM
17.810	1745	United Nations Radio		Eng	44444	PP
17.820	1730	BBC World Service	G/AFS	Eng	35423	SH
17.870	1742	Swiss Radio Int.	SUI	Eng	44233	EM
17.895	1725	Voice of America	USA/MRC		44434	BC
21.455	1745	WYFR, Okeechobee	USA	Eng	44243	EM
21.525	1725	WYFR, Okeechobee	USA	Eng	44333	BC
1800-1900						
5.890	1840	Vatican Radio	CVA	Ita	45534	SH
5.920	1842	Radio Slovakia Int.	SVK	Eng	45544	SH
6.055	1830	Radio Slovakia Int.	SVK	Eng	54444	ShH
6.055	1843	Radio Sweden Int.	S	Eng	44444	EM
6.195	1847	BBC World Service	G	Eng	44544	SH
9.410	1849	BBC World Service	G/CYP	Eng	55545	SH
9.475	1810	Radio Australia	AUS	Eng	43333	BC
9.480	1845	Voice of Russia	RUS	Eng	44544	SH
9.530	1841	Radio Canada Int.	CAN	Eng	42342	EM
9.660	1840	Vatican Radio	CVA	Lat	42343	VP
9.770	1840	Voice of America	USA	Eng	23442	MC
9.785	1830	Voice of Turkey	TUR	Eng	53444	VP
9.880	1815	Voice of Russia	RUS	Eng	45544	FW
9.890	1815	Voice of Russia	RUS	Eng	54444	BC
11.570	1820	Radio Pakistan	PAK	Urd	43334	BC
11.620	1805	All India Radio	IND	Eng	43334	BC
11.625	1840	Vatican Radio	CVA	Lat	43444	VP
11.630	1830	Voice of Russia	RUS	Eng	54544	VP
12.050	1840	Radio Cairo	EGY	Ara	54444	VP
12.095	1840	BBC World Service	G/CYP	Eng	44444	VP
12.105	1850	Voice of Greece	GRC	Eng	53344	VP
12.130	1835	Adventist World Radio	USA/AFS	Eng	44243	EM
13.640	1805	Voice of Turkey	TUR	Eng	55555	PP
13.710	1840	All India Radio	IND	Eng	24132	EM
13.730	1825	Radio Canada Int.	CAN/G	Eng	43334	BC
13.740	1812	Voice of Vietnam	VTN	Eng	44444	PP
15.170	1830	Voice of America	USA	Cro	44434	VP
15.255	1839	Radio Canada Int.	CAN/G	Eng	45344	EM
15.300	1850	Radio France Int.	F	Fre	24322	VP
15.380	1820	Radio Romania Int.	ROU	Eng	54444	ShH
15.695	1830	IBRA Radio	?/D	Eng	45232	EM
15.825	1845	WWCR, Nashville	USA	Eng	45444	FW
17.830	1836	BBC World Service	G/ASC	Eng	33443	MC
17.895	1840	Voice of America	USA/?	Eng	45534	SH
18.980	1815	WYFR, Okeechobee	USA	Eng	54444	BC
21.470	1838	BBC World Service	G/ASC	Eng	25322	SH
1900-2000						
5.890	1950	Vatican Radio	CVA	Eng	54444	ShH
5.920	1930	Radio Slovakia Int.	SVK	Fre	55445	BC
5.970	1938	RAI	I	Eng	45444	SH
6.040	1950	Voice of America	USA/?	Eng	23442	MC
6.065	1931	Radio Sweden	S		44444	FH
6.065	1947	Radio Sweden Int.	S	Eng	55545	MC
7.105	1900	Radio Minsk	BLR	Rus	54444	VP
7.120	1903	Radio Nederland	HOL	Eng	31432	EM
7.440	1950	Voice of Russia	RUS	Eng	55544	FW
9.500	1920	Radio Australia	AUS	Eng	44534	SH
9.585	1945	China Radio Int.	CHN	Eng	44434	VP
9.605	1937	RAI	I	Eng	41422	EM
9.630	1934	BBC World Service	G/SEY	Eng	44443	MC
9.730	1940	Voice of Vietnam	VTN	Eng	44543	MC
9.770	1902	Voice of America	USA		33333	FH
9.890	1920	Voice of Russia	RUS	Eng	55555	VP
9.895	1902	Radio Nederland	HOL	Eng	42443	EM
9.925	1937	Radio Vlaanderen Int.	BEL/D	Eng	55544	FW
9.960	1940	Voice of Armenia	ARM	Eng	54454	EM
9.990	1920	Radio Cairo	EGY	Ger	54555	VP
11.605	1900	Kol Israel	ISR	Eng	55555	CP
11.655	1900	Radio Nederland	HOL	Eng	42342	EM
11.720	1900	Radio Budapest	HNG	Eng	54555	CP
12.070	1928	Voice of Russia	RUS	Eng	45555	MC
13.635	1930	Voice of America	USA/CLN	Eng	54445	BC
13.740	1925	Voice of Vietnam	VTN	Eng	55445	BC
15.445	1917	Voice of America	USA		44444	FH
17.810	1909	Radio Nederland	HOL	Eng	24122	EM
18.980	1906	WYFR, Okeechobee	USA	Eng	25112	EM
2000-2100						
5.800	2040	Radio Bulgaria	BUL	Fre	55555	RH
5.850	2025	Radio Canada Int.	CAN	Eng	45444	MW
5.930	2011	Radio Prague	TCH	Eng	55555	FW
5.930	2035	Radio Prague	SVK	Spa	54454	RH
5.945	2050	ORF Radio Austria	AUT	Ger	44444	TW
6.005	2035	Deutschland Radio, Berlin	D	Ger	54444	RH
6.040	2030	Voice of America	USA/GRC	Eng	42333	RH
6.050	2025	Xizang PBS	CHN	Chi	43333	RH
6.065	2025	Radio Sweden	S	Swe	44333	TW
6.120	2007	YLE Radio Finland	FNL	Fin	55545	MC
6.155	2020	ORF Radio Austria	AUT	Ger	55555	RH
6.185	2034	RAI	I	Eng	45455	MC
6.190	2010	Deutschland Radio, Berlin	D	Ger	42333	RH
6.195	2045	BBC World Service	G	Eng	55555	VP
7.105	2054	Radio Minsk	BLR	Eng	44444	EM
7.150	2057	Radio Wales Int.	G	Eng	35555	FW
7.170	2055	Adventist World Radio	USA	Eng	41332	EM
7.170	2055	Voice of Turkey	TUR	Eng	31342	EM
7.190	2000	China Radio Int.	CHN	Eng	42433	VP
7.235	2000	Radio Canada Int.	CAN	Eng	55455	CP
7.410	2045	All India Radio	IND	Eng	55444	CP
9.325	2040	Voice of Korea	KRE	Fre	32232	VP
9.345	2015	Kol Israel	ISR	Heb	34433	VP
9.410	2015	BBC World Service	G/CYP	Eng	55544	FW
9.570	2000	Radio Exterior Espana	E	Eng	44434	GG
9.595	2000	China Radio Int.	CHN	Eng	55555	CP
9.645	2002	Vatican Radio	CVA	Eng	34544	FW
9.660	2007	Vatican Radio	CVA		33333	FH
9.665	2002	Radio Exterior Espana	E		33333	FH
9.670	2038	RAI	I	Eng	45454	EM
9.680	2042	Radio Thailand	THA	Eng	44444	EM
9.770	2058	Voice of America	USA	Eng	33333	TW
9.840	2011	China Radio Int.	CHN		44444	FH
9.895	2045	Radio Nederland	HOL	Eng	32232	VP
9.935	2030	Voice of the Islamic Republic of Iran	IRN	Ara	42343	VP
9.950	2045	All India Radio	IND	Eng	33333	TW
11.625	2020	Vatican Radio	CVA	Eng	35555	FW
11.630	2043	Voice of Vietnam	VTN	Eng	31221	EM
11.790	2005	China Radio Int.	CHN	Eng	44444	GG
11.880	2030	RAI	I	Eng	35555	FW
11.905	2050	Radio Tashkent	UZB	Eng	45444	MW
12.070	2020	Voice of Russia	RUS	Eng	44444	TW
12.095	2056	BBC World Service	G/ASC	Eng	25322	SH
12.105	2050	Voice of Greece	GRC	Eng	45555	FW
12.160	2056	WWCR, Nashville	USA	Eng	45233	EM
13.645	2010	Swiss Radio Int.	SUI	Eng	34333	GG
13.700	2035	Radio Canada Int.	CAN	Eng	33322	TW
13.740	2030	Voice of Vietnam	VTN	Eng	44444	GG
13.820	2015	Deutsche Welle	D	Eng	44333	ShH
15.150	2003	Voice of Indonesia	INS	Eng	14121	EM
15.290	2040	Radio Exterior Espana	E	Eng	24122	EM
15.400	2054	BBC World Service	G/ASC	Eng	35433	SH
15.455	2040	Voice of Russia	RUS	Eng	14242	MW
15.630	2050	Voice of Greece	GRC	Eng	35555	FW
17.735	2030	Radio Nederland	HOL	Eng	54444	CP
17.870	2025	Radio Canada Int.	CAN	Eng	34444	MW
2100-2200						
5.800	2130	Radio Bulgaria	BUL	Eng	55555	CP
5.975	2150	BBC World Service	G/ATG	Eng	23443	MC
6.005	2119	Deutscheland Radio	D	Ger	55448	MC
6.025	2152	Radio Budapest	HNG	Eng	45555	FW
6.055	2109	Radio Japan	J	Eng	44343	EM
6.095	2113	Radio Japan	G	Eng	55555	MC
6.065	2132	Radio Sweden Int.	SVK	Eng	43434	SH
6.085	2111	Bayerischer Rundfunk	D	Ger	55555	MC
6.100	2113	Radio Serbia and Montenegro	YUG	Eng	44122	EM
6.180	2136	Radio Japan	G	Eng	43453	MC
6.195	2137	BBC World Service	G	Eng	45455	MC
6.290	2142	China Radio Int.	CHN	Eng	24443	MC
7.130	2130	Radio Tirana	ALB	Eng	44444	ShH
7.170	2102	Voice of Turkey	TUR	Eng	45555	FW
7.185	2100	China Radio Int.	CHN	Eng	55555	CP
7.190	2100	China Radio Int.	CHN/?	Eng	43422	SH
7.285	2155	Radio Romania Int.	ROU	Eng	45544	FW
7.410	2100	All India Radio	IND	Eng	54434	VP
7.420	2100	Radio Ukraine Int.	UKR	Eng	55555	CP
7.500	2130	Radio Bulgaria	BUL	Eng	55555	GG
7.335	2130	China National Radio 1	CHN	Chi	34423	VP
9.325	2100	Voice of Korea	KOR	Eng	35343	EM
9.455	2100	All India Radio	IND	Eng	43434	MW
9.500	2100	Radio Australia	AUS	Eng	43333	CP
9.580	2150	Africa No. 1	GAB	Fre	34333	GG
9.600	2135	China Radio Int.	CHN	Eng	25343	FW
9.950	2125	All India Radio	IND	Eng	44444	GG
9.988	2100	Radio Cairo	EGY	Eng	55555	CP
11.335	2112	Voice of Korea	KOR	Eng	25122	EM
11.620	2100	All India Radio	IND	Eng	23222	MW
11.650	2127	Radio Australia	AUS	Eng	25343	FW
11.715	2105	All India Radio	IND	Eng	33443	MW
11.790	2115	China Radio Int.	CHN	Eng	33444	MW
11.855	2155	Radio Japan	J/ASC	Eng	32333	RH
11.865	2155	Deutsche Welle	D/RWA	Eng	43333	RH
11.905	2155	Radio Tashkent	UZB	Eng	44444	GG
11.915	2145	Saudi Radio	ARS	Ara	54555	RH
11.980	2133	KSDA/AWR	USA/GUM	Eng	23122	EM
13.610	2134	Radio Damascus	SYR	Eng	35443	EM
15.110	2109	Radio Exterior Espana	E	Spa	45433	SH
15.205	2103	Deutsche Welle	D/?	Eng	35333	SH
15.400	2130	BBC World Service	G/ASC	Eng	44444	VP
15.445	2100	Voice of America	USA	Eng	54444	ShH
18.930	2110	WYFR, Okeechobee	USA	Eng	54444	ShH
2200-2300						
5.960	2210	Radio Canada Int.	CAN	Eng	25343	MC
6.060	2214	RAI	I	Ita	35444	MC
6.065	2234	Radio Sweden Int.	S	Eng	55555	MC
7.135	2245	RTM	MRC	Ara	55555	RH
7.225	2240	Radio Tunisia	TUN	Ara	54454	RH
7.230	2209	Radio Serbia and Montenegro		Eng	43232	EM
7.240	2240	Xizang PBS	CHN	Chi	32232	RH
7.255	2240	Voice of Nigeria	NIG	Many	33343	RH
7.275	2235	Radio Exterior Espana	E	Spa	54555	RH
7.345	2230	Radio Prague	SVK	Eng	44454	RH
7.410	2205	All India Radio	I	Eng	55544	FW
7.415	2225	WBCQ, Kennebunk	USA	Eng	31222	RH
7.450	2225	Voice of Greece?	GRC	Gre	44444	RH
7.935	2215	CPBS	CHN	Chi	33333	RH
9.445	2209	All India Radio	IND	e	33333	FH
9.475	2202	WWCR, Nashville	USA	Eng	25343	FW
9.830	2200	Voice of Turkey	TUR	Eng	55555	GG
9.975	2250	WEWN, Birmingham	USA	Eng	35222	EM
11.635	2205	Radio Vlaanderen Int.	BEL	Eng	44243	EM
11.660	2215	Radio Canada Int.	CAN/CHN	Fre	54454	RH
11.690	2210	Deutsche Welle	D/CAN	Ger	44454	RH
11.730	2210	Radio Romania Int.	ROU	Spa	31222	RH
11.755	2210	Radio Canada Int.	CAN/ASC	Fre	43343	RH
11.770	2205	Radio Japan	J/CLN	Jap	32322	RH
11.780	2205	Radio Nacional de Amazonia	B	Por	32222	RH
11.820	2200	Saudi Radio	ARS	Ara	55555	RH
12.160	2205	WWCR, Nashville	USA	Eng	25444	FW
13.570	2253	WINB, Red Lion	USA	Eng	24121	EM
13.620	2212	Radio Australia	AUS	Eng	55354	EM
13.785	2207	Radio Canada Int.	CAN	Eng	45233	EM
15.600	2210	Radio Taiwan Int.	TWN/USA	Eng	45544	FW
15.695	2207	WYFR, Okeechobee	USA	Eng	25112	EM
17.650	2251	WHRA, Greenbush	USA	Eng	25122	EM
2300-0000						
5.960	2320	Radio Canada Int.	CAN	Eng	35422	SH
5.990	2337	China Radio Int.	CHN/?	Eng	23422	SH
6.060	2325	RAI	I	Ita	34433	SH
6.145	2329	China Radio Int.	CHN/CAN	Eng	34423	SH
7.280	2311	Radio Romania Int.	ROU		44444	FH
9.320	2307	WINB, Red Lion	USA	Eng	34232	EM
9.330	2309	WBCQ, Kennebunk	USA	Eng	43232	EM
9.700	2333	Radio Bulgaria	BUL		44444	FH
11.725	2346	Radio Cairo	EGY		33333	FH

Note: For ITU country code references, please see *SWM* June.

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Can be used in reverse

SEND SAE FOR DATA SHEET

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A superb digital signal processor built into a compact speaker. Simply connect to your receiver on short wave – feed with 12V & SIT back & listen – you'll hear the difference. SGC have excelled themselves with this product.

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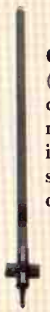

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Putting the DC-2000 up gave me a tremendous boost to all signals with the ancient AR-2000 coming alive! Signals were well received and I found that I wandered out of airband.

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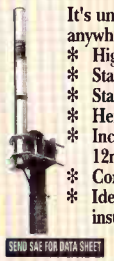

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ideal for airband

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0.1-2.6GHz all mode receiver with (optional) DSP plus bandscope/world clock and too much more to print. (Incl's power supply).

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hand-held scanners at realistic prices

SPECIAL Includes FREE EP-300 Earpiece

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Micro-handy scanner. 100kHz-1300MHz. 700 memories/stereo FM (earphones)/attenuator/bug detector/audio descrambler. AM/FM/WFM/ Selectable tuning steps (incl's 8.33kHz).

You couldn't fit much more into this compact scanner if you tried

OUR PRICE **£99.95** Delivery £10.00

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New pocket hand-held scanner (0.1-1310MHz) AM/FM/WFM.
Superb high-speed scanner featuring alpha tag and much more. BATTERIES AND CHARGER INCLUDED

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Next generation wideband receiver for the true perfectionist. 0.1-2GHz. (All mode). The IC-R8500 is not simply a scanner, it's a professional quality communications receiver with versatile features from high speed scanning to computer control. (Requires software/lead).
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150kHz to 3.3GHz, SSB/CW/AM/FM/WFM. Hardly anyting has been left out of this handheld.

They've even included an internal recorder. A superb professional-grade piece of equipment - supplied with lithium-ion battery & charger.
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£395!
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Full-featured handy. 100kHz-2GHz all mode. Includes SSB/CW band scope, alphanumeric display plus loads more. (Includes battery/drop-in charger).
Simply a must - great even at medium wave

Optional case £15.99
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PC interface £42.95
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Never before has one hand portable offered so much.
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★ Includes nicads/charger/antenna and car lead.

AOR unrivalled quality

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ALINCO DJ-X2000

The intelligent scanner! 100kHz-2.15GHz. All mode incl's SSB, "Flash Tune" reads frequency of nearly of nearby signal & tunes the handie for you. Incl's battery, charger. Amazing features include "Trasnsweeper™" which helps locate hidden transmitters that may be used for eavesdropping. With 160 seconds of digital audio memory, you shouldn't miss that important transmission. The only thing you'll need is plenty time! Includes battery pack and charger unit.

Nothing was left out of this handie

Includes 8.33kHz spacing

Optional case £15.99
Optional battery box £14.99
Cigar lead £19.99
PC interface £42.95

NOW
£379.99
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Bandscan

Europe

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An item on the **hard-core-dx.com** website reports that new station Radio Scandinavia was due to begin test transmissions beginning 25 May on 603kHz. The station broadcasts from the Finnish province of Åland. Initially the tests will be on low power, then increased to several kilowatts over time. The antenna is a long wire affair. The original plan was to broadcast from a fishing vessel but these first tests are thought to be land-based.

One fly in the ointment - the station wants to air their programming in English but one condition of the licence is that the output must be in Swedish. An appeal has been lodged with Landskapsstyrelsen (that's easy for *you* to say), Åland's local government, but this has been rejected. Further discussions were planned. Any reports to my twin brother over at 'LM&S'.

A new European short wave station began testing in May. Denmark-based World Music Radio (WMR) fired up their transmitters around the middle of the month. Station director Stig Hartvig Nielsen revealed that a new 10kW Collins unit on 5.815MHz had commenced just after 1500 on 18 May.

In addition, tests have been going out on 15.810MHz at a relatively modest 500W. Reception reports have already started coming in, and all those requesting a QSL will receive their verification soon, the station promises.

The transmitter site is near Karup in Western Denmark and the on-air studio (from where the test transmissions are coming live) is located near Randers. The antennas for both frequencies are dipoles.

WMR's newsletter goes on to say that test transmissions consist of non-stop music and that monitoring observations on the quality of the broadcasts are highly appreciated. Their postal address is **PO Box 112, DK-8900 Randers, Denmark**. Alternatively, you can E-mail them at **wmr@wmr.dk** You can even buy a WMR T-shirt via their website. For a link to this and a number of other sites related to this month's column, please visit **www.pwpublishing.ltd.uk/swm/bandscan**

Switch To Digital

Closer to home and a press release from the BBC heralds the corporation's publication of its first report on the switch to digital. The report states that digital switchover is challenging but achievable within the government's timetable, given continued consumer enthusiasm and the right policy framework.

The report then sets out key recommendations that the corporation believes are essential if the UK is to achieve switchover from analogue to digital television. These include a scheduled, regional switchover sequence, the creation of a dedicated and properly staffed organisation to manage the switchover programme and a strong marketing and communications campaign that will be key to ensuring that the audience is able to make the transition to the fully digital world. With the digital switchover slated for 2010, is it any wonder that all the majors are virtually giving analogue TVs away?

Radio Bulgaria is the latest in a long line of international broadcasters to offer its programming on-line. Starting in mid-May the station offered its output, in real time, in eleven languages: Bulgarian, English, French, German, Spanish, Russian, Serbian, Greek, Turkish, Albanian and Arabic. The streams can be accessed via their website: **www.bnr.bg**

Terrestrially, Radio Bulgaria transmits nearly 60 hours of programming daily to Europe, Asia, Africa, North and South America on short and medium waves in ten languages: all the above, bar Arabic.

St. Paul, home to Radio Scandinavia.

The Summer 2004 edition of *Broadcasts in English* is now available from the British DX Club. The 32-page booklet contains details of all known international broadcasts in English on short wave and medium wave for the Summer (A04) schedule period. It is in time order throughout and covers all target areas. Transmitter sites are listed where known. It includes a guide to DX and Media Programmes plus schedules for WorldSpace and World Radio Network's European stream.

Copies of *Broadcasts In English* are available for £2 (including postage) and cheques or Postal Orders should be made payable to: **British DX Club, 126 Bargery Road, Catford, London SE6 2LR**.

Summer Schedules

For those of you with Internet access and a desire to mull through the latest A04 schedules from Europe and beyond, I have good news. The *World Radio and Television Handbook* (*WRTH*) have announced that a host of the summer season broadcasting schedules are now available for free download at their website **www.wrth.com** The 62 page (215kB) file contains the latest broadcasting schedules for over 200 international and overseas broadcasters. The format is the same as *WRTH* and includes transmitter sites and languages for each broadcaster. Nice.

Still with the Internet, the BBC announced that all forty of its local radio stations across the English Regions are to be streamed on the Internet - meaning that listeners who log on can access their local service no matter where they are.

The announcement follows last year's decision to broadcast all the national and regional variations of BBC ONE to audiences across the UK on the digital satellite platform and, like that move, reflects the BBC's strategy of making its local and regional services as widely available as possible. The service will be phased in later this year and will be accessible to people with both narrowband and broadband connections.

For the record, BBC Radio Scotland, Radio Nan Gaidheal, Radio Wales, Radio Cymru, Radio Ulster and London 94.9 are all streamed on the Internet already. Personally, I have no desire to hear the about the traffic jams and the inclement weather in Berkshire, from my retirement home in years to come, except maybe, to gloat.

Single Chip

Finally, digital: Kings Langley-based Frontier Silicon has started shipping a combined digital terrestrial TV and DAB decoder system on chip - a single chip. The IC enables a low cost set top box which can allow users to receive all available Freeview digital television channels and DAB digital radio channels from one unit. The first product to feature the device is a set top box produced by Goodmans. The chip provides all the functions required for receiving DTV and DAB, fully decoding this input to an analogue video and audio output.

Anthony Sethill, CEO of Frontier Silicon, said, "Our device enables set top box manufacturers to produce low cost boxes with considerable consumer appeal, including the reception of 24 digital TV channels and 50 or more digital radio (DAB) channels that are all free".

Have a great summer.

Communications at the Battle Of Arnhem

John Berry utilises modern-day technical analysis methods and approaches to assess the problems of communications at the Battle of Arnhem. "It should have worked", he says.

Over the years there have been many reasons cited for the failure of Allied troops to reach a successful conclusion to Operation Market Garden. It has been repeated that the failure of radio communications during the battle was a key component in the failure of the mission. Until now it has been accepted by many that the communications could never have worked, due to the disparate state of the troops and the equipment they were using.
However, John Berry, Managing Director of radiocommunications specialist ATDI has now undertaken a modern-day technical analysis of communications during the battle, and has reached a new, and startling conclusion: Despite history accepting that the Allies were asking too much of the radio equipment, they were not. A modern-day, thorough study of the equipment and techniques used back in 1944 shows that fundamentally the communications should have worked, as he explains...

It's been well documented that, if Field Marshall 'Monty' Montgomery's daring plan, Operation *Market Garden* had succeeded in September 1944, the Western Allies could have ploughed their way across one of the last great natural barriers between them and Germany, thus ending the Second World War by six months and saving countless lives on both sides.

However, it was not to be. Despite 30,000 British and American airborne troops being flown behind enemy lines to capture the eight bridges that spanned the network of canals and rivers on the Dutch/German border near Arnhem, with further British tanks and infantry pushing up from the Allied front line in support, Hitler's forces had managed to regroup and were defending the area skilfully and bravely.

What transpired was one of the most ferocious (and costly in terms of human life) battles seen in the Second World War: The Battle of Arnhem.

It's also been well documented that communications during the Battle of Arnhem were difficult. From experience during previous campaigns using the proposed equipment, they were predicted to be difficult. They did however appear more problematic than expected with some commentators claiming an almost total communications breakdown. Many of the reasons for this claimed failure are the subject of significant myth and supposition, and have been presented in many books. This article is the result of a project that aimed to quantify one area not yet covered - radio propagation - and asked (and found answers to) the question "should they have been able to communicate"? Others can comment on whether they were able to communicate and hence comment on the difference between the actual plan and execution of it.

The approach that I took was one of simulation. Both Command and Artillery nets on Day 1 (17 September 1944) and Day 2 at Arnhem were modelled and compared one with the other. A conclusion of the work showing the likelihood of communications success is reported here for each path from Division to Brigade and between Brigades.

Equipment

Two wireless sets were in use at Arnhem - the vehicle mounted or Trek Cart carried Wireless Set No. 22 and the man-portable Wireless Set No. 68. I obtained the technical parameters for these two main radios. Both used 3.8m (12 foot) long vertical rod antennas. They differed principally in r.f. output power - the 22 Set gave 1W output and the 68 Set, 0.25W - resulting in a 6dB advantage wherever the 22 Set was used.

The signals plan of the first day is shown in the map, **Fig. 1**, which shows several nets with associated frequencies. Initially the Divisional command net provided communications between the 1 Airborne Division dropping zone Zulu where the Division initially set up HQ and 1 Parachute Brigade on the bridge over one arm of the Rhine at Arnhem **(Fig. 1)**. The path length here is 9.35km or just over six miles.

On the second day the Div HQ moved to the Hartenstein Hotel near Oosterbeek. The new map of the layout is shown in **Fig. 2**. The main path dropped to about 6.6km or just over four miles. Now 1 Para were joined by 4 Para at dropping zone Yankee to the north west of the town. The path from Div HQ to 4 Para Battalion is shown and is around 8.6km or 5.7 miles.

The Battalion nets from Brigade HQ on the bridge have been omitted from the study since the path lengths were somewhat less than that to Div HQ - and therefore assumed to have had reliable communications on 2.692MHz using No. 68 Sets.

The artillery were reported to have communications both during Day 1 and Day 2 and these nets were used to pass some Divisional command traffic in the supposed absence of their own links. To complete the picture these additional nets are also shown. In the artillery nets the main link is from the Forward Observation Officer on the bridge co-located with the Brigade to Div HQ initially at the drop zone and

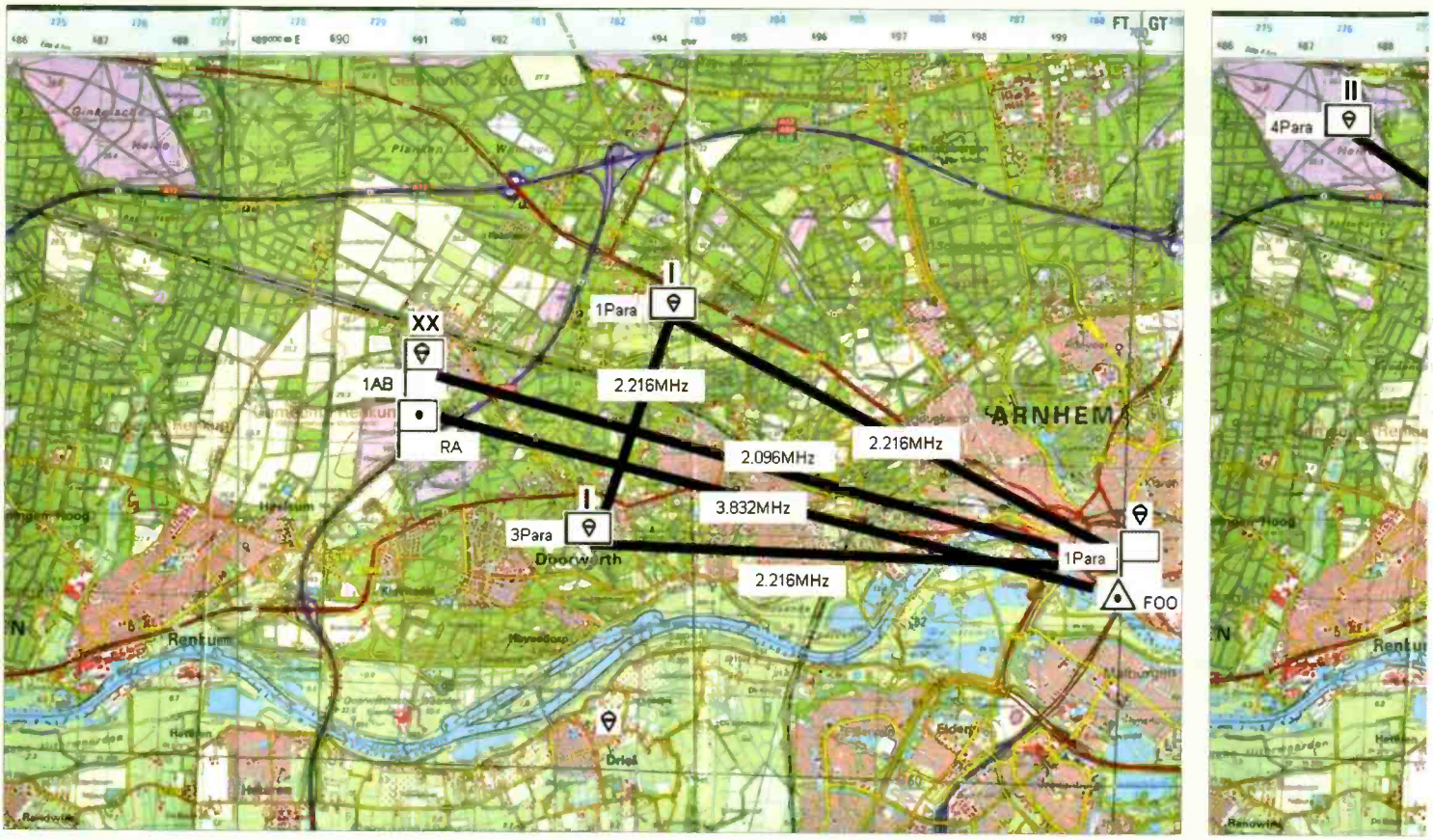


Fig. 1: Command and Artillery Nets, Day 1, 17 September 1944.

then the next day co-located with Div HQ at Hartenstein Hotel.

Artillery Links

The path lengths of these artillery links were 9.35km and 6.6km respectively as noted above. The artillery HQ was in the grounds of the hotel in a dug-out. The net diagram also shows the battery net between Light Regt. HQ and two of the three artillery batteries. Radios used for all artillery links were No. 22 Sets.

The addition of the lower link back to No. 3 Battery from the Officer Commanding 3 Battery who was located on the bridge should also be noted. This was a 'private' link and was reported to have supported significant command traffic.

Vertical Whips

The Divisional communications at Arnhem used ground wave and all antennas were vertical whips. There are several facets of the short vertical whip that have been considered in the work reported on here. The antennas:

- Were short compared to the wavelength and hence would be difficult to match to the signals.
- Needed good coupling to ground to avoid high Earth resistance losses.
- Had a significant null towards the horizon in their vertical response.
- Were short and hence of low capture aperture in turn making them inherently lossy.

The antennas, if used with an adequate Earth coupling over perfect ground or with a good counterpoise Earth losses and the vertical response null could be reduced. In the real application of Arnhem however, there can be no dispute - the antenna systems used were certainly lossy.

During the project no evidence was found to suggest that the antennas had ever been characterised and so the project had to look at another means of estimating just how lossy they were. The only way forward was to look at similar structures used in modern equipment in the hope that modern antennas had been defined. A 'modern' antenna that comes closest to those used at Arnhem is the whip antenna used by the PRC320 Clansman manpack radio set. This is specified as having a loss to the horizon of -22dBi at 2MHz with a gain curve showing a rise in efficiency towards 4MHz. Considering this and the evidence above a figure based on -22dBi at 2MHz was assumed.

Signal To Noise Ratio

Typically military planning is conducted assuming a 13dB signal to noise ratio. This is the modern planning minimum. A good signaller could probably work a link down to 6dB but the link quality would be poor forcing high repetition and error. For the purposes of this study a minimum of 10dB minimum was assumed defining the limit of useful communications.

Environmental noise has a huge bearing on h.f. path performance. **Table 1** shows the signal power needed (the receiver threshold in its environment) for a 10dB signal to noise ratio considering the ambient noise power. As an approximation to the noise environment in 1944, somewhere close to today's 'rural' has been assumed. The values of received signal were used as the receiver threshold in all budget calculations in the project assuming a noise bandwidth of 20kHz.

Path Budget

The path budget defines the maximum permissible propagation loss available for the equipment and antennas used. If that budget was exceeded the link would not have provided the communications required. The maximum permissible propagation loss has been calculated for the 22 Set as 89dBi at 4MHz dropping to a more constrained figure of 69dBi at 2MHz. For the 68 Set this is 73dBi at about 3MHz falling to 63dBi at 2MHz.

Probability Of Communications

Now to look at the simulation results and probability of communications. Each of the paths with each of the associated parameters has been analysed using *HTZ Warfare*. This software in turn used ITU-R Recommendation P368-7 - *Ground Wave Propagation Curves for Frequencies Between 10kHz and 30MHz*. Appropriate values of ground conductivity and relative permittivity which govern ground wave propagation at these frequencies were used. The recommendation expresses path length in terms of path loss for various frequencies, ground conductivity and relative permittivity. The summary of paths versus predicted path loss are shown in **Table 2**. It also shows the maximum permissible loss and

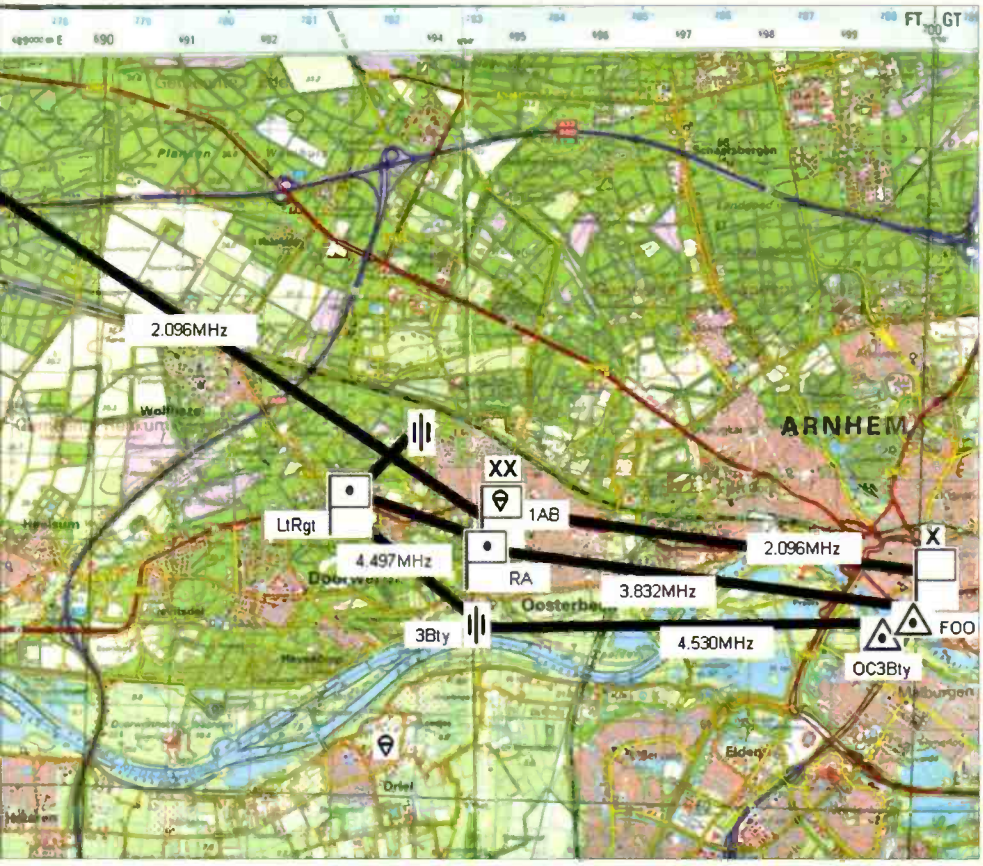


Fig. 2: Command and Artillery Nets, Day 2, 18 September 1944.

the two can be compared to yield a margin. If the predicted loss is less than the permissible loss (giving a positive margin) the path will work. If the reverse is true the path will not work.

The probability of communications column, is a judgement based on the margin available. We can assume from knowledge of the propagation model and the potential for error in the antenna characterisation and other parameters that the aggregated error in the prediction is high at around 8dB. Assuming that errors result in a normally distributed error curve, a zero or very low margin of up to 3 or 4dB will result in a probability of communications of not more than 20%. Given a margin of more than 10dB we might assume a probability of around 90% with values of margin versus probability giving a greyscale between. This thinking has been reflected in the categorisation of Low, Medium and High Probability. To achieve a high probability, a margin of over 10dB is needed in turn giving a 90% chance that the path would have worked during the battle.

Conclusions

On Day 1, 17 September 1944, the Division HQ located at the drop zone some 9km from the bridge was too far away to provide reliable command communications to the Brigade HQ on the bridge. The artillery link over the same path to the 1 Bd FOO did have a distinct advantage in frequency (having lower noise and more efficient antennas) giving a high communications probability. Since the Brigade net on Day 1 used 68 Sets over long paths of around 6.5km, the probability of communications between 2 Para on the bridge and 1 Para and 3 Para was low. When the Division HQ moved to the Hartenstein Hotel the frequency advantage came into its own providing much more robust artillery links.

On Day 2, all links (with the exception of that out to 4 Para) show a high probability of communications. It's possible that if there had been equipment problems with the main command link from Division to Brigade, or if the antennas had been less efficient on the bridge end through poor location or damage, this link would have degraded leaving only the short hop command links and the artillery. The loss of this command link may then have given the perception of communications failure on a Division-wide scale.

The overall conclusions, that I've reached from this work is, that the communications should have worked well as soon as the path lengths fell to around 6km between 22 Sets. My feeling is that if the command links such as that from Div HQ to the bridge did not work, then the failure was as a result of something other than transmission loss.

SWM

Table 1

Frequency	Noise Power (Received)	Received Signal (Needed)
2MHz	-92dBm	-82dBm
3MHz	-97dBm	-87dBm
4MHz	-101dBm	-91dBm

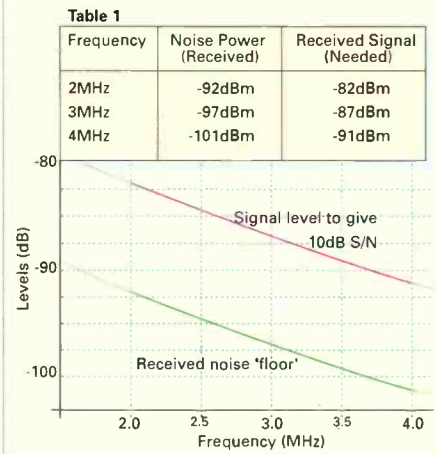


Table 2

Day	Path	Station A	Station B	Radio Sets Used	Frequency	Predicted Path Loss	Maximum Permissible Loss	Margin	Probability of Comms
17-Sep	Command	Division HQ	Brigade HQ	22 Sets	2.096MHz	64dBi	69dBi	5dB	Medium
	Artillery	HQ RA	1 Bde FOO	22 Sets	3.832MHz	77dBi	89dBi	11dB	High
	Command	1 Para	Brigade HQ	68 Sets	2.216MHz	59dBi	63dBi	4dB	Low
	Command	3 Para	Brigade HQ	68 Sets	2.216MHz	59dBi	63dBi	4dB	Low
	Command	1 Para	3 Para	68 Sets	2.216MHz	46dBi	63dBi	17dB	High
18-Sep	Command	Division HQ	Brigade HQ	22 Sets	2.096MHz	56dBi	69dBi	13dB	High
	Command	Division HQ	4 Para	22 Sets	2.096MHz	71dBi	69dBi	-2dB	Low
	Artillery	HQ RA	1 Bde FOO	22 Sets	3.832MHz	66dBi	89dBi	23dB	High
	Artillery	HQ Lt Rgt	3 Bat	22 Sets	4.497MHz	52dBi	89dBi	37dB	High
	Artillery	HQ Lt Rgt	2 Bat	22 Sets	3.396MHz	41dBi	79dBi	38dB	High
	Artillery	3 Bat	OC 3 Bat	22 Sets	4.530MHz	68dBi	89dBi	21dB	High

Number Stations
a beginners guide
Part 1

Welcome to the world of Number Stations! Number Stations have been around for a long time, their origins come from World War One; their heyday was during the Cold War, but there's still lots to hear. Paul Beamont, front man of numbers specialist group 'ENIGMA 2000' explains.

Perusal of RA305 *United Kingdom Table of Radio Frequency Allocations – Part 1* illustrates the manner in which the spectrum between 9kHz to 28MHz is arranged.

Aeronautical, Broadcasting, Fixed - defined as "a radiocommunication service between specific fixed points", Government, Maritime Mobile and so on describe the status of the allocated users for any band of frequencies set within the relevant coordinates. All the definitions of these users are fairly obvious in stating who and what will be on within these frequency allocations.

Just tuning through the h.f. bands an entire plethora of signals can be immediately heard, a catholic range of the identifiable and the unidentifiable, the interesting and the not so interesting, different language stations, amateur conversations, aircraft and maritime transmissions and so on, each requiring a different skill; be it technical, language or computing.

Every now and then stations appear that do not fit into any allocation. They have no schedule or callsign, their transmission lasts just minutes or hours. The content is boring to the casual listener; a voice of varying gender reads a series of numbers. Then as quickly as it was found it disappears into the static not to be heard again.

Antennas used to transmit E03 - Lincolnshire Poacher.

However, the plot is deeper than that for it is just not voices that do this. Morse characters, mainly numbers rattle out at various speeds, sometimes machine sent, occasionally hand sent. The transmission ceases, yet there is no answer from the recipient.

A data station sends a slow cyclic series of five tones for two and a bit minutes and after a break of a few seconds sends a rapid series of even more tones, of different frequency, before ending a few minutes later. Returning to the frequency at the same time on another day the familiar slow tones are heard again but all you hear this time is the same series of slow tones before the station of interest closes down.

Peculiar noises can be heard too, beeps, pips and crackles, ticks and suchlike seemingly indescribable noises that were once described as the flotsam and jetsam of the airwaves.

Welcome To The World Of Number Stations!

Number stations have been around a long time, their origins come from World War1; their heyday was in the Cold War when number stations were found with particular ease. Those that heard them described them by names intended to describe their origins and activities. Magdeburg Annie, Papa November and Bulgarian Betty were three such stations. Soldiers who served with British Army On the Rhine (BAOR) and whose spare time interest was Short Wave Listening had need to take care not to be caught intercepting those transmissions. Army Form *AF252* (Charge Sheet) would be issued and those miscreants who dared and were caught suffered disciplinary action the next morning.

To stand witness to our mention of the severity of the unauthorised reception of Number Stations by BAOR personnel, HJ Hagermann, a hands-on operator during the Cold War period, writes, "My interest in numbers stations, and those subjects associated with them, goes back to my Regular Army service, 1964 to 1971. Whilst stationed in BAOR, I served for a long period as a radio operator. Due to my fluency in German, I served a spell in an Electronic Warfare detachment. Our duties consisted largely of monitoring various stations, and we ourselves were monitored and treated to regular pep talks by, amongst others, members of the Intelligence Corps. One of the highlights was being treated to the then current rendition of "Magdeburg Annie", booming out of a large 'Nordmende' transistor portable, as she droned out the blocks of 5-number cypher groups intended for the many East German intelligence operatives known to be operating in West Germany. Coupled with facts given to us by the Intelligence Corps personnel, "This year (1968) the West German authorities made 3,500 prosecutions for espionage related offences" and posters proclaiming 'YOU ARE THE TARGET!' with a large hand pointing at the audience our interest was guaranteed. We were told in no uncertain terms that to listen to this lady in our off duty time was inviting trouble with a capital 'T'. Those of us, such as myself, on 'Classified

Duties', would be RTU'd, (Returned to Unit).

Imagine my surprise, when, on attachment to a unit involved in what is still 'Highly Classified' duties, we used "Magdeburg Annie", to practice copying cipher groups in the German language.

Come my demob, I retained my fascination with radio, particularly of the h.f. variety. Magdeburg Annie was still strutting her stuff, courtesy of Radio Magdeburg. After the collapse of the Wall, and the DDR, that, I thought, is that. Imagine my surprise; almost delight, when I monitored several numbers stations over a period of time. I felt as though I had found an old friend! Idly entering 'numbers transmissions' into a search engine led me to the ENIGMA 2000 group. Here were other people, who like me were fascinated by these stations. This has helped to keep alive my interest in radio and contributing the odd article to E2k has helped to stave off senility. I am even trying to keep up to speed on computers. Last but not least, it has led to my meeting, in some cases only electronically, some very interesting people, not least of which, is a former East German Army EW operator".

Explained Away

The Number Stations have long been dismissed as being 'those strange signals' and have been conveniently explained away. Those explanations have ranged from the sensible, as being fishing quotas from deep-sea factory trawlers or communications from drug runners, to the downright ridiculous. It was seriously suggested that the transmissions were secret government messages, some wag reckoned, to communicate with flying saucers, UFOs, for some undisclosed purpose.

There are those of us who always felt they knew what the transmissions were about. Short wave listening in the late 1960s and 1970s, the Cold War years, was excellent for those of us who wanted a greater understanding of what we were hearing. Some persons even wrote to various Government departments to try to uncover the truth. When there was an answer to the question 'what is this station I am hearing sending numbers' the answer would always be one of denial. These stations, in different languages and modes, times and frequencies, did not officially exist

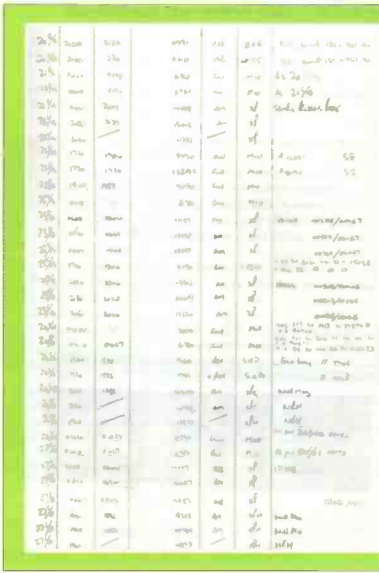
A piece in the *Daily Telegraph* on Number Stations quoted the Department of Trade and Industry, who regulate radio broadcasting in Great Britain, as saying, "These (numbers stations) are what you suppose they are, people shouldn't be mystified by them. They are not for, shall we say, public consumption". In the BBC's *Here and Now* programme broadcast on 21 April 1997, the late reporter, John Walters not only interviewed the founders of ENIGMA and the defector Oleg Gordievsky, but actually contacted the DTI about these transmissions, of which, of course, they made no comment. Former KGB station Chief Oleg Gordievsky was able to explain what the content of these messages would be.

Despite all the denials by relevant Government departments the Number Stations real purpose has been made blatantly clear by three important spying cases and the accompanying court proceedings.

Clear Case

On 26 June 1982 at 1630 Geoffrey Prime, a former GCHQ Linguistic Specialist, made a complete confession to Detective Chief Superintendent Cole of his activities as a spy. In evidence against him was a Grundig reel-to-reel tape recorder that when played droned a coded number message in German, as well as a powerful radio receiver of East German origin. Also found in the false bottom of his briefcase was a list of frequencies and schedules annotated with the ident he used to recognise the radio traffic destined for him as well as a quantity of one-time pads.

In answer to questions concerning the numbers transmission that was recorded, Mr Prime offered the explanation that it was his hobby, listening to the radio and twiddling the tuning knob. Mr Prime's trial, on Wednesday 10 November 1982, lasted little more than two hours; he had pleaded guilty to the charges against him for which he received 38 years imprisonment.



A typical page of G7VAK's number station log.

Antenna seen at Barford St. John.

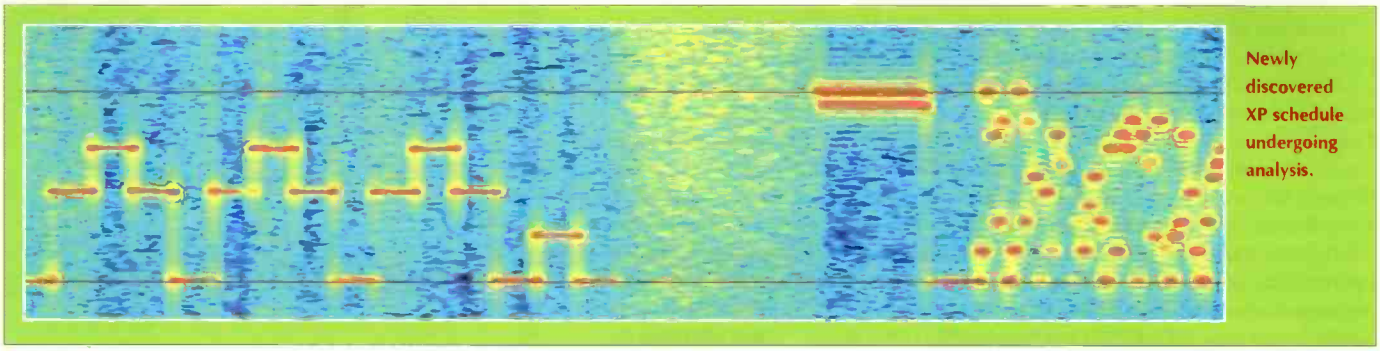
During investigations one of Mr Prime's former neighbours had mentioned that he was fed-up with hearing German numerals being read out on a Saturday night from the flat above where Mr Prime lived and that his wife had mentioned that she, "reckoned that bloke upstairs is a spy".

Another spy case also had Number Station content at its heart. During the evening of 2 April 1988, Special Branch detectives forcibly entered a third floor flat at 35 Silver Birch Court, Friern Barnet, North London. In doing so they caught the occupant, Erwin van Haarlem, in the act of receiving a coded radio message in Morse. Like Mr Prime he too possessed one time pads. The Morse messages were stated as having their origin from Prague in the former Czechslovakia. Van Haarlem, whose one time pads were hidden in a hollowed out bar of soap, also possessed chemicals for invisible writing and a coded list of dead letter boxes. His radio was described as "a popular type, manually tuned".

Whilst it is now generally believed that van Haarlem was exposed by the actions of a Czech defector there was an interesting 'radio' side to his discovery too.

The local neighbourhood watch coordinator had previously telephoned the police due to interference seen on the picture on her television screen. This interference was believed to correspond to the dots and dashes of Morse

Number Stations
a beginners guide



Newly discovered XP schedule undergoing analysis.

code and occurred regularly at 1720.

Various newspaper headlines described van Haarlem's Court appearance, where he received a ten year sentence; "Court told of 200 coded messages from Prague" to "Morse code Spy caught in the act". Perhaps the most accurate was the strapline "GCHQ had detected incoming signals from the Prague area for a long time".

Valuable Work

The examples above confirm that Number Stations carry coded transmissions from a variety of Intelligence Agencies to their agents working elsewhere although Number stations were never classified to any degree by the monitors. Valuable work was carried out by the founding members of the original British group, the European Numbers Information Gathering and Monitoring Association, ENIGMA, to produce the *ENIGMA Control List*.

This '*List* identifies, classifies and shows individual and family traits of each known Number Station. More importantly it assists with the recognition of these stations. Such was the accuracy and foresight of the authors that the List became the de facto world numbers recognition aid.

Prior to the list being developed all number station monitors had to go on were particular names such as 'Lincolnshire Poacher' or the 'Counting Station' to name two. The first refers to a station that uses the old English folk tune as an intro, whilst the second refers to the fact that the announcer counts as an intro.

Unfortunately, ENIGMA eventually ceased to exist as a member orientated organisation and left a vacuum in the interest, although their informative column 'Attention 123!' can be read here in *SWM*.

There was a postal notification to members concerning the closure of ENIGMA and two members were horrified to see that someone had posted the letter to the Internet. This posting was immediately noticed by the American monitors group 'Spooks' leading to suggestions from some members that they should take over the work of ENIGMA and that moves to do so should be made forthwith.

Because of these suggestions ENIGMA 2000 came into existence due to the swift actions of the two ex-members of ENIGMA who were horrified to think of the ramifications of all the valid work of ENIGMA being 'Americanised'. With very little to work on an initial introductory newsletter, based around an article rather than any logs, was produced. A website that had been configured for ENIGMA was rapidly reconfigured for ENIGMA 2000 by change of name and the current E2k was born. Unfortunately, the website has now gone but a group site exists that can be found on the Internet at **http://groups.yahoo.com/group/enigma2000**

Apart from the *ENIGMA 2000 Newsletter* the very important *ENIGMA Control List* can also be found within the 'Files Section' of the online group. It is regularly updated and still remains the de facto publication for the identification and classification of Number Stations. You should note that Number Station Monitors measure frequencies in kHz and state all time in GMT [also referred to as UTC] and depicted as 'z', or zulu time, after the time zone to which it refers.

Caged dipole antenna atop the Bulgarian Embassy. Viewed from Prince Consort Road SW7.

The Grey Man

Those without a receiver may well ask "what do I need?" Yet those with receivers may well ask the same question. Bear in mind that if the station that you wish to monitor is being transmitted to the area where you reside you

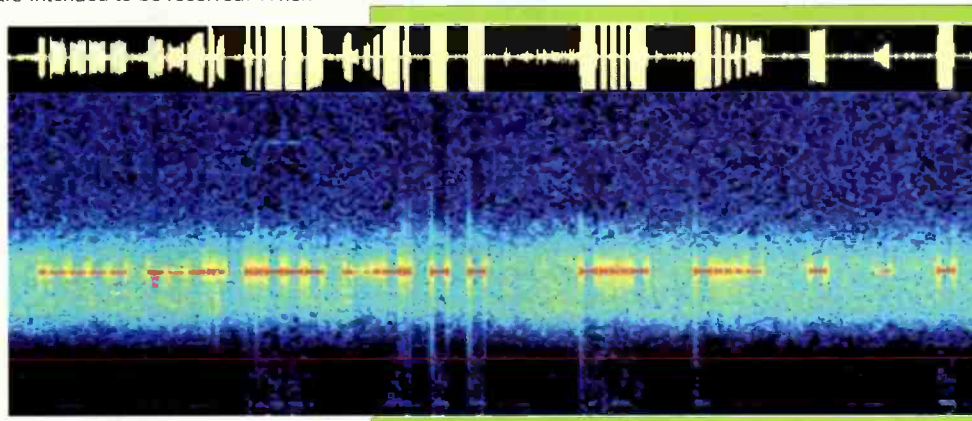
will not need a specialised receiver or massive antenna system.

If you consider that any agent in a target country will not wish to draw attention to himself and would rather blend in with his neighbours. He will not, as a result of his need to forever remain the grey man, have a rotating tribander antenna atop a lattice mast feeding shelves of wireless apparatus that would make most amateur radio enthusiasts envious.

What he would have is a common and commercially available radio with short wave capability that probably sports a b.f.o. He would probably expect to use the telescopic antenna on strong signals from his controllers. After all they will have selected the frequencies and times for his particular schedules for an efficient and trouble free transfer of information. Douglas Britten, was a spy who held an amateur callsign G3KFL, but there was never an accusation that he had used his knowledge of wireless in connection with his clandestine activties.

I have received signals of interest on a simple receiver with no b.f.o. whilst on holiday around the UK because that is where they apparently are intended to be received. When in Guyana I listened to a well-known number station, on s.s.b., using a commercial receiver that had no b.f.o. The technique is to use the local oscillator of a second receiver to beat with the product of the other receiver, a common enough technique employed by s.w.l.s of yesteryear who used equipment not fitted with a b.f.o. All that needs to be done is to place a few turns of wire from the antenna socket of the second receiver around the antenna wire of the main receiver. If there is no antenna socket a few turns of wire around the plastic case of the receiver suffices, as does placing the set in very close proximity, allowing the ferrite rod to close couple to the main receiver. Any receiver, sufficiently calibrated, with a similar i.f., could be suitable.

Antenna above Chinese Embassy, Portland Place W1.



Analysis of M03 transmission - note bandwidth due to filter use.

Different Modes

Number stations transmissions will be found using Morse or voice and there are least four active, plus one recently silent, data based stations. The majority of the number transmissions are in Morse, many having an equivalent voice 'sister'. The data transmissions are suspected to have at least two Morse equivalents.

Before you shudder and denounce Morse as obsolete and unnecessary consider this. To copy a Morse Number Station you need only know the numerals 0 to 9, the letters T A N D U W R I G M used as cut numbers, T being 0 and M being 9. The occasional punctuation or procedural character may also be encountered, the most common being the long break which shown as an equals sign is 'dah di di di dah'.

Regarding the number of active Morse stations one ENIGMA 2000 member recently E-mailed with some important station frequency and scheduling information and added, "...in my log for Tuesday I have 35 entries, 23 of which are Morse".

Within the *ENIGMA Control List* and in reports, Morse stations are always classified by the letter 'M' whilst the voice stations use 'E' - English language, 'G' - German, 'S' - Slavic and 'V' - a variety of languages, Arabic, Chinese, Hungarian, Korean, Spanish and so on.

A particular Morse station M03 has a schedule that can be seen to be in common with that of the English language voice station, Ell. These two stations were the subject of an E-mail, sent by 'AnonUK', mentioned above. The actual message concerned M03 and E11 that certainly appear to be related.

'AnonUK' wrote, "The 0830z E11 changed to M03 on Tuesday, frequency is 8544kHz".

The voice transmission that was previously heard via E11 on a Tuesday, also on a frequency of 8544kHz, would be a train of '182 oblique 00' by the female announcer for five minutes. The end of the transmission, is announced with "out". On the rare occasion when this station sends a message (at the time of writing that was 2 March 2004) the call altered to 189/67. This suggests that the original 182 id denotes a 'test' message. The 00 definitely shows no groups to follow, indicating a 'null' message.

In the full message the id changed to 189, perhaps an indicator to the recipient that the message is for them, whilst the 00 changed to 67. That depicted the number of groups sent.

The particular broadcast we refer to was shown in *Enigma 2000 Newsletter* Issue 22 as:

"E11 8544kHz, 0830z, 02/03 [189/67 82242 82242 14813 14813 85814 85814 49315 49315 18590 18590 etc. ENDING: 5-Fig groups:64030 45756 4344n OUT] The sending lasted 16m 52s. JoA noticed that part way through the message: "Attention" "82242 14813 85814" then followed 5-Fig groups, ending as shown above". (JoA is the British monitor credited with that observation).

When that sending changed from Ell to M03, and noted in the *'Newsletter* as

"M03 8.544MHz, 0830z, 06/04 189/67] AnonUK,' you will note that the ident and group count have remained the

Continued on page 32

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- BNC Flexible Antenna

£119 B

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- 66 - 512MHz *with gaps*
- NFM, AM (Airband)
- 100 memories
- 10 Priority channels
- 5/12.5kHz channel steps
- Data skip (lockout channels)
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- BNC Flexible Antenna
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AOR AR-8600 MKII

- 530kHz-2040MHz
- FM, AM, SSB, CW
- 1000 memories
- Tuning steps programmable
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- Telescopic antenna
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- 100kHz-3000MHz
- WFM, NFM, SFM, WAM, AM, NAM, USB, LSB, CW
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- 8.33kHz Channel Step
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- VHF airband plus lots more inc. emergency services
- 66-88/108-170/300-470/806-1000MHz
- AM & FM
- 200 Memories
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- LSB, USB, AM, WBFM, NBFM
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GLOBAL AT-2000 RECEIVER ATU

*100kHz - 30MHz
*SO-239 socket
*Size: 150 x 67 x 146mm
*Weight 300g

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Improves any short wave receiver. Lets you hear more! A 'Q' switch adjusts the front-end selectivity to match the band and QRM conditions. Handles end fed wires and coax systems.

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Many extra features make this a top-selling budget scanner.
- 100kHz-1300MHz
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DIY DSP for any receiver!!

Made by SGC in USA, this adjustable DSP unit also includes adjustable bandwidth filtering for SSB and CW. Just fit in-line with speaker, connect 12V and use the supplied dual micro-button control panel to select parameters. It's pure magic and great value.
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PSR-282

- 66-88/118-137/137-174/380-512MHz
- Modes AM, FM
- Memories 200 (10x20)
- Search speed 50 steps/sec
- Scan speed 25Ch/sec
- 4xOne-touch search banks
- 8.33kHz steps in airband
- Audio 180mW into 8 Ohms int. spkr
- 4xAA (not included) ext. power 9V DC

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GENERAL ENQUIRIES:
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- 66 - 512MHz *with gaps*
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- 80 memories
- 1 Priority channel
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- Data skip (lockout channels)
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- BNC Flexible Antenna
- Earphone

"BUDGET VALUE"

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ALINCO DJ-X2000 *"FABULOUS FEATURES"*

- 100kHz - 2150MHz
- AM, NFM, SSB, CW
- 2000 memories
- 23 tuning steps
- Channel scope
- Fully programmable
- 4.8V Ni-Cd battery pack
- 8-15V DC ext.
- Telescopic Antenna

PAY 2005

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UNIDEN-BEARCAT UBC-780XLT

- 25-1300MHz with gaps
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- Analogue Trunk Tracking
- Alphanumeric display
- Automatic Tape recorder option
- Antenna BNC
- 13.8V DC 700mA

PAY 2005

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AOR AR5000A/AR5000A+ NEW

The new AR5000A now offers a frequency coverage of the entire radio spectrum that is practical to cover. The +3 version offers even more with synchronous AM (USB/LSB/DSB) AFC & Noise Blanker.
**10kHz-3GHz *AM, FM, USB, LSB, CW*
**2000 memories *45 CH p/s scan speed*
**Audio 1.7W (8 Ohms)*
**Supply: 12V DC @ 1A*
**217x100x260mm *3.5kg*

PAY 2005

AR5000A	AR5000A+
£1599 C	£1799 C

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- 100kHz - 2599MHz
- FM, AM, SSB, CW
- 2000 memories
- Large digital display
- Real-time band scope
- DSP Noise & notch filters (Opt)
- Super HF performance
- Automatic Tape recorder option

PAY 2005

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YAESU VR-500

- 100kHz-1300MHz
- NFM, WFM, AM, USB, LSB, CW
- 1000 Memories
- 100 Skip channels
- Smart search feature
- 8 char. alphanumeric display
- Band scope
- PC programmable

£199 B

YAESU VR-120D

- 100kHz-1300MHz
- AM, FM, WFM
- Adjustable steps
- Over 600 memories
- Skip channels
- Smart search
- Alphanumeric tags
- Requires 2xAA cells

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A fully featured nearfield receiver that displays analogue signals in spectrum format.
**30MHz-3GHz*
**FM Analogue*
**64x128 graphical display with white LED backlight*
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**Sens: 100uV @ 500MHz*
**Pwr: 8xAA alkaline or AC adaptor (optional) 12V DC 350mA*
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X-SWEEPER with GPS: £1599.95

PAY 2005

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- AM Ferrite antenna
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- Emergency Services
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- BP-206 Lithium-ion battery
- Telescopic Antenna

PAY 2005

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RADIOSHACK HANDHELD SCANNER AMPLIFIER
Specifically designed for handheld scanning receivers using BNC antenna connectors (male/female) for ease of connection. **100-1000MHz *Gain variable 0-20dB *Bypass switch *Requires PP3 batt or ext. 9V DC 100mA min. *In/Out BNC connectors *Size: 40x95x35mm *Weight: 100g*
SPECIAL OFFER WAS: £69.95

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- 100kHz - 2000MHz
- USB, LSB, CW, AM, FM, WFM
- 1000 Memories
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- Free PSU included
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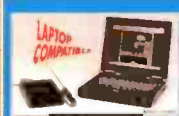

- 100kHz - 1300MHz
- USB, LSB, CW, AM, FM, WFM
- Unlimited memories
- Synchronous AM detection
- RS-232 interface D-sub 9-pin
- BNC Antenna connector
- New Icom version 2 software
- Requires PC (Not included)

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bhi NEIM1031

NOISE ELIMINATING IN-LINE MODULE
** Noise attn 9-35dB * Noise Attn levels 8 * Audio output power 2.5W RMS max (8 Ohms) * Audio connections: Line level in/out (RCA Phono), Audio in/out 3.5mm mono jack * Line i/p impedance 10K * Line o/p impedance 100 Ohms * Line in sensitivity 300mV -2V RMS * Headphone socket 3.5mm mono jack * Power 12-24V DC 500mA*

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bhi NES10-2 & NES-5

NES10-2

NES-5

**Speaker with built-in DSP noise filters *Dip switches for 8 filter settings (NES10-2) *DSP settings preset, no user adjustment (NES-5) *Plugs directly into 3.5mm speaker socket *Handles up to 5 Watts input *Max 2.5 Watts output *Requires 12V at 0.4 Amps max *Use mobile with cigar adaptor*

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The Scout frequency recorder automatically stores frequencies as it locks onto them
**10MHz-1.4GHz *Input: 50 Ohm *Sens:<3mV @ 150MHz *Measurement: 10mS *Records: 400 freqs *Display: LCD *Bargraph: 16 segments *Supply: Int Ni-Cads *Battery life: 8hrs *AC adaptor AC90 *Size: 94x70x30.5mm *Weight: 240g*

PAY 2005

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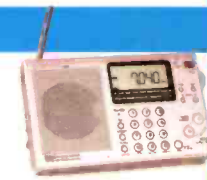
ROBERTS R9914



- 153kHz-30MHz, 87.5-108MHz
- AM, SSB/CW, FM (Stereo)
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- Dual time
- Clock/Alarm
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The **BAA898HG Wireless Weather Station** offers more info than ever! Weather, temperature, pressure trends as well as pressure readings, history and max and min readings. Operates with up to 3 remote thermo-hydro sensors, one supplied.
**Wireless freq. 433MHz *Main unit 195x105x77mm, 4xAA cells *Remote unit 92x60x20mm, 2xAA cells.*
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This professional wireless weather station is a high quality system that measures the indoor surrounding area and receives weather data from 3 outdoor sensors through 433MHz signal.
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- Off-air Frequency Counter
- 10MHz - 3GHz range
- 4 Switched Gate Spreads
- Hold Display Button
- 2 Switched ranges
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- AC Charger

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WATSON HP-200 & HP-100

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*

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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*

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CAN'T DECIDE? PHONE FOR EXPERT ADVICE

E&OE, All prices subject to change.

Number Stations
a beginners guide

Continued from page 29

same as an E11 message sending. On Tuesday, 13 April 2004 at 0830z and again on 8.544MHz 'PLondon' intercepted M03 sending 182/00 [As E11 would be doing in a null message situation]. E11 is generally sent in USB, M03 in ICW [interrupted CW], rarely MCW. Perusal of the Control List gives enough detail to allow identification of these stations as:

'E11 YL AM/USB calls "nnn Oblique 00" Non-voice counterpart: M03 M20'

'M03 044/54 == 54x5F, ending 000 Voice counterpart: E11, G01, G10, S11 044/00 null message ending == 000 S12, S26'

The schedule for these two stations, compiled by 'AnonUK', allows us to predict transmissions for M03 and E11 for 2004, those wishing to have a gentle intro to number stations could well benefit from attempting to intercept these two stations.

Day	Time	ID	MHz Nov to Feb	MHz May to Aug	MHz Sep, Oct, Mar, Apr
Daily	1630	287	4.180	7.377	6.252
Daily	0915	284	7.317		8.196
Mon	0700	40	4.505	5.082	4.958
	0900	976	10.210	7.440	7.772
Tue	0730	41	4.840	5.082	4.870
	0745	503	11.486	10.245	10.728
	0815	211	4.958	6.814	5.082
E11	0830	182	8.544	8.544	8.544
	0930	552	6.480	6.480	6.480
E11	1030	312			8.759
E11	1230	312			8.544
E11	1300	183			8.800
Wed	0730	508	8.088	6.797	6.941
	0900	214	9.610		7.377
	0945	211	5.358	6.252	5.815
	1100	186	9.339		9.610
Thu					
E11	0800	232			7.663
	0900	18	6.480	6.480	6.480
	1000	976	10.384	7.984	8.760
	1030	214	9.950	7.377	7.984
	1100	742		7.377	
Fri	0800	41	4.909	6.814	4.958
E11	0800	232			8.091
E11	1030	312			8.759
Sat	0800	624	7.377	9.339	8.186

We previously mentioned the 'Lincolnshire Poacher'. This station is a very common one and has the ident E03. No Morse counterpart has yet been identified or discovered, if such even exists.

Transmissions for this station start daily at 1200z and continue until 2200z, upper side band is used for the transmissions which are indicated by bars of the old English folk tune, *Lincolnshire Poacher*, along with a five figure group that is repeated. At the end of a number of cycles of the intro tune and the five figure group a gong sounds and the synthesised voice, female with a 'plummy' British accent then recites around 200 five figure groups, each repeated. At the end of the groups a gong sounds and few bars of the signature tune are played prior to shut down. The entire transmission never lasts longer than 45 minutes. The five figure group during the intro may well indicate the recipient - but then again, it may not.

Frequencies used are 5.422, 5.746, 6.485, 6.959, 7.337, 8.464, 9.251, 10.426, 11.545, 12.603, 13.375, 14.487, 15.682, 16.084, 19.452MHz. All the sendings commence on the hour, [H+00]. This station is thought to be transmitted from Cyprus.

A similar station is 'Cherry Ripe', its message structure matches that of E03 (Lincolnshire Poacher).

The similarity is such that the station is actually designated as E03a. The name 'Cherry Ripe' is the signature tune played as an intro before the same 'plummy' female synthesised voice recites groups in exactly the same way as heard in E03. The ending is the same except the final tune is, of course, 'Cherry Ripe'.

The schedule is different from that of E03 and runs Monday to Friday 0000z, 0100z. 1000z to 1400z plus 2200z and 2300z. The transmissions, like those of the Lincolnshire Poacher, also last around 45 minutes.

Frequencies used by E03a are 18.864, 19.884, 20.474, 20.707, 21.866 and 23.461MHz.

The sendings are believed to originate from the island of Guam and as such the station can be difficult to intercept. Daytime monitoring is possible but for the late night and early morning sendings we rely on our monitors in Australia and South Africa. The target area for E03 is believed to be in the Saudi Arabia area. The E03a target area is not known but a past monitor in Brunei, BFPO11, stated that the station was very strong. Given the stated use of the jungle around Brunei by author Andy McNab *Immediate Action* and claims by ex-MI6 operative Richard Tomlinson in his book, *The Big Breach* of receiving his SAS instruction by radio, in a code in five figure groups, the use of E03a in the area may well be obvious.

A lot of conjecture exists about whom these transmissions are sent for, given the girls public school accent it is not difficult to form an opinion that a rather smart building on the south bank of the Thames, by Vauxhall Bridge, may well have some input. It is for this reason that ENIGMA 2000 will not print any reports on these stations within its *Newsletter*, although we cannot stop reports of it reaching our online group.

MOSSAD Numbers?

Israel is also believed to have its external Number Station that has the ident E10. The *ENIGMA Control List* offers:

'E10 YL [female voice] a.m., Nato Phonetic Alphabet, (CIO, VLB, EZI etc).'

Like E03, E03a there appears to be no Morse equivalent stations.

The E10 frequencies are plentiful and are an easy catch. They use a variety of identifying three letter groups, some with a number attached, that can easily be mistaken as a callsign.

The message structure is simple and consists of an easy to follow structure. For instance 4.880MHz 2000z 14 April 2004 as heard by E2k monitor IW:

'ULX ULX ULX (repeated)
MESSAGE MESSSAGE

GROUP 29 GROUP 29
TEXT TEXT
AONZA LINOB HVOJP KFOQS ZNMSA ENKEV TOQYD TSVIM GAUAR ULWDY
MGMNK OGHXY OYGMN NECQC RGBSP JTQYN WFVMW MBMNX QWURN BAPWX
JYVMN DYYRO PZYGA UUOEC FQJQQ SYTRP BMPKC RAPEM KNIWO
END OF MESSAGE, END OF TRANSMISSION'

Apart from the use of alpha characters E10 has another identifying trait, the pronunciation of the phonetic for N. Novem**bear**, with the 'r' being partially rolled.

As yet there is no conclusive evidence as from the point of transmission. It has been suggested that the recorded transmissions are sent from MOSSAD headquarters by a microwave link to a transmitter site and then sent on schedule - but then again it has also been suggested that it is sent from Cyprus or Guam too.

No one has suggested that it is sent from the British possession Diego Garcia, leased by the Americans as a military base, in the Indian Ocean, but there is a strong possibility. Wherever the transmissions emanate from E10 has a very wide coverage, in both frequency and time. They are very strong in South Africa, according to our monitors who reside there.

Frequencies used, and there are many, include 2.626, 2.630, 3.270, 3.640, 3.840, 4.015, 4.165,4.461, 4.780, 5.230, 5.339, 5.530, 6.260, 6.840, 7.605, 7.811, 8.025, 8.127, 9.130, 9.202, 10.648, 11.565, 14.530, 15.980, 17.410 and 19.715MHz to name a few. The stations are believed to be active 24h. The identifiers include, ABC, ART, CIO, EZI, FDU, FDU-M, FTJ, HNC-S, HNC-F, JSR, KPA, MIW, PCD, SYN, ULX, VLB, YHF. There will also be variants to these and other identifiers. If the identifier has a number attached, perhaps FDU2, there may be no message. Each ident is sent on a varying number of frequencies. For instance on 25 December, 2003 the ENIGMA 2000 E10 Desk operative, Bob Meech of Dartford, writes of twelve different frequencies for SYN2. These are 3.640, 4.015, 4.165, 4.648, 4.780, 5.170, 5.230, 6.370, 6.912, 7.605, 7.811 and 8.025MHz. This is a very active station and very easy to intercept, the transmissions are in a.m. mode but can also be heard in synchronous a.m. or s.s.b.

Slavic Stations

Slavic Language Number Stations are a good catch and ENIGMA 2000 is fortunate to have the services of DoK who runs our Slavic Desk from the Garden of England. DoK is a trained ex-intercept operator and fluent in certain Slavic languages.

Perhaps the easiest of these stations to intercept is S17c. This station currently sends, at the time of writing, on two parallel frequencies 5.301//8.190MHz in u.s.b.. It transmits daily at 1250z and continues with its message, in Slavic numbers, until 1257z. It previously used 9.166MHz.

This station is strange because the entire transmission remains the same save for one five figure group, which may, or may not change daily.

To understand the transmission knowledge of the Czech numerals is necessary. This list concentrates on pronunciation rather than the correct spelling:

Numeral	Czech Pronunciation		
0	null	4	ctyri
1	yedna	5	pyet
2	dva	6	shest
3	tri	7	sedoom
		8	osoom
		9	devyet

All that's needed to receive numbers stations.

Whilst the pronunciation looks cumbersome and difficult, it is quite easy once the transmissions of the relevant station have been repeated a few times.

A transmission starts:

"Pyet Pyet Pyet...Tri Yedna...Tri `Null Pyet", which is repeated continuously for around five minutes.

After a slight pause we'll hear "Tri, Yedna, Tri C tyri Dva", followed by "Null Pyet".

Then we will hear "Pozor Pozor", which means, attention attention! Then the operator announces the message, a single five figure group. An example of this would be '98036' as actually sent on 3 January 2004, or perhaps '73033' as previously sent on 11 April 2004.

Then the message continues with "Pozor Pozor" followed by, "Ctyri Dva...Null Pyet" [42 05] and ends, after a pause, with "Konec Konec", Finish, Finish.

Taking the numerical group sent on 11/04/04 the actual message [with frequency details] translated is:

S17c 1250z 5.301//8.190MHz (Daily)
555 313 05 [Rptd 5 mins]
313 42 05 Pozor
73033 Pozor
42 05 Konec
[Sent Sunday 11/04/04]

The only thing which changes within this transmission is the single five figure group. Speculation has been offered as to what the 5-figure group represents; a weather reading, scintillation counter, ionospheric value or a coded instruction of frequency or time of a transmission, Decode Key. Who knows?

Another similar station is 'Bulgarian Betty' as mentioned at the beginning of this feature. Betty's voice can be heard a number of times and has a definite schedule, much followed by our Slavic Desk. 'Bulgarian Betty' is better known to E2k monitors as S10d and even has a Morse equivalent, M10.

S10d [Bulgarian Betty] 1520z 8.175/9.986MHz [Weekly]
555 152 30 [Rptd 5 mins]
152 53 30 Pozor
text 30 groups Pozor
53 30 Konec
[Sent Sat 10/04/04]

That concludes this first part of the introduction to Numbers Stations. Join Paul Beaumont again in *SWM* August for the next exciting instalment with more station details, in the mean time tune around and see how many numbers stations you can hear.

To be continued...

MAYCOM FR100

Civil & Military HANDY AIRBAND SCANNER

- 66-174, 420-470 MHz
- AM/FM/WFM
- 150 Memory Channels
- S meter bargraph
- 3 x AA cells *(not supplied)*
- Supplied c/w:
  - SMA antenna
  - Belt clip
  - Carrying strap

SAVE £20

Maycom FR100 SPECIAL PRICE £79.95

LIMITED OFFER

~~£99.95~~ **£79.95**

MICRO 454

33 Channel UHF RECEIVER

SPECIAL PURCHASE £29.95 P&P £5

Originally intended for monitoring "Mosques" or other Wide Area Paging systems. We have a quantity of these radios for sale at a **VASTLY REDUCED PRICE.**

Features

- Frequency: 454.025 - 454.825
- Steps: 25 KHz
- Channels: 33
- Power: 2 AA batteries (not supplied)
- Scan Function
- Channel up/down button
- Low battery indicator
- Automatic Key lock
- Earphone Socket
- Low Battery indicator
- Supplied c/w:
  - Rubber Antenna
  - Operating manual

limited quantities ONLY

OUR SPECIAL CLEARANCE PRICE **£29.95** +P&P £5

MAYCOM AR108

- Airband: 108-136.975MHz VHF: 136-180MHz
- Selective Channel Steps: 5, 10, 12.5, 15, 25, 1MHz
- Modes: AM or FM
- Memories: 99
- Supplied c/w Belt Clip, Carrying Strap

Mains Charger £8.95 £2.75 p&p

£69.95

AR5000A+3

- 10kHz-2.6GHz
- Modes AM,FM,USB,LSB,CW
- 1000 memories
- 45 ch/sec scan
- 20 search banks
- DTMF decoder
- RS232 port
- N type & SO239 sockets
- Audio 1.7W (8Ω)
- 12V DC @ 1A

SPECIAL PRICE

~~£1,999~~ **£1,799** P&P £10 | 3 CHEQUES OF **£603.00**

PAY BY CHEQUESPREAD INTEREST FREE!

JIM M75

Pre-Amp

- 24MHz to 2150 MHz
- Variable gain: -10dB to +20dB
- 12V DC or internal Battery
- BNC plug & socket
- Size 95 x 50 x 33mm
- Weight 180g

£79.95 P&P £4.75

AOR AR-8600

SAVE £20

All Mode Wideband Base Receiver

- Now 100kHz-3GHz
- Increased RX sensitivity
- New Bandpass filter
- 12V DC or optional internal NiCad pack

NEW Mk II VERSION

OPTIONAL PSU AVAILABLE

~~£699~~ **£599** P&P £10 | 3 CHEQUES OF **£203.00**

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ICOM IC-R1

Wideband Scanner + TV

- 495kHz - 2451MHz
- 450 memories
- FM, AM, WFM, AM-TV, FM-TV
- Supplied c/w
  - Telescopic antenna
  - Belt clip
  - Charger
  - LI/ION battery pack

SPECIAL PRICE

~~£449~~ **£339** P&P £10 | 3 CHEQUES OF **£116.33**

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AOR AR-8200 MK III

Full featured wideband scanning & communications receiver

- Latest database (over 20,000 freq)
- 0-1750MHz (gap at 36-46MHz)
- LSB, USB, AM, CW, Synchronous AM (USB, LSB and DSB), NBFM, Wideband FM, STEREO FM, Video output
- Tuning steps Auto/user
- 54,700 definable memories
- Stereo, Record & Video outputs
- Data Slicer
- 50 memories/steps per sec
- Mains power unit supplied as standard. 1A 230V AC

SAVE £200

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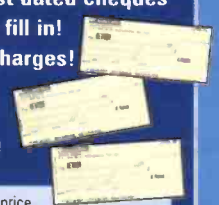

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AOR AR8200 Mk III	Handheld Scanning Receiver	299.00
AOR AR8200 Mk III	W/band Hi spec Scanner c/w CTCSS Card	345.00
AOR AR8600 Mk II	Wideband Base Receiver	485.00
Yaesu VR120D	Handheld Scanning Receiver	120.00
Yupiteru MVT7100	Wideband Handheld Scanner	159.00
Yupiteru MVT9000 Mk II	Handheld Scanning Receiver	225.00
Icom ICR71E	HF Receiver	425.00
Icom R75	Base Receiver c/w Filters & OSP	599.00
Icom R75	Base Receiver	499.00
Roberts 9914	FM/MW/LW/SW Receiver	65.00
Sony ICFSW07	All mode S/W RX & Active Loop Antenna	159.00
Sony SW55	Portable Shortwave Radio	125.00
Videologic DRX601ES	DAB Tuner	159.00
Yaesu FRG8800	General Coverage Receiver	299.00
Yaesu FRG8800V	HF Receiver + VHF Converter	325.00
Yaesu FRG9600	All Mode Wideband Base Receiver	259.00

YAESU VR-5000

Yaesu's Flagship Desktop "Ultra Wideband" Scanning Receiver

- 0.1 to 2600 MHz
- Tons of features !

GUARANTEED! price match GUARANTEED!

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YAESU VR-500

Compact all mode wideband handheld, PC Programmable with ADMS-3 Software

- 100 kHz to 1300 MHz
- AM/FM/WFM/SSB/CW
- 1,000 Channel Memories

£199.95 P&P £10 | 3 CHEQUES OF **£69.31**

PAY BY CHEQUESPREAD INTEREST FREE!

YAESU VR-120D

New D model with:

- ***NEW!*** Charge Socket
- 0.1 - 1299.995MHz
- AM, FM, Wide FM
- Auto select channel steps
- 12 preset memories
- 89 channel Memory Bank
- 640 channel memory system
- Slot machine game!
- *Optional extra:* Mains Adaptor

GUARANTEED! price match GUARANTEED!

£159.00 P&P £10 | 3 CHEQUES OF **£55.66**

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YUPITERU MVT-7100

All mode, wideband handheld Our No.1 Seller

- 530kHz-1650MHz
- 1000 memories
- AM/FM/WFM/SSB/CW
- Comes complete with: NiCads, mains charger, 12VDC cigar lead, belt clip, carry strap

~~£249~~ **£229** P&P £10 | 3 CHEQUES OF **£79.66**

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YUPITERU MVT-7300

200 Channels with Switchable AM/FM

SPECIAL OFFER

- 66 - 88MHz, 108 -170MHz, 300 - 470MHz, 806 - 1000MHz
- Modes: AM/NFM
- Memories: 200

~~£159~~ **£129** P&P £10 | 3 CHEQUES OF **£46.66**

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YUPITERU MVT-7300

Top of the range airband handheld with 8.33 kHz steps

- 520kHz -1.32GHz
- 1000 Memories
- 8.33kHz Airband
- Duplex reception
- Descramble function
- Supplied c/w: Mains adaptor • 12V DC lead • NiCads • Belt clip

~~£299~~ **£239** P&P £10 | 3 CHEQUES OF **£83.00**

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CABLE DEALS at WHOLESALE PRICES!

HIGH QUALITY MILITARY SPEC

50Ω Coax per 100 metre drums *(ADD P&P £10)*

RG58 C/U Mil spec	~~£38~~ £25
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H100 Semi Airspaced	~~£95~~ £65
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300 Ohm Twin feeder (slotted)	~~£89~~ £69
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- 168 strands of 14 AWG copper wire.
- Ideal for all your antenna projects

FLEXWEAVE

per metre.....55p .. +10p/metre P&P

per 100 mtr Drum..£40 ..... +£6.50 P&P

ICOM R20

NEW ICOM R20 Ultra Wideband Scanning receiver

NEW

With

- "Twin Band" receieve
- Record facility
- RF gain control
- freq: 150kHz to 3.3 GHz
- Memories: 1050
- Modes AM/FM/SSB/CW
- *plus lots more features*

SAVE £100 LIMITED INTRODUCTORY OFFER usually £499 offer price £399

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BEARCAT UBC180XLT

A stylish new Sports Scanner with 8.83kHz Airband steps

NEW

- Frequency: 25 - 87, 108 - 174, 406 - 512, 806 - 960 MHz
- AM/FM
- 100 Memories
- Twin Turbo Scan
- Alpha Numeric display
- Supplied c/w: Mains Adaptor/charger, Nicad re-chargeable batteries, Earphone, Belt clip.

£129 P&P £9 | 3 CHEQUES OF **£46.33**

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BEARCAT UBC780XLT

Desktop with trunktracking & PC programming (via 3rd party software) • a MUST HAVE for enthusiasts

- 500 channels
- 25-1300 MHz *(with gaps)*
- AM,FM,WFM

GUARANTEED! price match GUARANTEED!

SPECIAL OFFER

~~£249~~ **£299** P&P £10 | 3 CHEQUES OF **£103.00**

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BEARCAT UBC278CLT

Base Scanner with MW/FM Radio & Alarm Clock

- 25-956 MHz *(with gaps)*
- VHF Radio: 88-108MHz
- 100 Memories
- 20 Radio Presets

£159.95 P&P £10 | 3 CHEQUES OF **£56.65**

PAY BY CHEQUESPREAD INTEREST FREE!

BEARCAT UBC 280XLT

SPORTCAT Twin Turbo Handheld

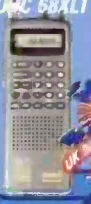
- Triple conversion RX
- 25-956MHz (with gaps)
- 200 memories
- Comes complete with: Antenna, Earphone, Belt Clip, Nicad battery, 240V UK Mains adaptor

£179.95 P&P £10 | 3 CHEQUES OF **£63.31**

PAY BY CHEQUESPREAD INTEREST FREE!

BEARCAT UBC 60XLT

NEW UK BAND SCANNER



- UK Search Bands
- 66 - 512MHz *(with gaps)*
- Pre-programmed UK Search Bands
- 80 Channels
- Programmable Chain Search
- Priority Channel Scanning
- Scan+Search rate:10 Ch/Sec
- Supplied c/w: Antenna, Earphone, Beltclip, Operating Guide

£79.95 P&P £8

BEARCAT UBC 220XLT

Easy to use with Airband and Turbo Search

- 66 - 956 MHz *(with gaps)*
- AM/FM
- 200 memories
- TURBO SCAN/SEARCH
- Data Skip facility
- 10 Priority Channels
- Memory Backup
- Supplied c/w: earphone, belt clip, charger and rubber duck antenna

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YAESU FRG-100

Shortwave Communications Receiver

- Fully featured radio with Frequency 50 KHz to 30 MHz
- Receives AM/SSB/CW
- 50 Memories
- Programmable on/off
- Twin 12/24 hour clock/Timer
- Memory Scan
- Selectable input Attenuator
- Noise Blanker
- Size 238(W) x 93(H) x 243(D)
- Optional FM Unit - £33
- Supplied with Free 240V mains – 13.8V DC Supply

FREE MAINS PSU

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Enjoy the STUNNING QUALITY of DAB digital radio

RD-3 GEMINI 3

Mains/battery portable DAB/FM radio

NEW

- 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 P&P £10

3 CHEQUES OF £49.66

RD-6 GEMINI 6

DAB / FM Mains radio with RDS display

NEW

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

£179.99 P&P £10

3 CHEQUES OF £63.33

RD-4 GEMINI 4

Sports Portable Personal DAB Digital Radio

NEW

- Joystick control of tuning/volume
- Select stations by name
- 10 Station Pre-sets
- Search/Manual tuning
- Clock/Date display
- 6 Preset tone settings
- 20 hour battery life (3x AA size - supplied)
- External Power Adaptor
- AC Adaptor included
- 65(w) x 110(h) x 20(d) mm

£159.00 P&P £10

3 CHEQUES OF £56.33

RD-5 GEMINI 5

Mains/battery portable 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

£149.99 P&P £10

3 CHEQUES OF £53.33

Communications Receiver

This receiver is everything we hoped it would be, covering 100kHz - 2GHz.

LOTS of FEATURES including computer control.

SAVE £177

GUARANTEED price match GUARANTEED

~~£1376~~ £1199 P&P £10 | 3 CHEQUES OF £403.00

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GRUNDIG YB400

Hi-Performance SW Radio

- 144kHz - 30MHz
- SW, FM Stereo, MW/LW
- SSB reception *(both USB/LSB)*
- Dual alarm clock
- Narrow/Wide bandwidth
- Mains or Battery *(with optional mains adaptor)*
- Supplied complete with: SW HANDBOOK, CARRYING CASE, EXT. WIRE ANTENNA, CARRY STRAP

£99.00 P&P £8

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ICOM IC-R5

- 495 kHz-1309.995MHz
- AM, FM, WFM modes
- PC programmable
- 1250 memory channels
- Dynamic Memory Scan
- CTCSS & DTCS Decoder
- Auto Squelch

SAVE £20

~~£179~~ £159 P&P £10 | 3 CHEQUES OF £56.33

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Multiband Receiver

Covers LW,MW and:

- Shortwave (2.3 - 22MHz)
- Marine/Airband (108 - 175MHz)
- Battery/Mains

£79.95 P&P £8

PALSTAR AA30

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.

- Frequency: 100kHz-30MHz

£69.95 P&P £8

Digital Worldband Radio with RDS

- Covers MW/LW/FM/SW
- SSB/CW reception on SW
- 307 presets
- Clock/alarm facilities
- Supplied with: Dual voltage AC supply, sw antenna, earphone, carrying case

We stock the COMPLETE RANGE of ROBERTS RADIO!

~~£200~~ £179 P&P £10 | 3 CHEQUES OF £63.00

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SHORTWAVE RADIO'S BEST KEPT SECRET

. . . until NOW!

WRTH 2003 W.R.T.H HANDBOOK BEST HF DESIGN 2002 ★★★★ RATING OVERALL

Don't just take our word for it! Check out the user reviews on eHam.net where the Palstar R30 consistently receives the 5 Star Rating! *'Great SWL RX'...'Best I have used!'....'Wow-that audio!'...'Amazing Radio - Exceptional Value!'*

PALSTAR R30

Portable Communications Receiver

The R30 is a compact portable high performance shortwave radio *(capable of running from internal batteries or 12V DC)* providing excellent strong signal handling, high sensitivity and dynamic range.

- 100kHz - 30MHz AM, SSB, SW
- 20Hz, 500Hz tuning steps, synthesized *(low phase noise performance)*
- 500Khz up/down
- 45MHz 1st IF, 455 kHz 2nd IF
- RF derived AGC, fast/slow
- 4-pole crystal filter at 45 MHz
- Ceramic filters fitted
- Bandwidth, 4kHz AM and 2.5 kHz SSB
- 6-digit LCD display
- Analog S-Meter
- 100 channel memory
- 5W low distortion full fidelity audio amp
- External soft muting
- Line Audio output
- +18dBm 3rd order intercept
- 455kHz IF output
- Switchable 7 pole input filters
- Power source either: Internal batteries (not included) or 12V DC
- Ultra miniature size 8"(w),x 2.5"(h) x 9"(d)
- Weight: 7 lbs

£449 P&P £10 | 3 CHEQUES OF £153.00

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WorldSpace Digital Satellite Radio

Crystal clear digital radio, almost anywhere in the world!

BPL CELESTE MkII

Digital Satellite Radio

- FM / AM reception
- 10 Preset memories
- Dataport provision
- Stereo Line output socket

~~£109~~ P&P £10 | 3 CHEQUES OF £49.66

PAY BY CHEQUESPREAD INTEREST FREE!

WS-0110

Compact size ideal for travelling

Digital Satellite Radio

- 10 Memories + LCR
- Headphone socket
- line out socket
- Built in speaker
- 4AA battery powered
- Mains adaptor inc

£119 P&P £10 | 3 CHEQUES OF £43.00

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ROBERTS C9950

NEW

IDEAL FOR THE RADIO ENTHUSIAST

Programmable Cassette Recorder

- Dual record speed
- 6 separate timed recordings
- 6 hr recording, C90 cassette
- Voice activated recording, timed voice activated recording, remote switching of other equipment

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SCANMASTER quality antennas

SCANMASTER LP1300

WIDEBAND BEAM ANTENNA 16 EL LOG PERIODIC DESIGN

- 105 -1300MHz
- Gain 11-13dBi
- 'N' type connector
- 500W

~~£124.00~~

SCANMASTER B128

AIRBAND BASE SCANNER

A dedicated CIVIL AIRBAND base antenna designed to give long distance reception on 117-140MHz. Supplied c/w mounting tube & mast clamps.

- 'N' Type connector
- length: 1mtr

£4.75 P&P

£39.95

SCANMASTER DESKTOP

WIDEBAND SCANNING ANTENNA

A complete desktop antenna covering 25 -1300 Mhz, just 36" high with 4 m of cable, fitted BNC plug with a magnetic base.

£4.75 P&P

~~£41.38~~

SCAN AIRMASTER

DEDICATED CIVIL & MILITARY AIRBAND ANTENNA

- Covers 117 – 137 MHz, 224 – 400 MHz

Antenna contains :

- 2 dipoles for Civil Band
- 6 dipoles for Military Airband
- Uses "N" Type connector

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GRUNDIG SATELLIT 800

B GRADE

SAVE £150

Your chance to own the ULTIMATE portable shortwave radio!

We have a limited quantity of 'B' GRADE mail order returns - fully refurbished by Grundig and sold with a full year's guarantee!

- 100-30,000kHz (0.1-30MHz) for AM Broadcast and Shortwave
- 87-108MHz for FM Broadcast
- 118-137MHz for Aircraft Band
- AM, USB, LSB modes (0.1-30MHz)
- AM mode only for 118-137MHz
- WFM mode only for 87-108MHz
- Three built-in bandwidths for SW
- AGC- Automatic Gain Control
- C/W Deluxe Stereo Headphones
- Synchronous detection

~~£440~~ £399 P&P £10 | 3 CHEQUES OF £136.33

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Short Wave Magazine Listening Contest - Year 2

On Air with G3SWM

Kevin Nice reports on the recent activities concerned with the running of G3SWM on the May bank holiday this year.

G3SWM On-Air Day 2004 Facts

Contacts Made:	223
Countries Worked:	8
Hours On Air:	9
G3SWM Ops:	Kevin G7TZC, Colin G3XAS, Clive G4SLU, Richard G0RSN
Logs:	Ted 2E1EJC, Clive G4SLU, Kevin G7TZC, Toby M1CGX
Rig:	Icom IC-746
Antennas:	Half-wave end-fed via 'un-un' (MLB). Both N-S and E-W orientation, 3m a.g.l.
Location:	IARU - IO80SN , WAB - SY77DOR
Power:	100W
Average Contacts/hour:	24.77
Max Contacts/hour:	39
Min Contacts/hour:	10
Busiest Hour:	1301-1400

Sunday was a beautiful day, in fact a perfect day to run a special event station on the top of Dorset's land connected 'isle' of Portland. It came as a bitter disappointment that we'd chosen the Monday to run, the magazine's station G3SWM in support of the 2nd annual *SWM* Readers Listening Contest.

The weather had taken a definite turn for the worse. But, it would take more than wind and rain to dampen the spirits of those running the station.

We had after all, enjoyed glorious weather and temperatures in the high 20's whilst setting-up the station the previous day.

Benefiting from the lessons learned last year, setting-up the various aspects of the temporary station was considerably quicker this time.

Still Present

Fortunately, even the hooks for the antenna wires that we'd installed on the previous year's contest day, had been left untouched as we'd hoped. This meant that rigging the two antennas, EW and NS was reasonably trouble free. Even the feeders from last year were removed from a storage chest in the DPARS caravan and re-used.

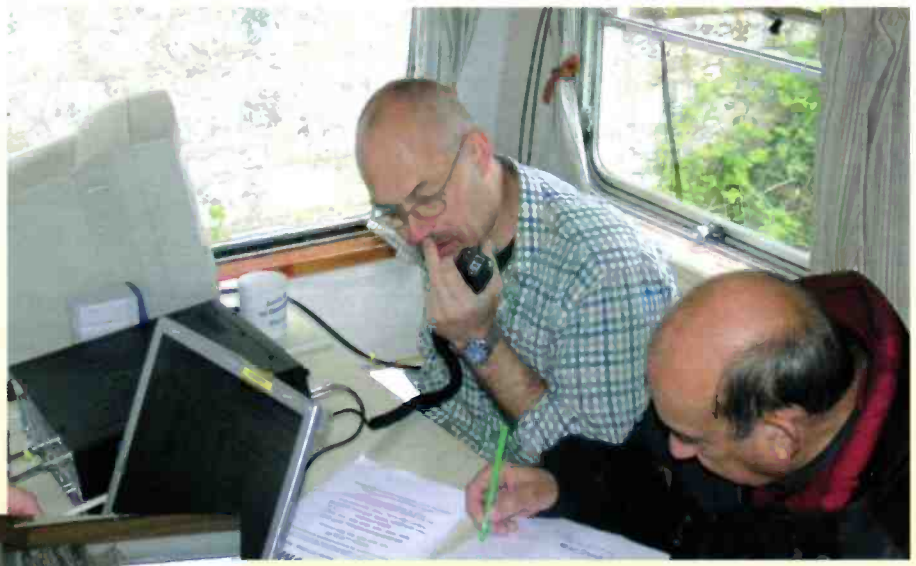
The rather excellent ex-army 10m portable mast caused a few problems as the second set of guys and adjusters had mysteriously gone missing. Some creative use of miscellaneous rope did the trick however.

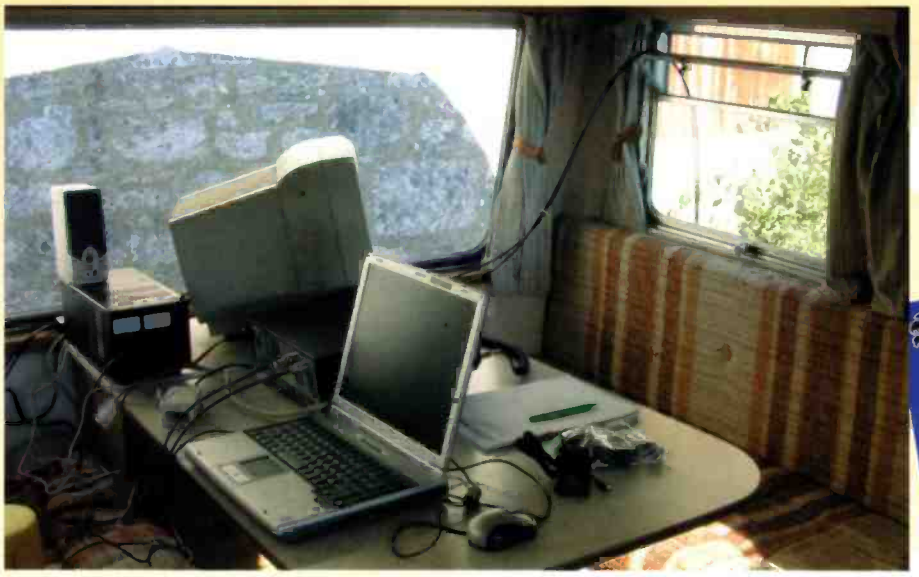
This wasn't the only mast to prove awkward, as the 2m APRS mast also suffered from AWOL guys. Strangely, it got blamed on the Brownies...don't ask!

Once the minor hiccups were overcome, we were set to go. The radio was installed in the operating position, the generator tucked around the corner at the other end of the disused loco shed, the 'Portaloo' delivered. All set-up in a couple of hours.

It had been two o'clock when I caught up with the forming convoy of vehicles leaving Weymouth on the Portland road. **Ted 2E1EJC** at the front, followed by **Martin G6GDT** who was towing the aforementioned caravan. **Colin G3XAS** was behind the 'van when I joined at the rear. Not long after that we were up to five vehicles when **Clive G4SLU** with wife **Chris M3SHE** appeared in my rear view mirror. Spirits were high as we passed jovial banter via 2m, on the final leg of the journey to our Grove Road site on Portland.

The land we chose for the station location is owned by the Portland Port Authority who, like last year, had kindly allowed us access for the on-air activities.





Better Than Last Year!

Although the weather conditions could have been better, being tucked up in the caravan it didn't really matter too much, those on the band were far better than last year.

Gone was the QRM generated by the Italian contest of 2003, but there was considerable activity that prompted a few

Walnut Tree Cottage, Poringland Road, Stoke Holy Cross, Norwich, NR14 8NW, England

G-20985

small shifts up and down from our published frequency of 7.070MHz.

These variations didn't seem to stop the contacts being made. As you can see in the On Air Facts panel, some hours were four times as busy as the quiet ones. At peak, we were working a new station every minute and a half!

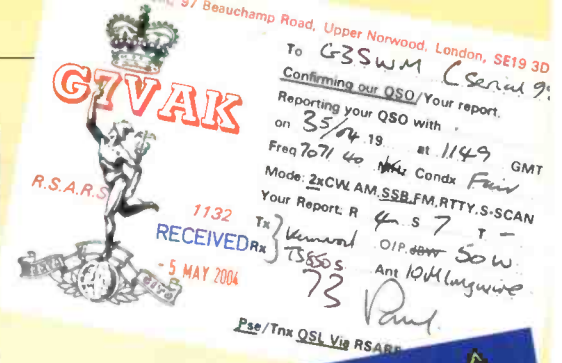
As the day progressed the weather improved and so did the sense of achievement. By the end of the day we didn't want to stop. The opportunity was there, as things picked up apace as we were due to shut down. The last hour proved to be the second busiest of the session - just like last year! Next event, I intend that we start proceedings a little later and finish a few hours later too.

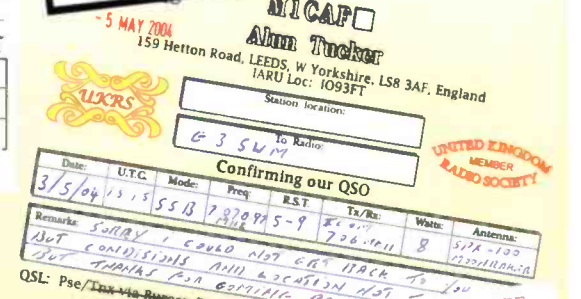
We ended up working almost as many stations as last year in three hours less time on air - we had a really good session, which certainly benefited from our learning experience of last year. I'm sure I speak for everyone involved when I say the G3SWM on-air day was a thoroughly enjoyable experience. A huge thanks to everyone who helped to make the day a success. ***SWM***

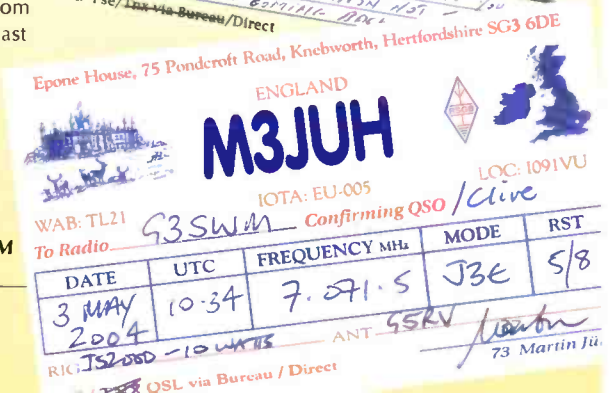
PRIZES

Here's to next year's activity when we'll be back with more facilities and prizes for the first three placed listener entries. I have just had confirmation that Kenwood Electronics UK are to donate first prize!

See you on-air next May.







Operator : Dick Goo **MU3GSY**

Lionel Roithmeir,
La Rance, Kimberley Avenue,
St. Sampson's, Guernsey,
CHANNEL ISLANDS
GY2 4EW

E-mail: roith@guernsey.net

RECEIVED 5 MAY 2004

GUERNSEY
IOTA EU 114
CQ Zone 14
ITU Zone 27
LOC IN89RL
WAB WV38

RIGS: ICOM 706
ANTENNA: G5RV
POWER: 10

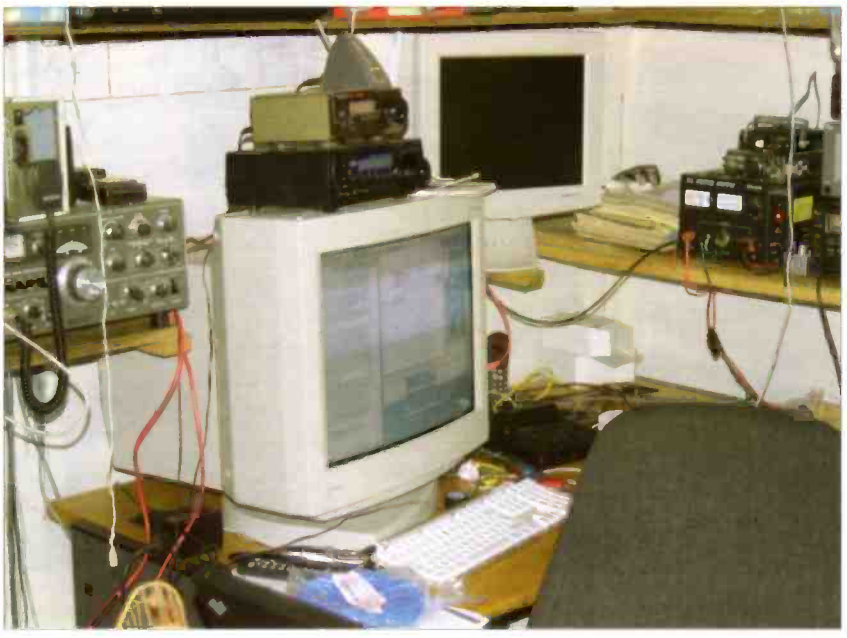
Confirming QSO / ~~SWL Rpt~~ G3SWM 55

Day	Month	Year	UTC	MHz	2-Way	RST
03	05	04	0904	7068	SSB	57

UX5UO print

PSE QSL TNX via bureau / ~~direct~~ 73 de Lionel

In The Ed's Shack



Low Down Low-down

In his recently relocated Ed's Shack, Kevin Nice discovers a handy active v.l.f. loop antenna that's easy to build and effective in use.

There's more to very low frequency (v.l.f.) listening than you might think. Sadly, there aren't too many receivers that tune as low as 10kHz. There are the ex-professional sets that cover this lower part of the electromagnetic spectrum as described in past issues of *SWM* by reviewer extraordinare John Wilson.

It's also possible to acquire or build a v.l.f converter or you can build a receiver such as the one described by the late Joe Carr back at the end of 1994 and beginning of 1995 in the Radio Science Observing series.

Having provisioned a suitable receiver the next obstacle is that of rigging a suitable antenna. This is no mean feat when you consider that a wavelength at 10kHz is $3x10^6/10000 = 30km$! Even if you plan to use a quarter-wave end-fed antenna you'll need to find 7.5km of wire and of course somewhere to run it out!

There are solutions. These come in the form of either reduced length wire antennas, tuned loops or active antennas.

It has been discussed in *SWM* many times before, that there are huge benefits in utilising an untuned loop. See JW's in-depth explanations on the reasons for using a loop over other types of antennas in 'Loops vs Whips' *SWM* November 2001 and his review of the AOR LA-350 *SWM* November 2002.

It's my view, that for reception, the compactness and noise immunity of the active loop antenna makes it the prime candidate for collecting signals on all the bands below 30MHz.

A little research led me to such an active loop antenna designed by v.l.f. enthusiast and fellow WUN member Klaus Betke. Klaus' small v.l.f. loop antenna is intended for reception between 10 and 150kHz. Klaus say's that the design will work with reduced performance up to 600kHz. Originally the antenna was conceived mainly for quick direction finding of unidentified utility radio stations.

Klaus built his prototype for indoor use and I've followed the same premise. This is possible because it picks up much less noise from the mains than wire antennas, which are mostly useless indoors, in particular at frequencies below 50kHz.

Design Considerations

Receiving antennas can be characterised by their 'effective height' h_{eff}. The output voltage U for an electrical field strength E is then given by,

$$U = h_{eff} \times E$$

The effective height of a loop antenna is,

$$h_{eff} = (2\pi nAF\cos\varphi)/\lambda$$

where n is the number of turns, A is the loop area, λ is the wavelength, and φ is the angle between loop plane and transmitter. As can be seen, the loop's output voltage is inversely proportional to λ, and proportional to the frequency F.

In near field operation, it is the magnetic field that the loop senses, not the electrical field. But in the far field generated by a remote transmitting antenna - a condition that is usually met, electric and magnetic field vectors are simply related by a factor. This is the reason why the output voltage can be expressed in terms of the electrical field strength E.

At 30kHz, the effective height of a single turn loop of 1m diameter is only 0.5mm. This is very small compared to an E-field antenna of similar size: The theoretical value for a 1m vertical rod over a conducting surface is $h_{eff} = 0.5$ m. So why not increase the number of turns to, say, 1000? Unfortunately, the more turns, the larger the inductance L and hence the larger the inductive reactance $X_L = 2\pi FL$ in series with the 'generator' voltage U. In multi-turn loops, L increases by a factor of about $n^{1.8}$. Additionally, the inductance and the

loop's stray capacitance form a resonant circuit, which may limit the usable frequency range.

However, if the loop is connected to an amplifier with a very low input impedance, the inductance can be used to compensate for the U ~ F property. This topic was discussed thoroughly by Andy Ikin back in 'Receiving Loop Antennas' *SWM* October 1998 and the subject is also covered in depth in *Communications Receivers* [1]. You can also read Marco Bruno's thinking about 'Ideal Loops' at **www.vlf.it** If the amplifier's input resistance is less than the inductive reactance at the lowest frequency of intended use, the output voltage is independent of frequency. The low resistance also damps the stray parallel resonance to Q << 1. Due to the (almost) shortened loop inductance, this kind of antenna is completely insensitive to the E-field.

The loop I wound, shown in **Fig. 1**, has an inductance of 1.2mH and its resonance frequency is about 350kHz. At 10kHz, the reactance is 75Ω. With an amplifier input resistance between 30 and 100Ω, Klaus found the sensitivity to be insufficient for frequencies above 70kHz, compared to other active antennas, a Rohde & Schwarz HE-011 and a Wellbrook ALA1530 loop. For this reason, he chose a slightly different design. Instead of using a 'zero input impedance' amplifier, the loop is terminated by a load of a few kΩ - the observed gain lack was not caused by the amplifier; the circuit used in the first tests performed by Klaus had a flat frequency response up to well beyond 500kHz.

Fig. 1: The loop is wound with 40 turns and a has a diameter of 380mm.

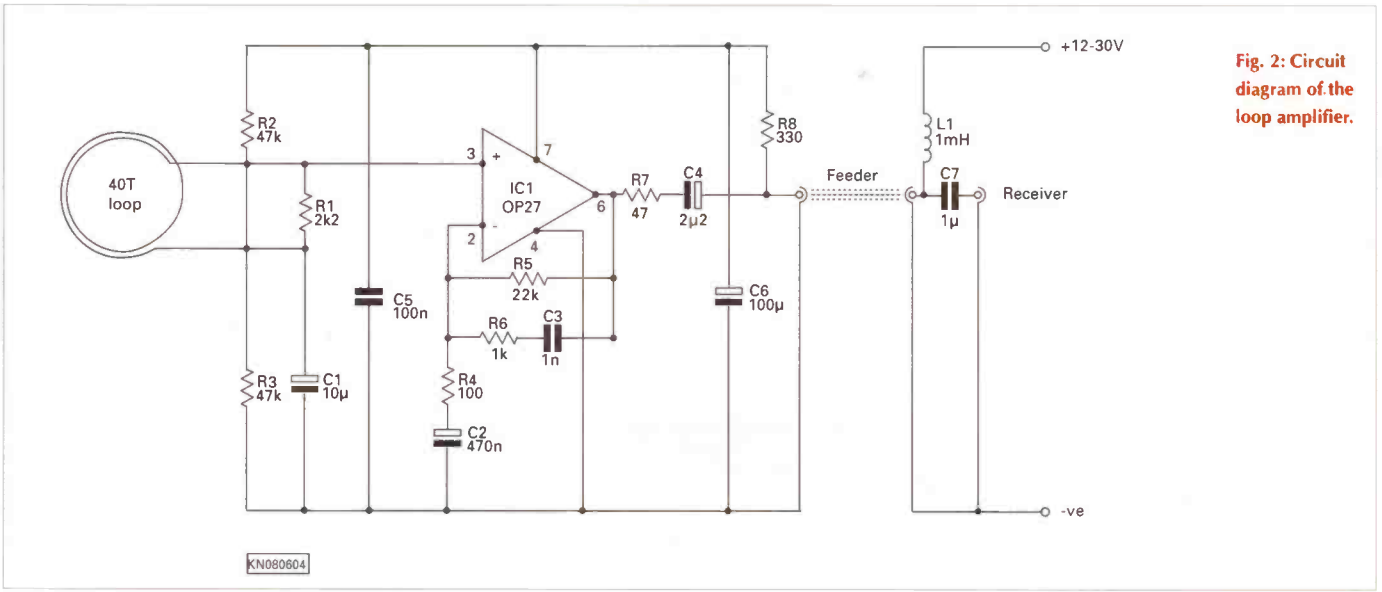


Fig. 2: Circuit diagram of the loop amplifier.

The Circuit

There is nothing special with the amplifier shown in **Fig. 2**. With the load resistance R1 = 2.2kΩ, the Q factor of the loop's inherent parallel resonance still fairly below 1, hence the resonance does not cause problems. The feedback circuit of R5, R6 and C3 makes the signal loss at low frequencies less severe. Since the antenna was intended for radio monitoring rather than for precise measurements, no further effort was taken to obtain a flat frequency response. Resistor R7 in series with the amplifier output ensures stability when using a long cable.

The amplifier can be powered remotely through the antenna cable by using a d.c. blocking circuit to isolate the receiver's antenna input. Klaus suggest the one included in **Fig. 2**. comprised of L1 and C7, but other power supplies for active antennas might do just as well I temporarily used a satellite LNB splitter I had lying around. Klaus stresses that a clean supply voltage is mandatory. So I checked my old Lab grade supply with the 'scope just to be sure.

Switching regulators (e.g. tapping the PC power supply) will usually cause problems, but linear power supplies can also be noisy. Integrated regulators like the LM317 or the 78xx series need a large capacitor of 1000µF or more at the input terminal to reduce the noise in the l.f. and v.l.f. range, in parallel to the common 100nF.

Building It

As can be seen from my rapidly built loop in **Fig. 1**, the construction need only be kept very simple. The loop has a diameter of about 400mm and 40 turns, which needed a little less than 50 metres of wire. Neither the diameter, the number of turns nor the exact shape are critical. The loop is easier to wind on some kind of former. Klaus used a box for example and then bent the antenna into a circular shape afterwards. I used a clay planter borrowed from the garden discovered after an extensive wander around with a tape measure. I happened to have 100m of Farnell's finest 24-strand pvc insulated wire with a bundled conductor diameter of just under 1mm. Thinner wire is acceptable too. Using 0.5mm wire, the inductance will increase by less than 20% and the

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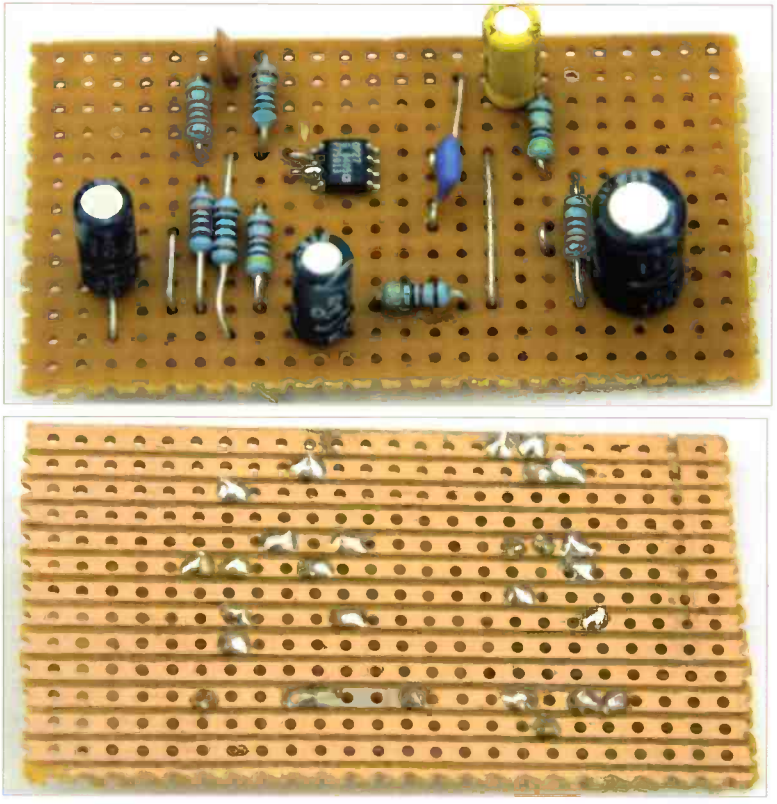

Fig. 3: The amplifier circuit partially assembled on Veroboard. Note the glued on SO8 version of the OP27.

resistance is still an inconsiderable factor. With thick wire, however, the antenna can be built without a supporting structure; the loop in **Fig. 1** is held together simply by cable ties. The amplifier was built on Veroboard - thanks for coming to the rescue Rob - with all wire ended components except for the Op amp - **Fig. 3**). I used an OP27 was chosen for IC1 mainly because Klaus used one in his prototype and I had an SMT sample lying around. Alternatives such as LT1028, or so-called audio op-amps like LM833 (a dual op-amp) Klaus says will probably also work. If I get some time I'll try some alternatives and report back, the whole antenna project has scope for refinement, should you wish to do so.

How It Performs

The results with this antenna do rather depend on the local noise floor. Klaus notes that he could hear Alpha navaid stations [2] Krasnodar and Novosibirsk on 14.88kHz, with the loop two arm lengths away from his computer. He reports that when the PC is off, the beeps are audible on the other two Alpha frequencies 11.9 and 12.65kHz as well. Below about 250kHz, his antenna had a very sharp bearing minima. You can at least distinguish whether a station is located in direction NW - SE or in NNW - SSE. A precise direction calibration down to the one degree level is pointless, not only due to the semi-rigid construction, but also due to the portable character of this antenna, since the directional accuracy strongly depends on the environment that the antenna is operated in. Klaus has observed that as a consequence of the non-zero termination resistance, the loop is a little sensitive to electrical field components and to capacitive coupling at higher frequencies, and above 250kHz, he says "the antenna slightly 'squints'". That is, taking bearings are still possible, but the angle between the two minima is not exactly 180°, and the antenna should be rotated by avoiding hand contact with the loop itself. Below about 100kHz though, the loop is completely insensitive to touching.

Unfortunately, I've run out of space for this visit to my relocated and somewhat smaller but improved shack. So I'll report back on my own findings with this intriguing v.l.f. antenna next month, when I'll also be looking at the other end of the spectrum with high gain antennas for 1.3 and 2.4GHz.

SWM

Fig.4: Absence of p.s.u. noise on trace.

References

[1] *Communications Receivers 2nd Ed.* by Rohde, Whitaker and Bucher ISBN 0-07-053608-2 McGraw-Hill.

[2] Trond Jacobsen: The Russian VLF Navaid System Alpha, RSDN-20. July 2000. See **www.vlf.it** July 2001 – Minor corrections October 2003.

Starting Out Part 3

Back due to reader demand, this month, we continue the rerun of the excellent beginner series from the past brought to you by the late Brian Oddy G3FEX.

A simple portable receiver with built-in whip antenna will enable anyone to explore the various s.w. bands allocated to international broadcasting and doing so for the first time is likely to be an interesting and exciting experience!

It will quickly become apparent that many hundreds of stations use these bands to reach listeners in distant lands during the day - in fact there are so many of them that tuning the receiver will require more care than needed on the medium and long wave bands if the stations are not to be missed. Many languages in addition to English are to be heard and identifying them will be intriguing and often difficult!

The name/callsign and the operating frequency of a short wave station is usually announced from time to time in several languages, many stations also use an interval signal or a few bars of a signature tune, or a bird call, as an aid to identity.

Some of the major broadcasters, such as the BBC, VoA and Radio Moscow transmit on several frequencies within a band and can also be found on other bands too. It will be noted that in contrast to the domestic broadcasts on m.w. and l.w., many of the s.w. transmissions take place only for a limited time on a particular frequency before the station either closes down or requests listeners to retune to another frequency.

Fading

Although many short wave stations can be clearly received, nearly all s.w. signals suffer from continual changes in strength called **fading**. Many of the frequencies are shared by several stations and sometimes **co-channel interference** exists, another problem, **adjacent channel interference** may arise when a strong signal exists on a frequency just above or below that of the weaker one wanted. These and other factors require some further consideration, so let us examine them now.

Selectivity

First, whereas domestic l.w. and m.w. stations are separated by 9kHz, this is reduced to 5kHz on the s.w. bands to allow more stations to make use of the available space. In order to be able to receive each station clearly and without channel interference, it is necessary for the receiver's tuned circuits to be sharply tuned to provide sufficient **selectivity** - though this means some reduction in the receiver's a.f. response. (This will be more fully explained in a future instalment of this series concerned with principles of the radio receiver). The audio response of the station transmitter is also tailored to avoid mutual interference.

One of the most noticeable effects on nearly all s.w. signals is fading. This is caused by the signals from a transmitter arriving at a receiver via two or more different paths, whose relative lengths are changing, there will be a varying relationship between the signals, consequently the overall signal level varies. Sometimes severe audio distortion occurs when a signal fades because the individual components of the signal (carrier and sidebands) do not fade equally at the same time. Fading may be fast or slow - the latter results in an audible low frequency flutter.

Sunspots

The nature of the ionosphere and the major importance of ionisation as a factor in international broadcasting has already been outlined in this series. Blemishes on the sun's surface, such as sun spots and invisible areas called 'M' regions tend to have a 27 day periodicity in their effects on ionisation as the sun takes 27 days to rotate on its axis. The number of sun spots present follow an 11 year cycle (minimum-maximum-minimum), see **Fig. 3.1**. In order to maximise reflection along a path to a chosen target area at a particular time of day, the frequency

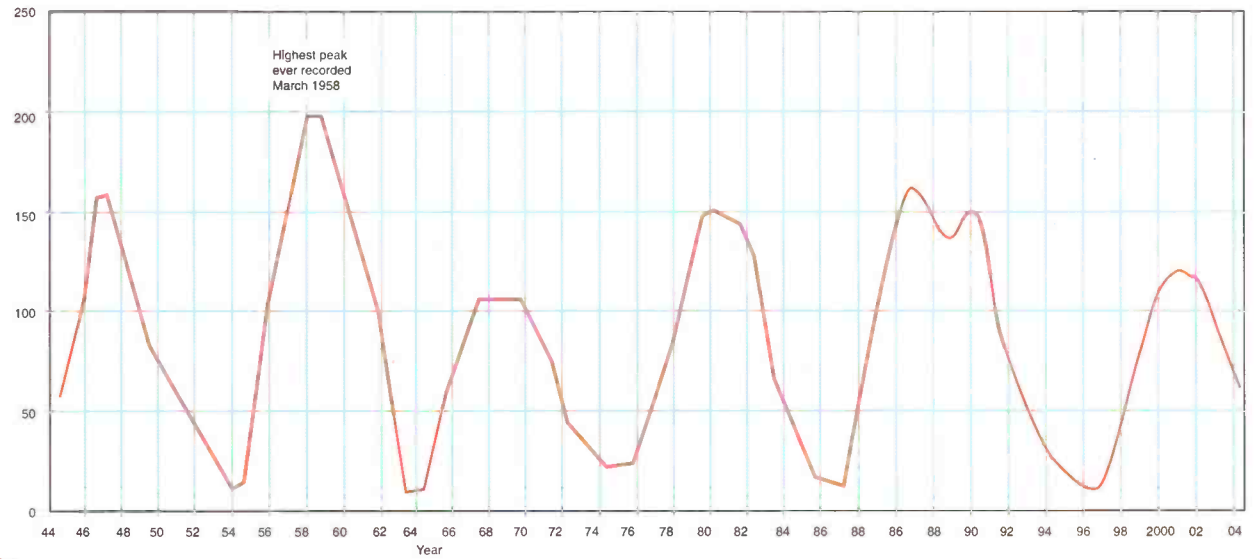

Fig. 3.1.

Starting Out
Part 3

has to be selected with care by broadcasters . When the ionisation levels change it may be necessary to change the frequency so as to maximise the reflection along the path, or perhaps broadcast in another more suitable area.

Schedules

Once the frequency and times of transmissions have been chosen for a particular target area, they form part of a **broadcast schedule**, which is normally adhered to during a specified period. Using the schedule it should be possible to receive the broadcast in the target area, but this is not always the case because of the variability of s.w. reception conditions. To overcome some of the problems of uncertainty, a broadcaster may well decide to transmit on two bands simultaneously to a chosen area, leaving the choice for best reception to the listener. If the programme is a long one, the broadcaster may well advise listeners to re-tune to a more suitable band.

Each s.w. band therefore has an important role to play in providing an international broadcast service. In general the 49m (6MHz), 41m (7MHz) and 25m (11MHz) bands would be selected for short and medium distances during daytime and for long distance use after dark. The 19m (15MHz), 16m (17MHz) and 13m (21MHz) bands are used for long distance daytime broadcasting, however, these are the bands most affected by solar events. The 19m band normally remains open from early morning until quite late at night - during sunspot maximum periods it may well remain open around the clock. The high levels of ionisation present during daylight are required for satisfactory propagation on the 16 and 13m bands, consequently, they tend to close soon after dark. During sunspot minimum periods, the 11m (25MHz) band is virtually unusable, but for a year or two either side of the maximum period, it is suitable for very long distance broadcasting to all continents.

So far we have only considered the effects of radiation from the sun on the ionosphere when it is said to be **quiet**. There are times, however, when the sun is **active** and the ionosphere is then liable to be subjected to a **sudden ionospheric disturbance**, or 's.i.d.' When an eruption or **solar flare** occurs on the surface of the sun, an intense emission of electromagnetic radiation occurs. The ultra-violet and X-ray radiation present may be so intense that the level of ionisation in the D-layer is increased to the point where it absorbs all radio waves before they can reach the higher reflecting F-layers and a **Dellinger fade-out** results - this causes a radio block out over all or part of the h.f. spectrum and may last for a few minutes, an hour or more!

Identification

One of the most important aspects of short wave listening is to be able to identify the signals received and then to keep accurate records about them for future use. Such records are traditionally kept in a log book, although many listeners now make use of a card index system or a computer database.

While broadcast schedules and station guides are of assistance, identification is not always a simple matter. The identity of a station is usually announced at the start of a transmission, but this may well be in a foreign language, furthermore the language may not relate to the country of origin, but to the chosen target area!

A good way to tackle the language problem is to record broadcasts from known foreign countries so that the sound pattern of an unrecognised language can be compared with them later. To that end, it is a good idea always to have a cassette recorder or PC running a suitable recording program, attached to your receiver when tuning around the bands. Many s.w. stations make use of interval signals as an aid to identity, and by making recordings of these sounds when they are radiated just prior to the start of a programme in your language, a library can be built up which can be used to identify a station when it is broadcasting in another language.

Line-Up Tones

Signal strength cannot be used as a clue to identity since it does not follow that a nearby s.w. station will be stronger than a distant one, that will depend on conditions prevailing at the time. However, some knowledge of the existing skip conditions may give a clue to the continent in which the transmitter is located in order to set up a s.w. transmitter before a broadcast an audio 'line-up' tone is often radiated and this may give a clue to the identity, for example, the BBC uses a 1kHz tone, whereas some other countries use 900 or 440Hz tones.

Tropical band broadcasts are often much more difficult to identify since they often consist of a balanced, continuous programme of speech, music, drama and news. By carefully listening for clock chimes preceding speech, both the time of the day and the type of chime may narrow the field considerably - although such clock time may well contain local summer or daylight saving time.

Having identified a station, it is necessary to note in the log its position within the s.w. band so that it may be either found again or referred to in the future, this is done by noting the frequency in megahertz. The broadcast frequency is usually announced by the station

Fig. 3.2:

UTC	(eastwards from the UK)
0001	UK
0100	Central Europe (Berlin, Geneva), Stockholm
0200	Eastern Europe, Cape Town, Cairo, Moscow
0300	Arabia, Ethiopia, Madagascar
0400	Mauritius, Ian, Reunion Island
0500	Central Russia, Bombay
0600	Calcutta, Tibet
0700	Sumatra, Thailand, Laos
0800	Philippines, Perth
0900	Japan
1000	Eastern. Australia, (Melbourne, Sydney)
1100	New California, New Zealand
1200	International date line: Fiji

UTC	(westwards from the UK)
2359	UK
2300	Iceland, Canary Islands
2200	Azores
2100	Greenland, Rio de Janeiro, Brazil
2000	Argentina, Nova Scotia
1900	Montreal, New York, Peru
1800	Chicago, Costa Rica
1700	Calgary, Denver, Phoenix
1600	Los Angeles, Seattle, Juneau
1500	Eastern Alaska, Dawson
1400	Hawauu, Midway Island
1300	Nome, Alaska, Samoa
1200	International date line: Fiji

at hourly intervals. (Note: some stations give their frequencies in kilohertz, but it is a simple matter to convert them to megahertz - see 'Starting Out', *SWM* May 2004). It is of course possible to look up a station's exact operating frequency for a chosen time in its schedule, or in a station or frequency guide book, but these must be up-to-date! As a tuning/logging aid it may be helpful to remember that s.w. stations are generally spaced 5kHz apart.

Many older receivers do not have an accurate frequency display and so tuning to the frequency given in a broadcast (BC) schedule or finding a particular station again later, can present a problem this is obviously is not a problem with digital synthesised receivers. Although the wave change switch on some older analogue dial receivers may only have one s.w. position, several s.w. bands may be covered by this setting. Such receivers are often fitted with a simple pointer and a single scale which is clearly marked in megahertz, but usually lack any serious attempt at calibration, except for a few meaningless dots or coloured blocks, the stations appear to be very close together when tuning across a scale of this nature.

Some of the better receiver designs with analogue displays incorporate several s.w. ranges, each being selected by the wave change switch and each s.w. band then being electrically spared out across the dial. The calibration of these **bandspread scales** is usually more detailed but is nevertheless often still inaccurate, leading to confusion! In addition to these scales, a **logging scale** is often provided, which usually has a linear scale of 0 to 100. Although it may be used to simply log the position of the pointer, it may also be employed to prepare a set of graphs which will provide a reasonably accurate frequency calibration for the receiver, especially when bandspread scales are utilised in the design, see Appendix.

Time Zones

It is also necessary to note the time of a particular broadcast. When tuning around the s.w. bands, remember that time differences are not just restricted to the time of day - it may be summer in one country and winter in another! Remember too that some countries are so vast that they have introduced **time zones** to take account of time differences between their eastern and western boundaries, for example, the USA has four such zones.

Civil time in the UK is, of course, **Greenwich Mean Time (GMT)** which is derived from observations of the sun's transit over the Greenwich Meridian located at longitude 0 degrees, **British Summer Time (BST)** is one hour ahead of GMT. Some idea of the time of day in other countries in relation to GMT is given in **Fig. 3.2**.

Universal Time

Looking at the time problem from the broadcaster's point of view, it is important that they can quote a time in their schedules which is universally understood. Because of the difficulty in converting from one time to another the ITU established a universal time standard called

Fig. 3.3: Standard Time Stations.

Station	MHz	kW
MSF Rugby, England	0.060 (60kHz)	15
WWV Fort Collins, USA	2.500	2.5
	5.00	10
	10.000	10
	15.000	10
	20.000	2.5
CHU Ottawa, Canada	3.330	3
	7.335	3
	14.670	10

Universal Time Co-ordinated (UTC). For most practical purposes it is similar to GMT except that it is a 24 hour clock system and once a clock is set to UTC it is never altered. To avoid confusion with one's local time, it is a good idea to have a 24 hour clock showing UTC permanently near the your receiving set-up. This clock may be set anywhere in the world to UTC by making use of one of the special time/frequency standard transmissions detailed in **Fig. 3.3** or by listening to one of the s.w. broadcast stations (the BBC World Service frequently announces the time in UTC during the day). When writing to a s.w. station be sure to give all times in UTC - and that applies to your reports for 'LM&S' too.

Tuning Older Sets

The known frequencies of some of the BC stations and the logging scale on a receiver may be used to prepare a set of reasonably accurate calibration graphs. If a logging scale is not provided, but a strip of paper to exactly the length of the receiver scale, stick it on the dial and mark it with a linear scale from 0 to 100. Using a sheet to metric graph paper (5mm squares) enter along the horizontal axis a scale incorporating 50 such squares to provide, effectively a linear scale 0 to 100 which then becomes the receiver logging scale. If the receiver has only one s.w. range, mark on the vertical axis of the graph 1MHz step at each line forming every other square. If the receiver has bandspread scales, prepare a separate sheet for each band and mark the vertical axis in steps of 100 or 50kHz at every fifth square.

Using these axis plot a number of known station frequencies against logging scale readings by marking in crosses and then joining them up with a line, this line may not be straight, but curved, depending upon the characteristics of the receiver's tuned circuits. If these graphs have been drawn with care, it will be possible to read off the frequency of an unknown station simply by checking its logging scale reading against the graph, conversely, it will be possible to set the receiver to a particular frequency by looking up the logging scale setting on the graph.

Starting Out

Next time...

In the next installment of Starting Out we look at reporting and verification of reports by QSL cards. Additionally, we discuss the difference between direct and relayed broadcasts.

In Next Month's Radio Active...

radio ACTIVE

Introducing You to Hobby Radio

RADIO ACTIVE July ISSUE ON SALE 18th June 2004

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- **Tried & Tested**
  Roberts RD6 Tabletop DAB Radio
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- **Scanning Antennas**
  How to get the best results
- **What Does it Mean?**
  Your jargon guide

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RIAT 2004 Competition Winners

Congratulation to the following ten winners who will soon be receiveing their prize tickets worth a total of £700! kindly donated by the RIAT organisers.

Fred Wilmhurst, Northampton
John Stacey, Devon
Derek Thomas, Hants
Philip Mulhaire, Ireland
Terence Howell, Manchester
Reginald Thomas, Hertfordshire
Lee Standley, Manchester
David John Cruttendew, E. Sussex
John Escreet, E. Yorkshire
Richard Hyland, Dorset

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This year's Royal International Air Tattoo will be held at Fairford in Gloucestershire between July 17 & 18 2004

For more RIAT 2004 information, please see the free magazine presented with this issue of *Short Wave Magazine*.

SSB Utilities

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Logbow Blackhawk helicopter flown by the 1st Bat. 106th in Iraq.

They are sometimes a little overweight, they generally smoke large cigars and often are rather fond of Rye whisky. They are doctors, dentists, business executives and lawyers and they have seen combat in almost every war that the United States has been involved in since Vietnam.

In Peoria, Illinois Larry Evans is the chief of the Criminal Division of the local State's Attorneys' Office. He flew Bell UH-1 Iroqois (Huey) helicopters in Vietnam and Apaches in Bosnia. In Iraq Chief Warrant Evans drives a Blackhawk chopper.

Evans (55) is part of the 1st Battalion of the 106th National Guard Regiment currently based at Camp Anaconda located at Balat Airfield some 72km out of Baghdad.

In all the Illinois National Guard have 30 Blackhawk helicopters deployed in the region and they are mostly flown by seasoned pilots, such as Larry Evans.

Although the pilots flew into Anaconda, their support staff had to make the trip by land, the journey taking three days from Kuwait, arriving in mid March. They received a mixed reception from the locals as they negotiated the heavy Baghdad traffic.

Other Air National Guard Units are in the Iraq theatre and these include the 185th Air Refuelling Wing of the Iowa Air National Guard and many others. These units and ground forces deployed in the region make extensive use of their h.f. radios. Although mostly using the Automatic Link Establishment system some transmissions have been 'in the clear'.

Big users of the system are the United States' 1st Infantry Division (also known as 'The Big Red One') who in addition to their normal operations have donated ambulances to the Iraqi medical services. Many of the US forces in Iraq are using 10.408MHz u.s.b. with ALE and transmissions on 5.809MHz have also been monitored.

Map showing Balad airbase (camp anaconda) - their ops base.

Crowded Country

As the generations have passed, most inhabitants of the United Kingdom have become used to living cheek by jowl with their neighbours. With a population density of 241 people per square kilometre, Britain is one of the most crowded countries in the world.

Communications infrastructure is therefore easy to supply and maintain and one transmitter or cellphone base site can cover many thousands of users. This makes personal communications inexpensive. Just look at the number of people who have 'mobiles' clamped to an ear as they walk through a high street or shopping centre. This is only possible because such mobile 'phones are cheap to buy and run.

Contrast this rather sorry and full state of affairs with Australia. A land many times larger than ours it has a population density of just two people per square kilometre. Australian cities and towns benefit from mobile 'phone coverage but most of Australia is a remote land of harsh climate and unforgiving territory.

In this sort of place there is only one practical solution and that is h.f. radio. Australia is a land of mines, cattle stations and other isolated communities and now, as in the past, h.f. s.s.b. radio has provided a vital life line as well as social benefits to the occupants of these wild homesteads. Some possess satellite telephones, but h.f. remains a very practical option.

The Australian Outpost Radio Service is an h.f. network monitored by the Royal Flying Doctor Service. The network exists to provide emergency communications to these people and, in addition, a 'phone patch service is also available.

Upper side band (u.s.b.) is used and radios are restricted to a maximum power output of 100W. In the Northern Territory the following frequencies are in use. From Darwin (callsign VJY) 2.360, 4.010, 6.840 and 7.975MHz. Alice Springs (VJD) monitors 2.020, 5.410 and 6.950. In Western Australia there are five monitoring stations. Derby (VJB) who listen on 2.792, 5.300 and 6.945MHz. Port Headland (VKL) stand by on 2.280, 4.030 and 6.960 while Carnarvon (VJT) are on 2.280, 4.045 and 6.890. Meekatharra (VKJ) listen to 2.280, 4.010, 4.880 and 11.466MHz. Kalgoorlie (VJQ) is slightly busier and they have 2.656, 5.360, 6.825 and a duplex pair at 8.144 and 7.550.

The only monitoring post in South Australia is at Port Augusta (VNZ) and they have 2.020, 4.010, 6.890 and 8.165. Queensland boasts three stations at Cairns (VJN) Mount Isa (VJI) and VJJ at Charleville. Between then they listen on 2.020, 2.260, 4.980, 5.110, 5.145, 6.845, 6.890, 6.965, 7.465 and 8.165.

Finally, VJC at Broken Hill, New South Wales listen to 2.020, 4.055 and 6.920. In addition to these, land and marine Radiophone channels are on 4.354 simplex and the following duplex channels.

MHz	MHz
6.552	6.221
13.476	12.329
17.356	16.483
22.822	22.126

All frequencies are in MHz and all are u.s.b.

Outpost Service

Motorists are adventurous in Oz and they are not hesitant in getting into their cars, campers and trucks and getting out to see their country. Being sensible outdoor types they would fix Outpost radio equipment in their vehicles and use some of the frequencies allocated to the Outpost Service. This caused a certain amount of conflict and as a result, in 1993, a pragmatic Australian Government allocated frequencies for the use of mobiles travelling in the remote regions.

The Australian National 4WD Radio Network Incorporated (VKS-737 Radio Network) was established to provide a service that is constantly being updated and expanded. Position reporting and safety logging are part of the daily routine for control operators. The VKS-737 network has bases at Adelaide, Alice Springs, Cairns, Charters Towers, Derby, Darwin, Newcastle, Sandstone and St. Mary's in Tasmania. All the radio bases can be remotely controlled.

To use the system one has to pay an annual membership fee. Clubs, societies and organisations that are affiliated to VKS-737 pay a slightly reduced amount. Regular weather reports including fire warnings are broadcast daily as are road condition reports.

With some police departments and National Parks vehicles and offices carrying VKS-737 sets, the access to emergency services has never been better for the outback traveller. Daily schedules are held and this allows motorists to report their position and their forthcoming travel plans.

All in all the system provides a valuable and reassuring safety net for wanderers in the wild areas of Australia.

The frequencies in use are:-

Channel	MHz
Channel 1	5.455
Channel 2	8.022
Channel 3	11.612
Channel 4	14.977
Channel 5	3.995

I would suggest that the best time to hear any of the stations operating in Australia would be at about dawn in the UK in the 5, 6 and 7MHz frequencies and during the morning hours for the higher 11MHz and up frequencies. Just because these transmissions originate from the other side of the world doesn't mean they will never be monitored in Europe. They also have the added advantage to the British monitor that communications take place in the English language.

DX Television

- **Keith Hamer & Garry Smith**
  17 Collingham Gardens, Derby DE22 4FS
- **E-mail**: dxtv@pwpublishing.ltd.uk **Web Site:** www.test-cards.fsnet.co.uk

Fig. 1: A fiery beginning! The Spanish TVE-1 station opening caption used in the 80s. As well as the time, the transmission number was also included.

Long-distance TV reception during April showed a magnificent recovery following the r.f. drought since the start of the year. Sporadic-E (Sp-E) activity towards the end of the month brought renewed optimism about the forthcoming DXTV Season.

Reception Reports

The first major Sp-E opening occurred during the late afternoon on the 23rd. At around 1630, **Peter Barber** (Coventry) became aware of pictures on R1 and R2, the latter sporting a stylised '2' logo which was possibly from Rumania. From 1722, **Stephen Michie** (Bristol) logged Lithuania R2, Belarus R2, Hungary with RTL Klub R2 and MTV-1 R1. At 1815, **Tony Jones** (Basildon) received strong pictures on E2 with what appeared to be a logo with an 'RT1' logo.

On the 27th, a lunchtime path into Italy was established with Peter Barber receiving TVA on Channel A. RAI UNO was monitored in Derby from 1330 on Channels A and B. At 1354, Stephen Michie encountered a serial or film from SF-1 Switzerland on E2 and later E3, with a finale from RAI UNO on Channel A at 1419.

Stephen encountered a short-lived opening the previous day at 1548 with a glimpse of the G-204 test card on R2 from an unknown source. Peter encountered Italian signals again on the 28th with RAI UNO on Channel A at 1036. Between 1400 and 1630, Spanish programmes occupied E2 and E3 with further sightings the following day from 1049.

Tony Jones reports that the opening on the 28th continued into the evening with colour and sound from the Rumanian First Network on R1 from a transmitter in Moldova.

Tropospheric DX

On the 24th, **Simon Hockenhull** encountered a small tropospheric lift at 0815 with Crystal Palace TV and Wrotham FM broadcasts extending into Bristol. Living in the south-east, and closer to the Continent, DXing in Band III and on u.h.f. has been plentiful for Tony Jones with Dutch and Belgian programmes virtually 'on tap'. On the 27th, the Belgian VRT-2 service from Egem on E43 swamped the local Bluebell Hill ITV transmissions.

BBC West Globes

Stephen Michie points out that the photograph of the BBC-1 West Globe Symbol which we featured in the February log dates from September 1976. Recently the *Radio Times* ran a less-than-accurate article to celebrate 40 years of BBC-2. Archive Ident symbols were featured but several transmission dates were incorrect!

Spanish Closure Dates

Roger Bunney (Romsey) has supplied details relating to the closure of the remaining Spanish v.h.f. TV transmitters. Madrid E2, Sollube E4 and Santiago E4 are all to close on 30 June with Aitana lingering on until October 31. Most of the remaining Band III outlets will switch off this year but relays at Paramo E9 and Domayo E10 are set to close at the end of 2011!

New Middle East outlet

An E-mail from **Lt. Col. Rana Roy** (India) indicates that Al Jazeera TV has established a terrestrial outlet on Channel E2. The new transmitter is thought to be located in northern Syria close to the Iraqi border.

DVB-T Allocations

Gösta van der Linden (Netherlands) has sent details of the DVB-T multiplex allocations used by Digitenne, the Dutch digital service. The network is based on a single frequency network (SFN) although there are slight deviations in channel allocations in some areas. Most transmitters have been allotted channels E21, E23, E34, E57 and E64 with e.r.p.s generally of between 5 and 10kW. Lopik has an additional 'A' multiplex on E33.

How well a single-frequency network will work in overlap areas remains to be seen. In the United Kingdom, Sutton Coldfield digital viewers in elevated parts of Great Malvern were deprived of their service when the Great Malvern channels were reorganised and allocated the same frequencies on five of the multiplexes!

The Dutch digital channels allocated are clear of analogue broadcasts, unlike in the UK where the whole spectrum from E21 to E68 (apart from non-TV channels E36, E37 and E38) supports both the analogue and digital services with consequential channel sharing and all its inherent problems. There are still many unsolved interference situations throughout the UK where viewers have a legacy of degraded pictures on some channels due to the presence of co-channel digital multiplexes. The Tunbridge Wells service area in Kent is a classic example where widespread degradation exists from Heathfield digital where Multiplexes B and D pollute BBC-1 (Ch41) and Channel 4 (Ch47).

Fig. 2: A regional Spanish caption shown via the E3 transmitter for lunchtime opt-outs.

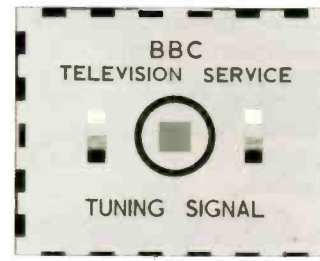


Fig. 3: The tuning signal caption card used when the BBC Television Service resumed after the Second World War on 7 June 1946.

George Garden (Edinburgh) has noticed that the reception of ITV Border on Channel E59 from Selkirk is well below that of the Channel 5 signal from the same site, even though they are both 50kW e.r.p. The ITV channel on E59 is shared with the 2kW digital multiplex from the Angus transmitter near Dundee and the 10kW digital multiplex from Pontop Pike. The effects are similar to weak signals, i.e. grainy pictures and in some cases corrupted teletext.

In the Derby area, during lift conditions, the local Waltham channels become extremely grainy with loss of colour and text due to the co-channel digital multiplexes from Tacolneston. It will be interesting to see if the Dutch digital signals on E64 have any impact on Tacolneston MUX D (or vice-versa) or whether the E33 Lopik allocation pollutes Crystal Palace BBC-2!

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 visited on the internet at **www.test-cards.fsnet.co.uk**

WR-G313i

High Performance HF Receiver

- **9 kHz-30 MHz frequency range**
  (optionally extendable to 180 MHz)
- **Software-defined DSP demodulation**
- **Excellent sensitivity**
- **High dynamic range**
- **Continuously adjustable IF bandwidth**
- **Excellent suppression of internal spurii**
- **Real-time spetrum analyzer**
- **Graphical IF shift and notch filter**
- **Noise blanker**
- **Audio and IF recording and playback**
- **Test and measurement facilities**

The WiNRADiO WR-G313i receiver is a software-defined high-performance HF receiver (9 kHz to 30 MHz, optionally extendable to 180 MHz) on a PCI card. The front-end is a DDS-based double-conversion superhet, the last IF stage is implemented in software resident in the on-board DSP.

This receiver is intended for government, military, security, industrial, surveillance, broadcast monitoring, and demanding consumer applications.

The receiver is extremely sensitive, making it possible to comfortably read CW signals well under -130 dBm input levels, 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, µV 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.

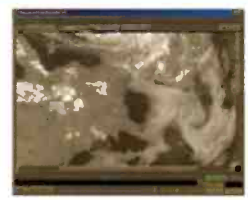
As the last IF and demodulation processing are entirely software-defined, this means that additional demodulation or decoding modes can be easily added by a mere software change.

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 extracting a weak signal with different filter settings for the best reception.

Apart from the antenna and audio leads, there are no other interface or power supplies cables - no clutter on your desk. Every modern desktop computer can be converted into a powerful HF monitoring station with minimum fuss.

Visit www.winradio.com for our huge range of PC-based receivers, software, antennas and accessories.

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Propagation

Forecasts

- *Jacques D'Avignon VE3VJA*
- ***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.

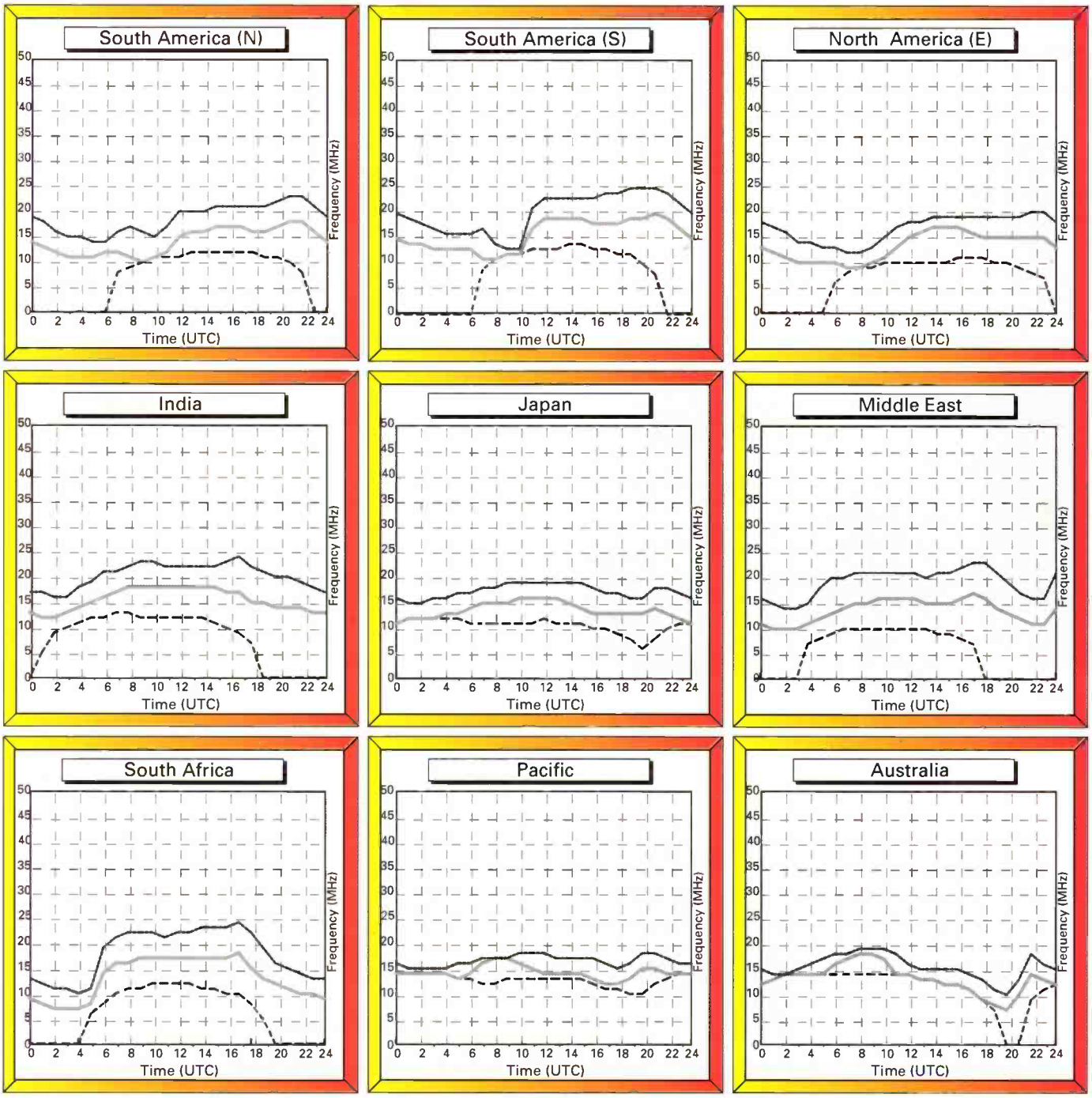
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

July 2004
Circuits to London



SK10035

Propagation Extra

- **Kevin Nice** G7TZC, M3SWM, SWM Editorial Offices, Broadstone
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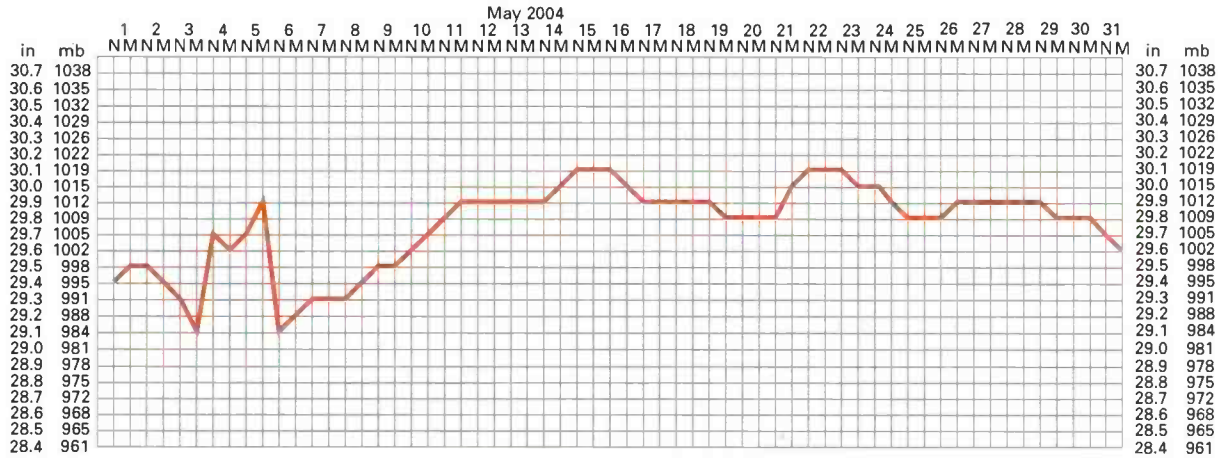
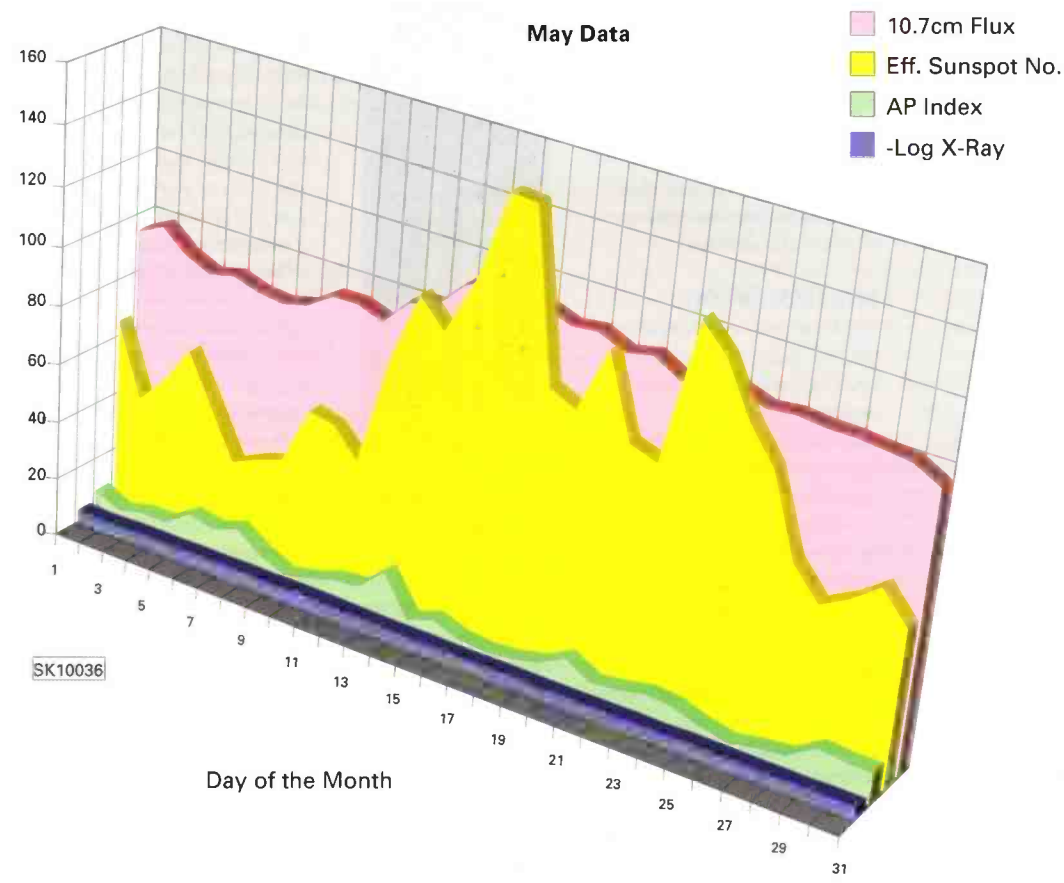
Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, May 2004





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.

Decode

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As promised more on audio levels for this month. I'll give you some tips on how to get the best from your soundcard and decoding software. But first, I'll just recap from last month, when you will remember that I described the analogue to digital conversion process and explained how the digital bits are apportioned to the audio signal. Whilst analogue to digital conversion is very sophisticated, it is also very unforgiving and overload causes clipping and distortion of the signal. This is a very common source of decoding problems as the onset of clipping will cause an immediate and severe increase in the number of errors.

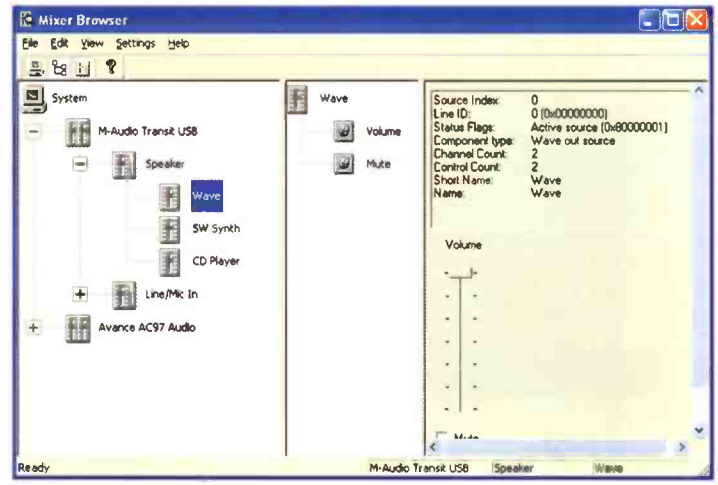
Avoiding the problem is relatively straightforward and depends very much on the software you're running. If your decoding package has built-in audio level meters, please make sure you use them and don't be tempted to run the levels too high - it doesn't help. If your decoder doesn't have level meters or you would like to get a little more sophisticated, there are some alternatives.

My favourite, and one of the simplest, is **Paul Marshall**'s *PPM*. This simple, but very effective, level meter is based on the Peak Programme Meter system that was developed by the BBC for monitoring broadcast signals. The special feature of the *PPM* is the way in which it captures and displays peaks in the signal level. The original design was based around electromechanical meter movements and provided some much needed standardisation in the way the needle responded to short peaks. This same thinking can be applied to computer barograph displays, hence Paul Marshall's *PPM*.

As well as being very effective, the *PPM* is a very compact program that is also very easy to read and is available as 'freeware'. The download is very small and is supplied as a 180KB zip file. There's no installer - you just unzip the program file to a folder of your choice and double-click to run it. You can get the latest version of *PPM* from the following link:

www.darkwood.demon.co.uk/PC/meter.html

When you run the *PPM* program for the first time, I suggest you make a few minor changes to the set-up. To do this right click on the meter scale whilst the meter is running - this will open the configuration screen. With this open set the Scale to show 'dB' and the Label to show 'LR' and click ok. If you now connect your receiver and tune into a utility signal you should see the green bars of the display start to respond. Next you need to open the audio mixer and adjust the record level control, which is best done by double clicking the speaker icon on the task bar and choosing 'Options - Recording' and clicking 'ok'. You should then see the Record levels control panel. With the appropriate input selected you can slide the volume slider up and down and see the reaction on the *PPM*. When adjusting the record level, it's important to make sure you're tuned to a healthy utility signal as noise is often louder. You should adjust the record level so that the red 'Over' indicator only flashes very occasionally. That completes the set-up and you should now be able to use your decoder without any fear of overload.



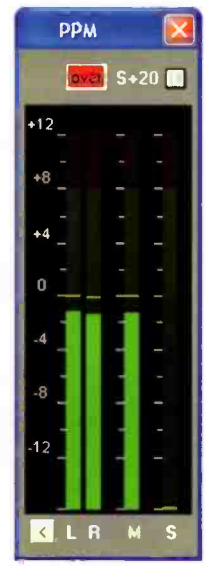
The excellent Mixer Browser for sophisticated mixer control .

Save Those Settings

The level setting process I've described so far is pretty straightforward, but you wouldn't want to do that every time you start your decoder! One of the problems you may encounter arises from software that accesses the Windows Mixer settings, but doesn't return the original values when the program closes! This is extremely irritating, but there are ways around the problem. One of the neatest solutions is to use **Martin Saxon**'s *Quickmix*. This is a very neat freeware package that provides a quick way to store and recall mixer settings. The program is available from Martin's website at:

www.ptpart.co.uk/quickmix/

This is also a very compact 350KB package, *Quickmix* even includes an installation routine so it's very quick and easy to get going. To make use of the program you first have to get your mixer settings right using the process I described earlier. When you've completed this, you run the program and choose 'save' to save the current settings. To restore them later you just run the program again and choose 'load' from the menu. If you want an even quicker method you can perform the operation from a command line or short cut.



Accurate level monitoring using *PPM*.

Here's how to use the program from a command line. Assuming *QuickMix* is stored in its default location, the command line to load settings stored in a file named decoder.qmx, to be found as follows: 'C:\Program Files\QuickMix\QuickMix decoder.qmx' It really is that easy! If you want a more sophisticated solution that lets you choose and set multiple soundcards then *Mixer Browser* is the program to go for. Again, this application is available as freeware on the Internet at the following site:

http://ilmari.siba.fi/users/pdonner/mixerbrowser.htm As you can see from the screen shots, *Mixer Browser* provides full access to the mixer panels and adjustments of all your installed soundcards. Like *QuickMix, Mixer Browser* can be started from a command line for speed of use - full details are in the documentation on the website, should you need it.

Speaker Outputs

By far the best way to get a signal from your receiver to the computer is to use the 'Line out' and 'line in' connections respectively. However, some receivers don't have a 'line out' connection and you are forced to use the headphone or external speaker jack. In these cases it's vitally important that you avoid the mic input on the soundcard or you'll experience severe overload. Stick to the 'line in' on the soundcard as this has its volume control placed before any active electronics. The other problem with using a speaker or headphone output is that you can't generally hear the receiver. There are a couple of ways around this. You can use your soundcard and PC speakers to listen to the audio, but this may not work with some decoding systems.

An alternative to listen to the signal, is to use a simple hardware solution. This requires the use of a 'Y' adaptor with one 3.5mm plug and two 3.5mm sockets wired in parallel. In use, such a 'Y' adaptor plug connects to the external speaker socket and the lead to the PC uses one of the 3.5mm sockets. The remaining socket is used to supply an external speaker. With this system you can listen to the receiver whilst decoding. You do need to remember that any changes in the volume control directly affect the level being fed to the computer, so the level set-up becomes more complicated. The *PPM* program I described earlier can be really helpful to keep the levels under control.

Microphone Inputs

Finally, a point that needs to be stressed - don't use microphone inputs if you can possibly avoid it. 'Mic' inputs are prime sources of overload, mainly because most soundcards employ a small amplifier between the microphone input and the main level controls. As a result, the level controls only reduce the volume after the damage has been done!

Non-Internet Purchasing

Several readers have written regarding the availability of software by post rather than via the Internet. This is a valid request and one that's getting evermore difficult to source. The latest enquiry related to getting hold of **AirNav Systems** software. Fortunately this is an easy one as they offer a postal and FAX service to their customers. If you want to contact them they can be found at the following address: **AirNav Systems LLC, 14221 Dallas Parkway, Suite 1500 #11, Dallas, TX 75254, USA, FAX - 1-214-242-2666.**

Another good bet for a wide range of decoding software is **Pervisell** in High Wycombe. Their contact details are as follows: **8 Temple End, High Wycombe, Bucks, England, HP13 5DR, Tel: (01494) 443033 or FAX: (01494) 448236.**

Next Month

Next month I'm planning to take a look at Automatic Link Establishment (ALE) and I've just about got space for a quick introduction now. ALE is now well established in military and government circles as an excellent system for restoring the credibility and usefulness of h.f. radio links. Until ALE came along, h.f. radio seemed to be gradually fading out of use, but the increased reliability offered by ALE has given h.f a new lease of life. Let's take a look at the problems with h.f. and the solution offered by the use of ALE.

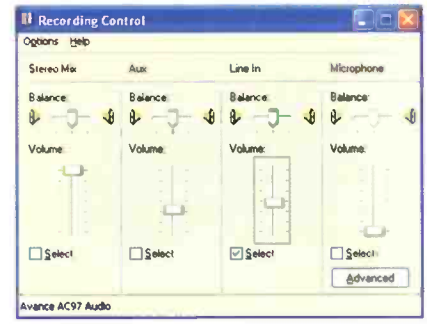
Whilst it is possible to use h.f. radio to communicate over incredible distances using very low power, there's a stack of variables that can make these communications very unreliable. The overriding problem is dealing with the ever changing propagation conditions. Predicting ionospheric conditions is a science in itself and is probably even more difficult than forecasting British weather! There is a huge volume of propagation information available, but it still demands an experienced radio operator to monitor a radio link and adjust frequencies and antennas to keep the link active.

The use of ALE is a very advanced station control package that overcomes the need for propagation forecasting. Instead of trying to predict the conditions and then choose the appropriate band, ALE controllers continuously monitor a wide range of frequencies and keep a record of the current link qualities.

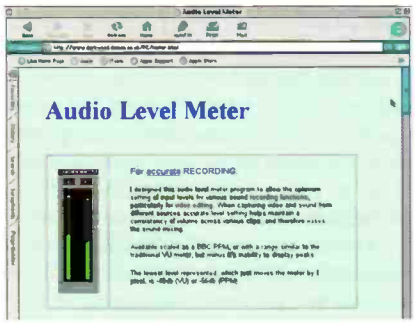
Let's look at a typical set-up to see how it works. Let's assume we have a network of multi-band radio stations based in the USA, Africa and India. With ALE controllers installed, each station will send regular 'sounding' signals on all of the available frequencies. The listening stations will note the reception and keep a record of the signal quality. If the network operator in the USA needed to contact the Africa office, the ALE system would check the latest sounding report and very quickly select the frequency that gave the best quality on the last sounding. Using this simple technique ensures that the best link is automatically and very quickly selected without the need for a specialised radio operator.

Not only are the ALE links interesting to try and decode, but they can also provide useful propagation information. Using information that's available on the Internet it's possible to identify many of the ALE links and you can use the soundings to spot the best frequencies for a particular country. So, I'll be providing you with some more information on this next month.

Quickmix - the easy way to save audio set-ups.



Typical Windows Record Mixer.



Paul Marshall's site where you can download *PPM*.

AirNav Systems' home-page.

Sky High

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After the large amounts of information in recent months regarding all the airspace changes a real mix of information this month. As always thanks to all my correspondents, please note that all replies will be through the column, I am sorry I cannot answer readers personally.

London Control-Military

It is now expected that London Terminal Control (TC), will move from West Drayton to the London Area Control Centre (LACC), at Swanwick within three to four years. London Military is also to move to Swanwick to join the London Joint Area Organisation (LJAO), the expected timescale for this is less than three years with London Military West moving first, with East following a short time later.

There is still no definite news on introducing 8.33kHz spacing to London Control, but it's still expected to see the first 8.33kHz channel before the end of the year. The work still continues to install the new equipment and my source suggests that 127.425 - London Upper East Sector **might** be the first to change - time will tell. Thanks to my anonymous correspondent.

Fruity Exercise

Two readers report what appears to be a small domestic exercise between the 23 and 25th March. The aircraft involved were Coltishall Jaguars, (BLACKCAT, BOXER and TURBO), 9 Squadron Tornado, (VEGAS) and 1/3/4 Squadron Harriers, (BOXCAR, PSYCHO, RUBIC, NIGHTOWL). They were working with an AWACS and the interesting thing about this is that the Forward Air Control (FAC), frequencies that they were using all had 'fruit' designators attached to them, what follows is a list of the designators in use and the frequencies that were linked to them.

A typical piece of RT used by the MAGIC working VEGAS 02, 'You are cleared to chop as required, confirm you are going to GFAC PLUM 10' or MAGIC 66 to boxer, work DELTA 10 on APPLE 21. If no joy, try PLUM 10.

APPLE 21	Not noted	DELTA 10
APPLE 31	241.7	DELTA 21
APPLE 41	246.975	DELTA 70?
APPLE 51	248.3	
PLUM 10	Not noted	
PLUM 11	257.2	DELTA 61
PLUM 12	Not noted	DELTA 31
PLUM 13	281.8	

It was also noted that some of the frequencies also had a DELTA reference linked to them and these are also shown in the list. The AWACS was using terms such as, 'emergency CAS DELTA 40'. Sadly, not all of the frequencies were identified during the exercise, does anyone know of any more frequency tie-ups or heard these fruit/Delta designators used before?

Tactical Leadership Program

Last month I reported that I had picked up some faint air-to-air chatter on 291.85 but could not identify the aircraft. An E-mail from **Martin** in Cromer, (Norfolk), may give a clue, he writes: After reading your column I included 291.85 in the scan and got nothing for a week or two and then I had a hit on the 13 May. I had been listening to the various TLP traffic and on the 13th I was monitoring VODKA flight on one of the primary AWACS/TLP frequencies in use that day which was 374.3, the aircraft sounded like Dutch F-16s. They were handed off by the AWACS to 291.85, but unfortunately I could not identify the frequency, could it be a TLP air-to-air or perhaps a Dutch Military discrete frequency? (TLP is Tactical Leadership Programme operated out of Florennes in Belgium).

Your readers might like to know that I monitored the following during four days of listening to the TLP aircraft. The AWACS, (Magic 60, 70 and 93), worked traffic on the primary TLP frequencies of 233.85, 263.025 and 374.3, the secondary frequency appeared to be 358.275. Callsigns noted were BORIS, DISCO, FALCON, FOZZY, GONZO, HORNET, KERMIT, KODAK, MIG, PASTIS, RAZOR, RICARD, ROMA, STUKA, TORO and VODKA. Plus of course the primary TLP callsign IGLU. (For reference, other TLP/AWACS control frequencies noted in the past couple of years are: 231.8, 233.95, 241.575, 355.775 and 363.0).

A brief history of the Tactical Leadership Programme for 'Sky High' readers - it was identified back in the seventies that allied/NATO air-arms were most likely going to fight together in the future, (how right they were). Consequently, the main principle behind the TLP and indeed a logical progression was that it would be a good idea for the allied countries to train together in many forms of air combat and so the TLP course was born.

Originally planned for the air forces of Belgium, Canada, the Netherlands, UK and the USA it has now expanded to include several new countries, (some as guests), including Denmark, France, Greece, Italy, Portugal and Spain. Once their European based aircraft returned home the Canadian Air Force no longer participate in the course. Who remembers the **very** spirited displays by Canadian AF Starfighters at UK airshows?

The Tactical Leadership Program was established as a two week training course back in 1978 the first course being held at Furstenfeldbruck in Germany. A year later it moved to Jever in 1979 where it was held until the end of 1988, during this period the courses were extended to four weeks. In the Spring of 1989 the TLP was moved to its current home at Florennes in Belgium where four or five courses are held every year.

This month's photo is from IAT 1989, a rare visit to the UK by a Greek Air Force TA-7H Corsair.

US Army Selcall

I have had a letter from MCB who asks if I know of the Selcalls used by US Army aircraft for trans-Atlantic flights. A bit of research led me to find just four which are listed below, if anyone knows of any others please drop me a line.

Selcall	Tail Code	User	Aircraft
DEMP	87-0140	US Army	C-20E/Gulfstream 3
GJBM	97-0049	US Army	C-37A/Gulfstream 5
GKBH	87-0139	US Army	C-20E/Gulfstream 3 (also reported as GKHS)
JSLM	02-1863	US Army	C-37A/Gulfstream 5

Lakenheath AUX

A couple of months back I included the primary frequencies for Lakenheath and it was my intention to follow that with the auxiliary, air-to-air details. Unfortunately, they seemed to have had a significant number of changes during March and April and it has been hard to keep track of the situation. What follows is what I believe to be the situation in early May, some information remains unidentified. With thanks to **Steve F**, **Paul** and **Greg** and **Milairman**. Can anyone fill in the gaps?

492 FS

AUX 11	231.8250	ex 292.5250
AUX 12	232.0750	ex 276.2000
AUX 13	unconfirmed	ex 277.7250
AUX 14	unconfirmed	ex 255.7250
AUX 15	???	ex 299.7250

493 FS

AUX 11	263.3000	ex 398.5500
AUX 12	264.6000	ex 343.6000
AUX 13	279.1750	ex 276.9250
AUX 14	279.4750	ex 283.6250
AUX 15	290.3750	ex 338.5750
AUX 16	299.8750	ex 263.3250

494 FS

AUX 11	341.6750	ex 311.5500
AUX 12	343.5500	ex 343.5750
AUX 13	358.3500	ex 255.6750
AUX 14	358.9500	ex 376.9750
AUX 15	359.2250	ex 345.1250

RIAT 2004

This will be the last 'Sky High' column you will read before the Royal International Air Tattoo at Fairford and I am pleased to report that the aircraft participants list is now starting to look very promising. *See the enclosed show guide for a full list as of 28 May 2004.* - ***Ed.*** The listing for the UK air-arms has recently expanded significantly and is looking good including two Typhoon T.1s. Other items of interest include two USAF F-15Cs from the East Coast Demo Team plus Boeing are to demonstrate their F/A-18F super Hornet.

From Europe some of the highlights are Finnish Hawks, French Mirage 4, Portuguese F-16s, Swiss Hornets and a selection of aircraft from Germany with a couple in special colour schemes. The Italians are really showing outstanding support for the RIAT 2004 with twenty aircraft so far confirmed. They include a rarely seen Breuguet BR1150 Atlantic and a Eurofighter from the RSV. This may also be one of the last chances to see (and hear), an F-104G Starfighter, the Italians have pulled out all the stops and it is hoped that no less than four Starfighters will be present, (sadly none in the flying display).

There is also an interesting selection of C-130s for the Herk 50 meet, recent additions include US Air Guard Hercules from Alaska and Puerto Rico and aircraft from the Brazilian, Jordanian and Omani Air Forces. It's interesting to note that some of our closest neighbours such as France and Belgium have not yet confirmed any aircraft for the 'Herk 50' meet. Have a regular look at **www.airtattoo.com/airtattoo** for further aircraft participation information but don't forget the list can change due to operational requirements and unserviceability.

As many of you will be attending the RIAT armed with your radios, here is a list of the frequencies in use at Fairford including those noted in use at recent Air Tattoos. Also included are the Brize Norton Radar frequencies that have been used for Fairford movements. Don't forget to send in your reports from Fairford, especially including any frequencies and callsigns noted in use.

Use	MHz	Comments
Approach	123.55	RIAT 2002 & 2003
Approach	124.275	Brize Norton
Approach	127.25	Brize Norton
Approach	311.825	Brize Norton
Approach	342.45	Brize Norton
Delivery	124.55	RIAT 2003 Monday Departures
Ground	119.15	
Ground	259.975	
Metro	257.75	Weather
Operations	129.7	RIAT 2002
Operations	139.9	Dragon Mobile Visiting U-2
Operations	240.225	Dragon Mobile Visiting U-2
Operations	249.75	Fairford Ops/100 ARW
Operations	249.975	Fortress Control
Operations	379.475	Dragon Ops/U-2
Radar	119.0	Brize Norton
Radar	277.35	Brize Norton
Radar	376.625	Brize Norton
Tower	119.15	Primary
Tower	128.975	RIAT 2002 & 2003
Tower	337.575	Primary

Abbreviations

ACC	Air Combat Command
ACMI	Air Combat Manoeuvring Instrumentation
ADR	Air Defence Region/Radar
AEW	Airborne Early Warning
AIRCENT	Airforces Central Europe
AIRSOUTH	Airforces Southern Europe
AUX	Auxiliary Radio
AFIS	Aerodrome Flight Information Service
AFRC	Air Force Reserve Command
AMC	Air Mobility Command
ANG	Air National Guard
APCH	Approach
ASACS	Air Surveillance And Control System
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
AWACS	Airborne Warning And Control System
C/POST	Command Post
C/S	Callsign
CAC	Centralised Approach Control
CFS	Central Flying School
CH	Channel
CRC	Control And Reporting Centre
CRP	Control And Reporting Post
DATIS	Digital ATIS
ETPS	Empire Test Pilots School
FAC	Forward Air Control
FIR	Flight Information Region
FIS	Flight Information Service
FOST	Fleet Officer Sea Training
FRADU	Fleet Requirements & Distribution Unit
FS	Flight Squadron
FSATO	Fleet Support Air Tasking Organisation
FTS	Fighter Training Squadron
FW	Fighter Wing
GCI	Ground Controlled Interception
H24	Operational 24 Hours A Day
ICAO	International Civil Aviation Organisation
ICF	Initial Contact Frequency
JAAWSC	Joint Anti War Warfare Shore Co-Ord
LACC	London Area Control Centre
LDOC	Long Distance Operational Control (HF)
LJAO	Local Joint Area Organisation
LMS	London Middle Sector
OTA	Operational Training Area
LUS	London Upper Sector
MAS	Middle Airspace Service
MATZ	Military Air Traffic Zone
NATO	North Atlantic Treaty Organisation
NDB	Non Directional Beacon
OPS	Operations
PETF	Practice Emergency Test Frequency
PRI	Primary (Frequency)
RAF	Royal Air Force
RAPCON	Radar Approach Control
RTTY	Radio Teletype (also noted as RATT)
RWY	Runway
S/B	Standby (Frequency)
SAR / S&R	Search And Rescue
SEC	Secondary (Frequency)
SHF	Support Helicopter Force
SOF	Safety Officer Flying (Squadron)
SOG	Special Operational Group
SSR	Secondary Surveillance Radar
ST	Stud
STC	Special Tasks Cell
SVFR	Special Visual Flight Rules
TAD	Tactical Air Designator
TC	Terminal Control
TCA	Terminal Control Area
UAS	Upper Airspace
UAS	University Air Squadron
UK ASACS	United Kingdom Air Surveillance And Control System
USAF	United States Air Force
USCG	United States Coast Guard
USN	United States Navy
WFU	Withdrawn From Use
VOR	VHF Omni-Directional Range Beacon

Lastly, I must sadly report the passing of Mr Paul Bowen FRAeS, co-founder of the Royal International Air Tattoo who died on 18 May after a six month battle with cancer. Mr Bowen, 57, from Marston Meysey in Wiltshire, founded the Tattoo with his friend and colleague Tim Prince in 1971 whilst they both worked as air traffic controllers at the then A&AEE Boscombe Down. The Tattoo was first held at North Weald airfield in aid of RAFA. From 1973 to 1985 the Tattoo took place at Greenham Common, near Newbury, before moving to its current home at RAF Fairford in Gloucestershire in 1985. With thanks to the RIAT website.

STATION X BLETCHLEY PARK

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HF Aeronautical Traffic, ACARS & Weather FAX

Extracts from Short Wave Magazine May 2004 by "Big Ears" (buy your Back Copies from SWM)

ACARS ... There are many computer programs on the market which cover ACARS but the one I use is SkySpy from Pervisell ....with SkySpy you will need a demodulator, Pervisell can supply one of these. A demodulator gives very good results, better than using sound card systems, but it cannot be used with Win 2000, NT or XP.

SkySpy The Program ... Load the program .... click the ComPort that you have chosen for your demodulator .... once you have designed the screen layout to your liking then you can save it .... The 'Message Screen' can get full very quickly.....

Weather FAX .... A quick call to Pervisell and they will advise you on the best program to suit your computer and receiver.....

NEED WE SAY MORE ?

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PUBLISHED APRIL 2004

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Amateur Bands

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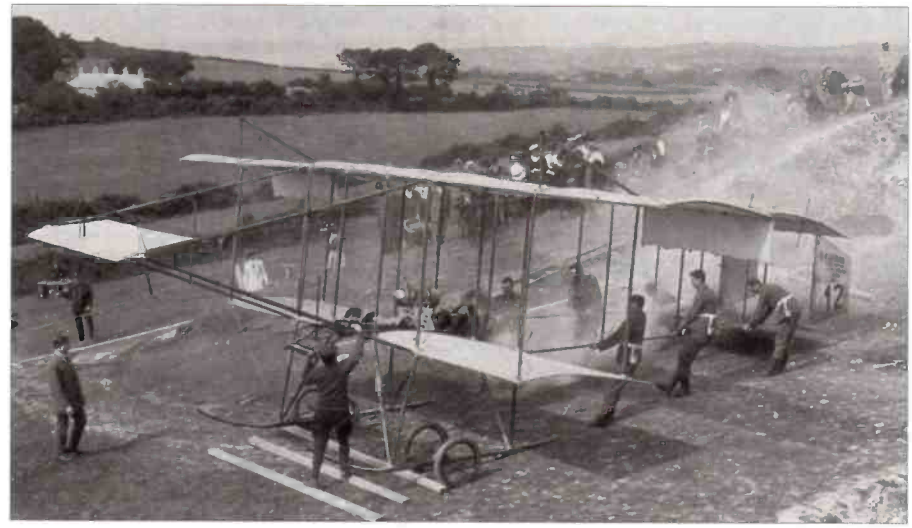
In keeping with this issue's aeronautical theme, to the right is a picture of an early 20th century flying machine. Taken in July 1910, it shows Robert Loraine's Farman bi-plane being prepared for its 16km return flight to Southbourne, near Bournemouth, from the Isle of Wight. Mr Loraine was an intrepid flyer who made several first flights, as well as that one to and from the island. Not only an actor and aviator, he was also a radio pioneer - hence his mention here.

Mr Loraine's radio first was achieved a couple of months after the Isle of Wight trip. Using a transmitter weighing 6.4kg and an antenna strung along and across the aeroplane's superstructure, he made the first UK air-to-ground radio transmission. The event took place at Larkhill in Wiltshire, possibly using the same aeroplane as the one used for the island journey, and communication was achieved over a distance of 0.5km.



Scottish Islands DXpedition

Peter Bower GM3OFT is doing some serious 'island hopping' around Shetland during late June and early July. His hectic schedule is taking him to 16 islands from where he will be operating almost continually for a fortnight. His only break times appear to be for travelling and a little bit of sleeping! As *SWM* hits the newsagents shelves, Peter will be halfway through his task, which will finish on the 1 July, with the journey home taking place the next day.

Having started on Thursday 17 June, the list of islands for the first week is Bressay, West Burra, East Burra, Trondra, Papa Stour and, weather permitting, Foula. Otherwise Vementry or Oxna. Similar meteorological considerations will dictate if Outer Skerries or one of the two previously mentioned alternatives is the start point for the second week of operation starting on Thursday 24th. From then on the itinerary is Muckle Roe, Yell, Unst, Uyea, Fetlar, Harcosay, and Whalsay. Not bad for a couple of weeks work!

No Support Required

Philip Davies in Shropshire reported the great success of the 3B9C DXpedition put on by the Five Star DXers Association during March and April as mentioned in the March column. Located on Rodrigues Island, part of the Mauritius group to the east of Madagascar in the Indian Ocean, it comprised of 15 stations and was heard by Philip with 59 signals on pretty well all of the h.f. bands.

He was less successful with the XF4IH DXpedition to Mexico's Socorro Island. However, his impressive s.s.b. log for the h.f. bands shows what can be achieved with patience and practice and it is all down to his own efforts because he doesn't have access to the Internet or DX clusters.

What Are These DX Clusters?

A DX cluster is a live forum for sharing information about activity on the amateur bands. Primarily concerned with h.f., they operate across the Internet and/or packet radio. The function on the cluster is to make amateurs and listeners aware very quickly of interesting stations on the air and the frequency where they are to be found.

It's very similar to an Internet chat room in many respects. When a rare bit of DX is heard or worked, the amateur or listener puts the details, i.e. callsign and frequency, onto the cluster. By monitoring postings to the cluster another operator can tune directly to the frequency being used by the rare and exotic station without the need to manually hunt up and down the bands.

Keep Your Distance

A touch of TVI was encountered by your scribe at his home QTH recently after erecting a new higher gain wide-band TV antenna. It was in exactly the same place as the single band one it replaced, and no changes had been made to the amateur station. Even so, at my usually TVI free abode, my transmissions on 144MHz were getting into the TV receiver.

Of course, it was all my own fault. In an effort to be neat and tidy I'd cable tied more of the TV cable than before onto the mast, which also carried the coaxial feed to the dual-band collinear from where the 144MHz transmissions came. Despite the length of run where the cables were immediately adjacent being only about one metre, it was enough to enable enough r.f. to worm its way across from the collinear's feed to the into the TV down-lead.

Having caused the problem by poor cable layout, I managed to solve it when I re-routed the TV antenna cable a mere 100mm away from the amateur feeder. It cured the interference instantly.

IOTA

The Islands On The Air contest is the main event late in July. It runs from 1200 hours Saturday 24 July to 1200 hours Sunday 25th and is likely to be a very busy period on the h.f. bands. Close to home, half a dozen members of the Cray Valley Radio Society are off to the Isles of Scilly to the west of Land's End for that weekend and will be using the call M8C. They'll be there for a few days before that using their own calls 'stroke P'.

Further afield a team which includes **Derek Cox G3KHZ** will be operating as CT9X from Porto Santo, north of Madeira off Africa's north west coast. For the preceding week most of the team will be at the nearby Ilheu de Cima lighthouse operating from 7 to 28MHz as CT9P.

Other Island DXpeditions

From Friday 2 to Sunday 11 July listen out for FP/K9OT & FP/KB9LIE on Miquelon Island. Together with the adjacent St. Pierre Island close to the south coast of Newfoundland these two small places make up France's only dependant territory in the north Americas. Just as that DXpedition is ending another is starting on the 10 July. With the prefix AH0 it will run for two weeks on Aland Island at the entrance to the Gulf of Bothnia between Sweden and Finland.

Satellite TV News

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Iraq continues to dominate the headlines. On 25 April **Alan Richards** (nr. Skegness) found 'CBS BAGHDAD' feeding a long NTSC video back into NY including General Hertling updating the press, convoys of Humvees, a pack of Apache helicopters and then dozens of fast moving RIBs packed with troops arriving and disembarking with heavy arms aboard a tanker, this in attempt to prevent further suicide boat bombs - playout over *Eutelsat W2*, 16°E 12.526GHz-H (SR 5632+ FEC 3/4) at 1830. The American attack on Fallujah on 28 April was seen with live pictures from a satellite 'phone on several networks, the attack at night provided vivid flashes with most of the pictures in shades of green. 'CNN NEWSFORCE' - now renamed 'INS-EUROPE' carried the uncaptioned pictures for a very long period. They may have well sourced the original sat-phone feed, downlinking over their usual 11.565GHz-H (6109+3/4) over *NSS-7* 21.5°W. The BBC often use *Eutelsat 2F3* 21.5°E for direct feeds out of Baghdad back into London, though for most enthusiasts without an independent elevation actuator for tracking the inclined orbit, *2F3* can only be received for about two hours from about 1350 onwards. 'BAGHDAD 216' is found at or around 12538GHz-H (4226+ 7/8).

There's a new religious channel downlinking on *NSS-7*, checkout 12.533GHz-H for 'TCT WORLD'. The *New Hope* programming uses a very high symbol rate - 39968 + FEC 7/8 - though picture quality tends to look 'smudgy' and captions show the output is directed into the USA, Asia and India. A curious service ID as 'CONTRIBUTION'. Meanwhile, at 11.554GHz-H (6600+3/4, service identification 'SCOPUSNET-TE TV) on 21.5°W during late April onwards has been NTSC colour bars which is rumoured to be yet another religious channel.

*Europe*Star-1* 45°E 21 April carried a protracted Sky News feed about African holidays, pictures of animals, sunsets, etc., which is part of the one decade of Black Rule in South Africa. **Roy Carman** found the 'GLOBECAST AFRICA' carrying the package 11.512GHz-V. Two days later and *Europe*Star* is fired up once more with more Democracy offerings - 'MOTO GP S.AFRICA' - 11.587GHz-V (both feeds 5632+3/4).

Activity across the 28.2/28.5°E slot (the Astra hot spot) is rarely noted here being this is more of a conventional broadcast source, however, **Edmund Spicer** in sunny Littlehampton comments otherwise. He notes that a new FTA stream on *Astra 2A* appeared over 11.973GHz-V (27500+2/3) and had to manually insert the PIDS for reception - PID information from the 'SatCoDX 'World of Satellite' data base provided the essential detail - VPID 2322; APID 2323; PCR 2304. On this downlink there then appeared (end April) - a BT 'Facility Line' and 'ITN DIGITAL' test card; Carlton colour bars and news report preparations; BBC *Six O'clock News* including studio preps (a recording of 23 October, 2003!) recorded coverage of the previous football premiership match; live coverage of the F1 Grand prix of that day in real time. When I checked a conventional programme downlink stream had established! So even on a standard Sky dish there is the potential for the unusual! Another 'hot-spot' in the sky is the *Eutelsat* 13°E slot and Alan Richards notes that the 'American Embassy Television Network' on the VOA/C-Span downlink of 12.222GHz-V (27500+3/4) can be checked out for news and views from 'Stateside. Alan has seen up to three channels within the 12.222 bouquet, including VOA radio programming. VOA are now cutting back on their external broadcasting commitments (over m.w. and s.w.) but they're hopeful on getting their message through on your sat dish. For up-to-date satellite slot channel content check on **www.tele-satellite.com** or **www.lyngsat.com** websites. New arrivals on the *PAS-3*, 43° W slot are Fox News and Fox Sports running 12.647GHz-H with an unusual SR30800+FEC 7/8. The BBC provides a very comprehensive text service for the British Forces Broadcasting Service (BFBS) and if you check the BFBS downlink on *Eutelsat W3*, 7°E, you'll find many interesting pages - such as p.869 which details the TV/radio channels available on cable in Gibraltar - BFBS is available at 11.325GHz-V (27500+3/4).

Interesting Offerings

CNN 'INS' European feeder has provided a couple of interesting live NASA TV offerings. The attempt at a new speed record proved successful when an unmanned rocket plane was detached from a high flying B-47 it then blasted away to achieve speeds of 8000km/h. An accompanying aircraft relayed live pictures of the B-47 and of the rocket itself being 'dropped' together with pictures from the B-47. In late April, *the crew aboard the International Space Station (ISS)* returned to Earth after six months in orbit. As the Shuttles aren't operational, they returned to Earth (Kazakhstan) via the Russian Soyuz spacecraft. The departure of the craft from *ISS* was relayed live over the CNN INS feed. The detachment and flight was controlled from Baikonur and linked to NASA in the USA. All supplies and crew exchanges now are carried by Soyuz craft, one of which is permanently 'moored' to the *ISS* should the crew need to depart in an emergency.

Whilst in a Russian mood, there's a new bright star at 53°E, a Russian sat called *EXPRESS-AM22*. Checking with my 'Spectralook' I found very large spikes and a Coship scan produced digital TV with a 2-ch bouquet - that of 'SGUTV 1' and 'SGUTV 2' plus a radio channel - 'SGU INTERNET'. They're strong signals giving a strength of '+80%' on both RSD and Coship receivers. The two TV channels offer rather poor quality pictures, content appears to be educational though feature films are carried. The SGU-TV bouquet appears at 10.976GHz-H (SR8882+3/4) with a massive signal, perhaps data, at 11.164GHz-H. A spectrum check on the **vertical** output of 53°E and more activity, a scan revealed 'Ukraini i Mir' at 11.083GHz-V and 'M1-KAHOVKA' at 11.091GHz-V, both running 3750+3/4. The 'M1-Kahovka' channel night of 2 May was transmitting a concert checking the second day revealed another channel present along with 'M1-Kahovka', this being 'M1 PLUS 1' carrying no programming. The *Express AM-22* may well a 53°E hot spot worth checking out! Viewing the 'hidden ident' with the RSD receiver showed 'UKRKOSMOS' on the SGU-TV signals and 'Scopus' on the M1 offerings, the M1 signal strengths are lower around 65-70%. The 'Ukraini i Mir' channel closing at 2000 aswitching to colour bars. A spectrum check showed no activity above 11.750GHz. The 'Ukraini i Mir' channel is also carried over the *Express-A1R* sat @ 40°E, 11.611GHz with a much lower signal level in the UK.

Though Greece have slotted their *Hellas-Sat 2* @ 39°E to take the 2004 Olympic Games, the EBU have made alternative arrangements with Eutelsat. Some 306MHz of Ku-band spectrum has been hired on a full-time basis for the Olympic's duration on the *Atlantic Bird-3* (5°W); *e-Bird* (33°E) and *W3A* (7°E). These are for broadcasters to use as direct circuits between their OB crews on site and their main HQ back home. The Athens EBU teleport will go on-air with tests on 2 August with first sports carried will be football a11/12 August, the opening events 13 August and onwards until the 29th. The EBU teleport will remain to cover the Paralympic Games 17-28 September. Over this period enthusiasts should see a plethora of 4:3; 16:9; HDTV, MPEG-2; MPEG 4:2:2 and encryption standards - with *Hellas-Sat* downlinks as well all sporting feed hunters should have a ball.


GIs rest during a patrol near Baghdad, via CBS News (over *W2*).

Test card prior to a sports programme ex Colorado (over 12.5°W).


The mach 5 speed record, the NASA rocket plane held under the B47.


Just after release as the rocket fires off, live pictures of the speed attempt via CNN

An unusual test card via *W2*.


A singer in national dress during a political rally over Kurdistan TV (via *W2*).


The BT end of transmission caption seen over *Atlantic Bird 1*.

Excitement from the Rallye de Tunisie as seen over *Eutelsat W1* on April 12th.

Info in Orbit

Lawrence Harris 55 Richville Road, Shirley, Southampton SO16 4GH
E-mail info.orbit@pwpublishing.ltd.uk **Web Site** www.astronomer.plus.com

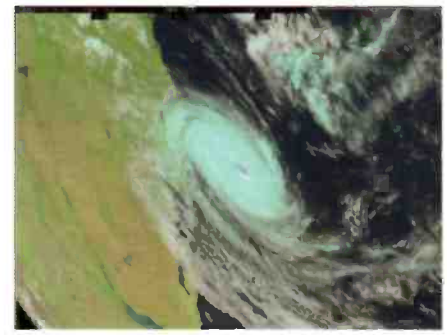


Fig. 5: Hurricane in south Atlantic - courtesy Gordon Bridge © EUMETSAT.

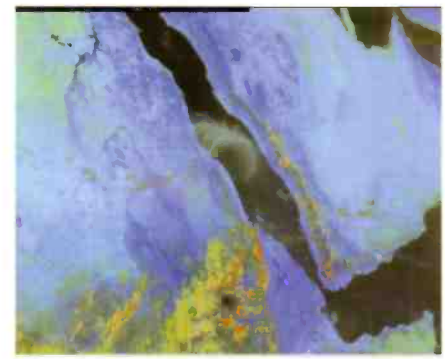


Fig. 6: Arabian dust - courtesy Gordon Bridge © EUMETSAT.

An interesting month for weather satellite (WXSAT) hobbyists! EUMETSAT - the European meteorological organisation that looks after METEOSAT - keeps coming up with exciting ideas for products to add to the EUMETCast data flow. For those not content to sit in front of television for hours every evening, *METEOSAT-8* has become the provider of the most fascinating stream of world-class imagery via the EUMETCast service on *HotBird-6*.

Meanwhile, polar WXSATs *NOAA-14* and *FENGYUN-1C* appear to bid farewell. Also covered this month: two British hobbyist WXSAT organisations hold meetings on the same day (Saturday 1 May).

GEO Meeting

The recently formed Group for Earth Observation had its first public meeting at the National Space Centre (NSC) in Leicester on Saturday 1 May. I was pleased to have the offer of a door-to-door lift from **Clive Finnis** who lives very close to me.

Fig. 1: Ruud Jansen, Nigel Evans, Clive Finnis and Lawrence Harris at the QFH construction demonstration (picture courtesy Les Hamilton).

We set off early that morning, arriving at the Centre at about 0830, in plenty of time for me to chat with exhibition presenters that were setting up various hardware systems. A large contingent from Holland's Werkgroep Kunstmanen arranged several tables of equipment to receive live satellite data on *METEOSAT-8/HotBird-6* reception equipment and a quadrifilar helix antenna (QFH) was on display. One Dutch delegate gave an impromptu demonstration of QFH construction while visitors were still arriving - see **Fig. 1**.

Formalities started at 1000 with a welcome from **Francis Bell**, the main organiser. He welcomed delegates from Holland and Malaysia and thanked Eumetsat for providing a large number of conference booklets. At Francis' suggestion, the audience sang 'Happy birthday *METEOSAT-8*', noting that spacecraft transmissions were about one year old!

Charles Bishop, the chief executive of the National Space Centre, also gave delegates an enthusiastic welcome and explained about the background and funding of the Space Centre. There had been a need to provide a stimulating public educational environment for space research, and the NSC had been set up for this purpose. Their original business plan had envisaged a quick build-up of visitor numbers, followed by a predicted slow decline. This decline had not happened.

Recent events associated with the *Mars Express* project in which the NSC had played a significant role and **Professor Colin Pillinger**'s presence had resulted in an increase in visitor numbers and considerable public interest. Mission scientists work there under public view - possibly the only place in the world where this happens. Charles anticipates that more *Beagle* spacecraft will be funded and the missions continue to be based at the NSC. He also expects more satellite involvement - the Huygens project and the £2.4 million Human Spaceflight Gallery would raise the profile of the Centre.

The Chairman of the NSC Amateur Radio Society **Geoff Griffiths** explained that their branch had been started with three main objectives, including the education of the public in amateur radio satellite operations - for example an Argentinian satellite was providing much worthwhile information. The public were able to see incoming satellite data being decoded live, producing 'house-keeping' information. Other objectives include the training of operators to use satellites and the opportunities for radio amateurs to use the equipment.

EUMETSAT's **Gordon Bridge** arrived with a large number of publications and pictures for delegates and gave an introduction to *METEOSAT-8* by explaining about the need for global observations of meteorological phenomena. Gordon explained the need to increase global coverage of the weather, and to improve the short range accuracy of forecasting. A general need was to get a better impression of weather.

Gordon described the EUMETSAT Headquarters and the METEOSAT Primary Ground Station, showing slides of various aspects including the satellites and their component systems. To the delight of delegates, he confirmed that follow-up satellites *MSG-2* and *MSG-3* would continue to provide data via EUMETCast as well as also providing direct transmissions, following the identification of the cause of the problem that led to the failure of the amplifier on *MSG-1*.

Fig. 2: Francis Bell opens the first GEO Symposium.

Fig. 3: David Taylor - picture courtesy Cynthia Taylor.

Fig. 4: Gordon Bridge of EUMETSAT.

Fig. 7: Dutch group display at GEO meeting.

Fig. 8: Les Hamilton mingling!

Fig. 9: Lunch break and form filling.

Fig. 10: Final presentation - Rob Hollander discusses antenna design.

METEOSAT-5 and *METEOSAT-7* would continue operations until the end of 2005.

The way in which *METEOSAT-8*'s 12 channels were optimised to measure and identify different features was explained. Gordon showed animations made using different channels to best display specific features. He showed one that identified biomass burning in Africa - all seen at very high resolution.

Sandstorms near the Red Sea, the one that we saw a few months ago (see **Fig. 5** in *SWM* May), and morning fog in the eastern Mediterranean sea made 'wow'-type animations! By applying artificial colour, the monitoring of significant features could be done - leading to a better understanding of the internal processes of hurricanes. These were the first applications of 15-minute imagery to meteorology.

Gordon summarised the process of data transmission via EUMETCast's DVB service, and some of its features. The hardware was economical when compared with the original expected costs. C-band transmissions were being undertaken for Africa using the *AtlanticBird-3* satellite, and would include *ATOVS*, *METEOSAT-6* RRS, *METEOSAT-8*, *METEOSAT-7* and *M-5* HRI (high resolution imagery). EUMETSAT was now planning for METEOSAT Third Generation satellites. They wanted to continue the fast high resolution imaging options, and wanted full-disc data as well.

The satellites EPS and METOP were discussed and some 14 years of operations were expected. Using the ground station at Svalbard, data could be collected on nearly every orbit and NOAA data could also be collected at times when the Americans could not see the satellites. *METEOSAT-5* will continue to image for the Indian Ocean Data (IODC) project and in due course, *METEOSAT-7* would be moved to replace *METEOSAT-5*, ensuring continuity in the absence of the Russian GOMS satellite. Gordon was thanked for his excellent presentation.

David Taylor is the author of the *SatSignal* suite of programs that many monitors use. He explained about the effect that the continued upgrading of computer specifications was having on METEOSAT data processing. When the tests were just getting underway last year, few people had a 3GHz computer; the recommended configuration was then a two-computer system to enable separate reception and processing.

Current machines with new processors could now effectively cope with the demands of EUMETCast data, but they should have fast hard drives with a 8MB buffer, and fast connection. It was essential to ensure that the reception dish was properly aligned, and that the resultant error measurements (shown on the status screen) were zero.

Professor Robert Moore of Liverpool university is an enthusiastic amateur WXSAT monitor and has installed an h.r.p.t. station, as well as *METEOSAT-8* hardware at his home in north Wales. He has been accumulating weather data such as thermal and rainfall records for three years. Robert showed his animation of a November storm, and other animations - all illustrating the potential for amateurs to make contributions to weather research.

Arne van Belle gave his presentation on behalf of Werkgroep Kunstmanen (Netherlands), starting with an animation of a satellite launch. Arne's main demonstration was the live reception of *METEOSAT-8* data from EUMETCast, using a 12 years old (BSB Ferguson) 0.35m dish and standard 0.6dB ALPS LNB. Outside I had noticed a 40m cable run was being used. The signal quality showed a red 8%, yet not a segment was lost during the complete day! Arne, we are impressed!

The computer doing this remarkable feat was a 3.0GHz Pentium-4 with 1GB RAM, running *Windows-XP Pro* in hyperthreading mode, and a Skystar2 rev 2.6C DVB decoder. The software was the *Tellique* program (with all PIDs activated to receive all available data), and David's program (*MDM*) decoding all LRIT and HRIT channels in the background, while displaying a total of 6GB *GeoSatSignal* generated animations in Windows *Mediaplayer*. Yet, that was not all!

To beef things up MSG animator was showing a UK HRV animation in 1024x768 (pixels) mode as well. The Deutsche Telekom transponder is also used by Kurdsat, so Arne also watched this satellite channel simultaneously using TV4PC. Arne confessed that he did close TV4PC before showing the virtual *ISS* Space Flight Simulation! This software is called *Orbiter* and is freeware available from the following site: **www.medphys.ucl.ac.uk/~martins/orbit/orbit.html**

Francis Bell then invited questions about GEO and membership. He explained that the Group is run by a Management Team rather than a committee, and that although the team had personally contributed to the cost of setting up the Group, they anticipated that the break-even number of members - about 1000 - would be reached by the end of the year.

They plan to produce a printed *Quarterly Journal*. At this point there was applause for **Les Hamilton** who had compiled both Journals.

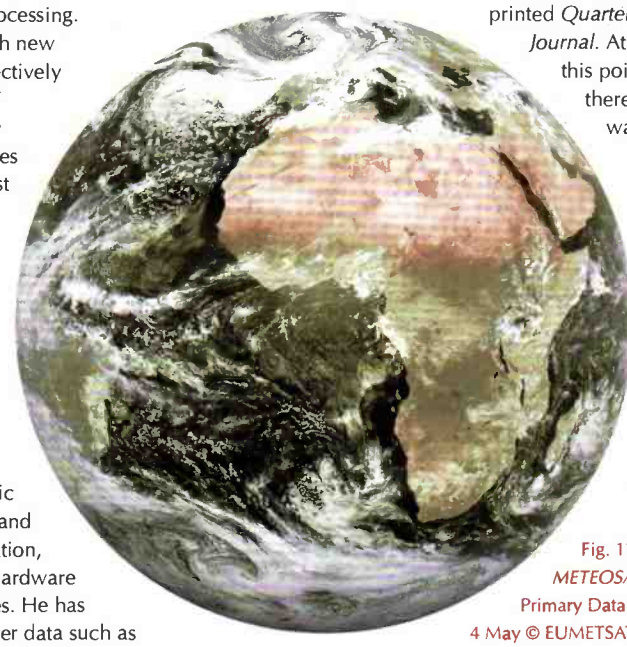


Fig. 11: *METEOSAT-7* Primary Data 1200 4 May © EUMETSAT.

Nigel Evans said that there had been 700 requests for copies of the first Journal. Clive Finnis spoke about the work in hand to modify the RX2 receiver to accommodate the new *NOAA-N* frequencies. **John Tellick** spoke

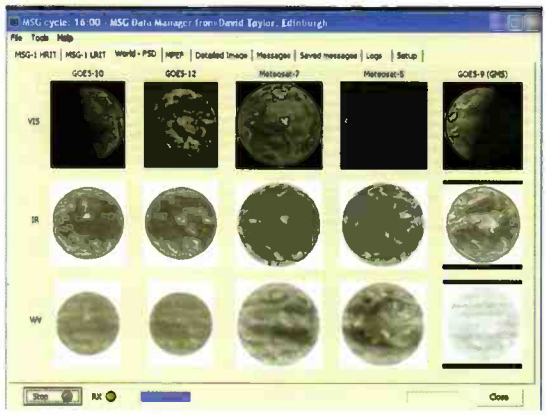


Fig. 12: MSG Data Manager software shows the full complement of Foreign Satellite Data channels.

briefly about LRPT from METOP and potential interference from pagers in Britain. One delegate noted philosophically that 'impossible' problems are often solved when necessary.

Rob Hollander gave the final presentation. An expert on quadrifilar helix antennas, he explained about their design and modifications. His short, well-received talk brought the sessions to an end.

The GEO meeting was a resounding success, and credit is due to its organisers and the speakers. A RIG meeting was held on the same day in Swindon, despite requests by me and others to a committee member to change the date so that members could attend. As of two weeks later, I have been unable to obtain any reports about the RIG meeting.

Current WXSATs

Much attention has been focused on the imagery from *METEOSAT-8* (via *HotBird-6*), but the polar WXSATs continue to be well monitored by observers around the world.

NOAA-14 effectively made what could be its last image transmission around 14 April when its scan motor stalled. Since that time the signal has remained strong, but with no image content. *NOAA-16* continues to provide high resolution imagery though there is sometimes interference across the image. Ferdinand Valk sent me **Fig. 14** - a composite including *NOAA-12*, *NOAA-16* and *NOAA-17*, showing that *NOAA-16* is not finished with yet! Latest news from NOAA in mid-May is the start of data re-phasing on every orbit.

A Little Ice?

EUMETSAT has recently added a new product to the EUMETCast data stream, which is freely available to all EUMETCast users. The product is one produced by the Satellite Application Facility (SAF). This is software written by experts to interpret and convert the raw data produced from weather satellites into a more useful format. In this case, the Ocean and Sea-Ice SAF uses data from the polar orbiting satellites to predict the amount of sea ice in high northern latitudes. Visit **www.satsignal.net/** - select 'satellite tools'.

There are three products available, and they are transmitted to users as gridded data on a polar stereographic map projection. They are sent just once per day, as 'gz' compressed files to save on bandwidth. The products are sea-ice concentration (what fraction of the sea is ice), sea-ice type (old ice or new ice), and sea-ice edges (open ice or closed ice). This data can be converted to false-colour images showing sea-ice in the region. David Taylor sent me his new, basic sea-ice viewer program that enables us to visualise the data being sent over EUMETCast - **Fig. 13** is from the free version.

For more information: **www.osi-saf.org/index.php**

Encryption Starts On *METEOSAT-8* Data

EUMETSAT implemented full data access control (encryption) on EUMETCast (the *HotBird-6* transmission) from 4 May, in line with EUMETSAT Data Policy. Users in possession of a EUMETCast Key Unit (the small USB dongle called an EKU) continue to receive licensed services in addition to the 6-hourly 'essential' transmissions. Those without an EKU who are using a EUMETCast username and user key/password issued to them during the Dissemination Trial had their access rights modified on 4 May 2004 to include only the reception of the essential services. The Essential Services include 6-hourly SEVIRI data, 6-hourly High Resolution Image data, Foreign Satellite Data, Meteorological and Satellite Application Facility Products and the EUMETSAT ATOVS Retransmission Services.

METEOSAT-7 Data Joins EUMETCast

The start of encryption of the EUMETCast data stream also marked the addition of *METEOSAT-7* Primary Data to the data stream. Although *METEOSAT-7* transmits data directly to users on 1691.0MHz (see transmission summary at end of article) the equipment required, called a Primary Data User Station, is somewhat beyond the normal means of most amateurs, and also requires a large (about 1.8m) dish.

The satellite provides full-disc, high resolution images every 30 minutes. Data is encrypted and at the time this was introduced, the cost of a decryption unit was too high for most amateurs - so I never obtained one. As at mid-May, those with the normal EUMETCast license can receive the 6-hourly synoptic (0000, 0600, 1200 and 1800UTC) *METEOSAT-7* images.

My first arrived around 1200UTC on 4 May. Like many others, I have applied for access to the regular 30-minute images. Why, you might ask, would anyone want to have

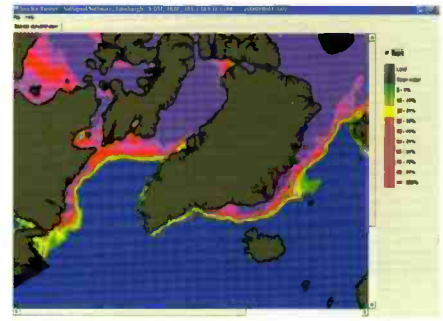


Fig. 13: David Taylor's Sea Ice Viewer - polar data from EUMETCast © EUMETSAT.

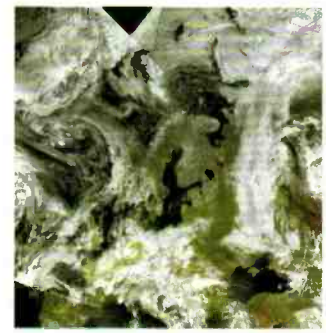


Fig. 14: *NOAA-12/16/17* composite from Ferdinand Valk.

METEOSAT-7 images with those from *METEOSAT-8* already available? During the *METEOSAT-8* decontamination periods (when the satellite's infra-red sensors are allowed to warm up to enable adsorbed gases to escape), imagery from *METEOSAT-7* will continue to be available.

This addition means that EUMETCast now also carries *METEOSAT-7*, *METEOSAT-5*, *GOES-10*, *GOES-12* and *GOES-9* imagery.

Frequencies

a.p.t. (low resolution)
NOAA-12 and *NOAA-15* transmit a.p.t. on 137.50MHz.
(During overlap periods, *NOAA-12*'s a.p.t. may be switched off).
NOAA-17 transmits a.p.t. on 137.62MHz.

h.r.p.t. (high resolution)
NOAA-12 and *NOAA-16* transmit h.r.p.t. on 1698.0MHz.
NOAA-14 transmits on 1707MHz (currently faulty).
NOAA-15 transmits on 1702.5MHz.
NOAA-17 transmits on 1707MHz.
FENGYUN-1C and *FENGYUN-1D* transmit on 1700.5MHz (*FY-1C* currently faulty).

WEFAX: *METEOSAT-7* (geostationary) transmits WEFAX on 1691 and 1694.5MHz and Primary Data on 1691.0MHz.
EUMETCast from *HotBird-6* carrying *METEOSAT-8* data on 11.096GHz

Scanning Scene

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

MPT1327 has long been a widely used standard for trunked analogue radio systems. Until now most engineers and monitors have utilised the *Ftrunk* program and its derivatives, written by **Ian Wraith**, to track the signals.

Now there's a new program that should do the job. This one is known as *Trunksniffer* and is available for evaluation download and purchase from **www.trunksniffer.com** Written by **Mike Puchol** this comprehensive program is compatible with many scanner receivers in common use. Most Bearcat receivers that support computer control will be usable with *Trunksniffer* together with several AOR receivers.

The Icom PCR receivers are also Trunksniffer capable as, surprisingly, is the Kenwood TH-F6/7 hand-held scanner transceiver series. The Alinco DJ-X2000 is also supported.

Facilities available vary with the receiver(s) in use, but generally the communications can be tracked and monitored as can some text signals. Many functions are available for engineers and administrators of the systems. This program will appeal to a plethora of purchasers who have a need to monitor MPT1327 radio systems. The cost...well it's 90 Euros which is around £78. If you have a need to cover your local MPT1327 system this represents a bargain. *Look out for a review in a forthcoming issue of* SWM. ***- Ed.***

British Grand Prix

It's that time again. Yes, the British Grand Prix time This year it's the weekend of the 9-11 July. Attending the British Grand Prix is something that each of us should do once in their lifetime, like going to Las Vegas (I did say once). If it doesn't rain and turn into a 'mudfest', it's usually a good weekend complete with traffic jams that only a science fiction writer could visualise.

Here are a few more frequencies for you that, in theory, are up-to-date. The teams and their communications seem to change on an almost hourly basis so this is the best current shot of a few to monitor although a good general search cannot be beaten at this event.

The marshals are on **167.975** paired with **172.775** n.b.f.m. The security bods appear to be using **453.925** and general Silverstone traffic is on **456.675** with the input frequency to the repeater being **462.175**.

The two Jordan drivers are using **146.1875** and **442.56875**, **151.275** and **150.200** and the race engineers have been using **450.700** and **462.1625**. Try **164.4625** paired with **169.4375** and **163.6375** and **159.1375** for the Williams drivers. Renault may be using **458.25625** paired with **468.250** and **458.13125/468.000**. Maybe their engineers will be on **463.8875**. Try McLaren on **450.225**. Again all frequencies in use are n.b.f.m. These, together with frequencies I've given previously, may give you a head start on the action.

For those people who are monitoring the police helicopter video down-linking, you can expect a busy weekend as the Chiltern Air Support Unit normally reports on the traffic queues and shows suitable aerial shots to their control facility.

Toy Alert!

The Cybiko Xtreme. What do you expect of a company that can't even spell extreme properly? Well quite a lot actually...

The Cybiko Xtreme - a hand-held personal organiser/games player/scientific calculator/voice recorder and MP3 player.

This gadget is a hand-held personal organiser/ games player/scientific calculator/voice recorder and MP3 player. This hand-held computer device also has an antenna attached and users can transfer files between Cybiko Xtremes at distances up to 25m thereby configuring the thing as a wireless application network of a sort.

The Xtreme is connected to your computer with a USB cable and software upgrades can be downloaded from the web. In addition to all this the unit can act as a two way radio at distances of up to 300m depending on terrain. The frequencies in use seem to be between 868 and 870MHz split into 30 digital channels.

I can't find any paperwork that implies that the frequencies are illegal for this use so I assume that they are legit. The Cybiko Xtreme sells for anything between £45 and £60 depending on where you purchase it. Now, if I was a kid living in a built up area I'd want one and I'd want all my mates to have them too. OK I'm a big kid but there's no one around here and my mate and I have talked about hooking up amplifiers and stacked antennas to these things but we don't think it's too practical.

And another thing....folks that have 'Bluetooth' capable mobile telephones are now using them for contacting similarly equipped mobiles over distances of around 10m or so. Looks like this is popular amongst bored rail commuters and, believe it or not, people in pubs. Now I have a Bluetooth 'phone but when I'm in a pub I don't have time to mess around with the thing. I'm much too busy drinking beer!

The pastime is called 'Bluejacking' (playing with the 'phone not beer shifting) and actually exposes security holes in the whole Bluetooth system. Don't expect to Bluejack me then.

More digital comms on 2.400-2.4834GHz. This time it is a communications system designed for very serious use, for example in hospitals. The Vocera is a comms badge like they have on *Star Trek*...honestly. Worn on the lapel it runs from a wireless LAN and allows personnel to communicate on a one to one basis or participate in conference calls.

The device is controlled by voice commands from the user and is specifically designed for people who operate in large building complexes. It negates the need for loudspeaker public address systems and ensures that staff are never out of contact. The unit can be set to 'Do Not Disturb' when the wearer is engaged in 'personal administration tasks' (that's in the bathroom to you and me). Obviously it is a pricey system!

What Does It Do?

Another photographic mystery. The antenna shown below was snapped in Builth Wells. It was spotted aloft above the police station. Has anyone a clue what this thing does? The picture was taken by a communications engineer who is as baffled as anyone else about it.

Another photographic mystery...

Secretive Subs

As anyone who regularly monitors the airwaves knows, a nation's submarines are probably the most secret strategic military asset that it possesses. Encrypted communications are the norm either sent by low frequency transmitters or satellite systems.

It is possible, however to monitor some communications from submarines when they are on the surface as they have to talk with other naval ships and aircraft and occasionally with civilian vessels as well. The UK has sixteen submarines, all of which are nuclear powered.

Starting with the heaviest, the four Trident Class subs, *Vanguard*, *Victorious*, *Vigilant* and *Vengeance* weigh in at 16,000 tonnes apiece. Then there are the Trafalgar class fleet boats at 5,000 tonnes, seven in all, *Trafalgar*, *Turbulent*, *Tireless*, *Torbay*, *Trenchant*, *Talent* and *Triumph*. *Trafalgar* has just come out of the body shop having had a bit of a bump at some small islands in the Hebrides.

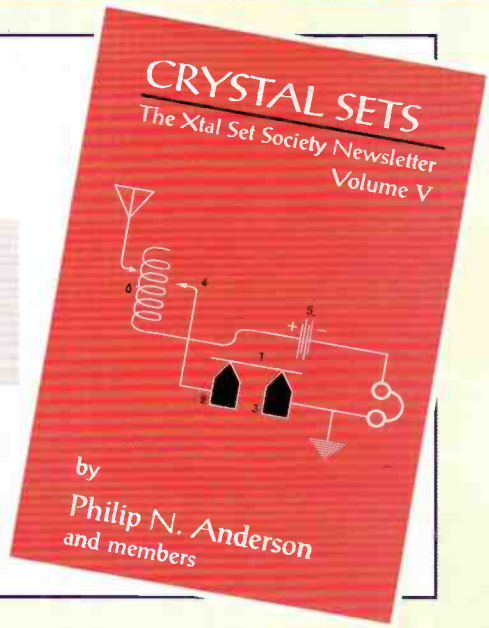
Weighing the same but slightly shorter in length are the Swiftsure class fleet submarines *Sovereign*, *Superb*, *Sceptre*, *Spartan* and *Splendid*. All these boats regularly exercise around our coasts and can often be heard on v.h.f. and u.h.f. channels. They will never identify themselves by name or type but will always just use the callsign 'Surfaced Submarine' when speaking with civilian vessels. When operating with other naval craft or air assets the callsigns will vary on deployment.

The frequencies in use will be in the 200 and 300MHz bands. I have monitored our submarines on 386.500, 358.925 and 359.625. It is obviously probable that there are other frequencies but these are those that I have heard. Good luck!

Short Wave Magazine book

new additions

Crystal Sets
The Xtal Set Society Newsletter Volume V



The Xtal Set Society started in 1991 and is dedicated to once again building and experimenting with radio electronics through the use of the crystal set, the basis for most modern day radio apparatus. This little book contains chapters on previous *Xtal Set Newsletters* along with The Design of Unpowered a.m. Receivers made from Rocks, Radio Outfit in a Headset and lots more. Order your copy now from the *SWM* Book Store for just **£7.00**.

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new additions

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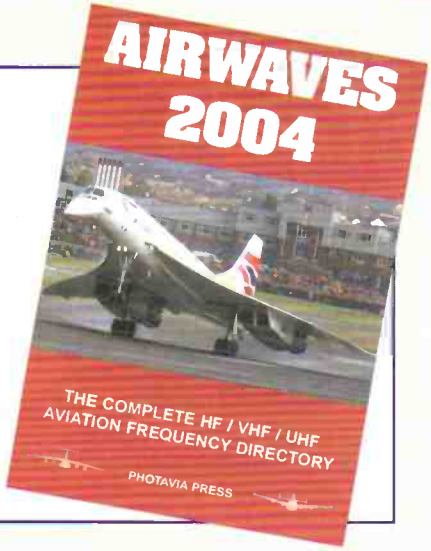

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SWM UK Radio Club Listing

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NORTH WEST

CHESHIRE

CHESTER & DRS, G3GIZ. Meets at the Burley Memorial Hall, Waverton. Details from Chris Wild. Tel: (01244) 683629.

HALTON RADIO CLUB, MOBXZ. Meets at the Play Centre, Norton Hill, Windmill Hill, Runcorn. 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, G3ZTT. Meets at the Cotebrook Village Hall, Cotebrook Nr. Tarporley, Cheshire. Details from Niall Reilly GOVOK.

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

RADIO OFFICERS ARS, MOROA. Details from Mr J. Bell GOCMM.

UKFM GROUP WESTERN, GB3MP. Meets at the Morley Green Club, Mobberley Road, Wilmslow, Cheshire. Details from Gordon Adams G3LEQ. Tel: (01565) 652652, FAX: (01565) 634560.

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

WIDNES & RUNCORN ARC, GOFWR. Meets at the Scout Hut, Castle Road, Halton Castle, Runcorn, Cheshire. Details from Martin Tust G4LUQ. Tel: (01928) 714843.

CUMBRIA

EDEN VALLEY RS, GOANT. Meets at the BBC Club, Penrith. Details from John Roze GOVMP. Tel: (01931) 716421.

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

WHITEHAVEN ARC, MOBEE. Details from Mr N. Williams MOCRM.

GREATER MANCHESTER

BURY RS, G3BRS. Meets at the Masses 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 Sceptre, Brookhouse Terrace, off Warrington Lane, Wigan. Details from Mr D. Snape G4GWG. Tel: (01942) 211397.

ECCLES & DARS, G3GXI. Meets at the Eccles Liberal Club, Wellington Road, Eccles, Manchester. Details from Chris Harrison G8KRG. Tel: 0161-773 7899.

THE MANCHESTER WIRELESS SOCIETY, G5MS. Meets at the Simpson Memorial Community Hall, Moston Lane, Moston, Manchester. Details from Ian MOIPR. 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.

OULDER HILLS ARS, GOUQA. Meets at the Oulder Community School, Hudsons Walk, Oulder Hill, Rochdale. Details from Carolyn Hope G7WFF. Tel: (01706) 522687.

ROCHDALE & DARS (RADARS), GOROC. Meets at the Barnfield & Fieldhouse, Cricket Club, Barnfield Village. Details from John Cannell G7OAI. Tel: (01706) 376204.

SOUTH MANCHESTER RAD & COMP CL, G3FVA. Meets at the Sale Cricket Club, Dawe Road, Sale, Cheshire. Details from Chris Ward G4HON. Tel: 0161-483 5174.

STOCKPORT RS, G6UQ, 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, GOTRC, G1TRC. Meets at the Watch House, Cruising Club, Canal Bank, Stretford, Manchester M32 8WE. Details from Roger May G4YLQ. Tel: (01457) 8666575.

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

WEST MANCHESTER RC, G4MWC. Meets at the Astley & Tyldesley Miners Welfare Club, Meanly Road, Astley, Tyldesley, Manchester. Details from Jeffrey Moran MOBGU. Tel: (01204) 497694.

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

ISLE OF MAN

ISLE OF MAN ARS, GD3FLH. Meets in the Sea Cadets Hall, Tromode Road, Tromode, Douglas. Details from Dave Walton MDOBXX. Tel: (01624) 816308.

LANCASHIRE

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

CENTRAL LANCS ARC, GOFDX. Meets at the Priory Club, Broadfield Drive, Leyland, Lancs. Details from Steve Shearing M1ACJ.

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

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

FYLDE ARS, RS53939. 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 Trimpell Sports & Social Club, Outmoss Lane, Morecambe, Lancs. Details from Brian Watson GORDH. Tel: (01524) 424522.

PRESTON ARS, G3KUE. Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from Eric Eastwood G1WCQ. Tel: (01772) 686708.

ROLLS-ROYCE ARC, G3RR. Meets at the Club Room, Rolls-Royce Sports Ground, Barnoldswick. Details from Mr J.A. York G3KYJ.

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

THORNTON CLEVELEYS ARS, G4ATH. Meets at the Frank Townsend Centre, Beach Road, Thornton Cleveleys, Lancs. Details from Mr J.E. Duddington G4BFH. 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, G2OA. Meets at St. Marks Church Hall, Scarisbrick, Lancs. Details from Don Atkins M1BUL.

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

WIRRAL ARS, G3NWR, MX1ARC. Meets at the Club Room, Ivy Farm, Arrowe Park Road, Wirral L49 5LW. Details from Alan Upton G3UZU. Tel: 0151-677 3266.

NORTH EAST

CLEVELAND

EAST CLEVELAND ARC, G4CRD. Meets at the Committee Room Of The New, New Marske Institute Club, Gurney Street, Cleveland TS11 8EG. Details from Malcolm Brass G4YMB. Tel: (01287) 638119.

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

CO DURHAM

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

DERWENTSIDE ARC, G4PFQ. Meets at the Steel Club, 36 Medomsley Road, Consett, Co. Durham. Details from Mr G. Darby G7GJU. Tel: 0191-370 2032.

GREAT LUMLEY AR & ES, G4EUZ. 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, GOKVJ. Details from Andrew Pennell GONSK.

HUMBERSIDE

EAST YORKSHIRE ARS, GOECR. 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, GOOLE. Meets at the West Park Pavillion, Goole, South Humberside.

GRIMSBY ARS, G3CNX. Meets at Cromwell Social Club, Cromwell Road, Grimsby, South Humberside. Details from Mr G.J. Smith G4EBK. Tel: (01472) 887720.

HORNSEA ARS, G4EXT. Meets at The Mill, Alwick Road, Hornsea, North Humberside. Details from Jeff Southwell G4IGY. Tel: (01964) 533331.

HULL & DARS, G3AMW. Meets at the SWL Centre, Club Room, Goathland Close, Walton Street, Hull. Details from Mr R. Hatton.

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

SCUNTHORPE STEEL ARC, G4FUH. Details from Allstair Butler M1ECF.

NORTH YORKSHIRE

DARLEY ARC, GOFOS.

HAMBLETON ARS, GOJQA. Meets at the Mencap Centre, Northailerton, N. Yorks. Details from Ian Brickwood GOJQA. Tel: (01609) 775598.

QUEEN MARY ARCG, G6QM. Meets at Blazefield, Pateley Bridge, Harrogate, 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 M1BDZ. Tel: (01423) 884733.

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

SCARBOROUGH ARS, G4BP. Meets at the Scarborough Cricket Club, Pavillion, North Marine Road, Scarborough, North Yorks YO12 7TJ. Details from Mr D.P. Tipper G3JBR. Tel: (01723) 377296.

SCARBOROUGH SE GRP, GX0000. 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 Nunnery Lane, York. Details from Keith Cass G3WVO. Tel: (01904) 422084.

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

NORTHUMBERLAND

NORTHUMBRIA ARC, G4AAX. Meets at the Old Telephone Exchange, Cresswell Road, Ellington, Morpeth, Northumberland. Details from Mr D. Stansfield GOEVV. Tel: (01670) 513026.

SOUTH YORKSHIRE

FINNINGLEY ARS, G7HAH. Details from John Fennell G4HOY. Tel: (01427) 872522.

MALTBY & DARS, G4SKM. Meets at the Centenary Hall, Clifford Road, Hellaby, Rotherham. Details from Keith Johnson G1PQW. Tel: (01709) 798098.

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

SHEFFIELD ARC, GOINF, NRAE/RAE tuition provided. Meets at the Sheffield University Staff Club, 197 Brook Hill, Sheffield. Details from Mrs Irene Glossop GOSFH.

TYNE & WEAR

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

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

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

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

WEST YORKSHIRE

DENBY DALE & DARS, G4CDD, G8KMK. Meets at the Pie Hall, Denby Dale, West Yorkshire. Details from Mr J.P. Morley G4FSQ.

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

KEIGHLEY ARS, GOKRS. 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, Yarnbury (Horsforth), RUFC Grounds, Brownberrie Lane, Horsforth, Leeds LS18 5HB. Details from Mr E. Howden GOIBU.

NORTH WAKEFIELD RC, G4NOK. Meets at the East Ardsley Cricket Club, Nr. Wakefield. Details from Mrs Olga Parker 2E1ASV. Tel: 0113-253 9087.

OTLEY ARS, G3XNO. Meets at The RAOB Club, Westgate, Otley, West Yorkshire. Details from Jack Worsnop GOSNV. Tel: (01274) 636197.

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

SPEN VALLEY ARS, G3SVC. Meets at the Old Bank WMC, Mirfield, West Yorkshire. Details from Mr J.R. Wilde GOFOI. 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 RPTR GP, GOKNR. Details from Mike Charlton G6OXZ.

WHITE ROSE ARS, G3XEP. Meets at the Moortown RUFC, 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 Chews House, 77 High Street South, Dunstable, Beds LU6 3SF. Details from Phil Seaford G8XTW. Tel: (01525) 384419.

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

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

CAMBRIDGESHIRE

CAMBRIDGE & DARC, G2XV. Meets at the Coleridge Community College, Radegund Road, Cambridge. Details from Ron Huntsman G3KBR. Tel: (01223) 501712.

DUXFORD ARS, GB2IWM. 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, Farcet Road, Fletton, Peterborough. Details from Alan D. Ralph G8XLH.

HUNTINGDONSHIRE ARS, GOHSR. Meets at the Medway Centre, Medway Road, Huntingdon. Details from David Leech G7DIU. Tel: (01480) 431333.

MARCH & DRAS, G3PMH. Meets at the British Legion Club, Rookswood Road, March, Cambs PE15 8DP. Details from Mr J. Braithwaite G3PWK. Tel: (01353) 698885.

PETERBOROUGH R & ES, G3DQW. Details from Mr V. Edwards G8NGZ.

WISBECH AR & ELEC. CLUB, M5ARC, G4PQL, G8NED. Meets at RAFA Club, Old Market, Wisbech. Details from Alan Bridgeland MODUQ. www.warec.org.uk

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BOLSOVER ARS, G4RSB. Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morris GORXT. Tel: (01246) 822856.

BUXTON RA, G4SPA. Meets at the Leewood Hotel, Buxton. Details from Derek Carson G4IHO. Tel: (01298) 25506.

DERBY & DARS, G2DJ. Meets at Carlton Road United Reform Church, Carlton Road, Littleover, Derby. Details from Martin Shardlow G3SZJ. Tel: (01332) 556875.

EREWASH VALLEY ARG, GOPCX. Meets at The Sitwell Arms Public House (between Horseley Woodhouse and Woodside). Details from Peter Russell MOAQI.

MOUNT ST. MARY'S ARC, G4MSM. Meets at the College, Spinkhill, Sheffield. Details from Rev. P. McArdle GODAG. Tel: (01246) 812230.

NOTTS & DERBY BORDER ARC, G4NID. Meets at Marlpool United Reform Church, Chapel Street, Marlpool, Ilkeston. Details from Graham Bromley G4UTN. Tel: (01773) 834308.

NUNSFIELD HOUSE ARG, G3EEO. Meets at the Nunsfield House, Boulton Lane, Alvaston, Derby. Details from William F. Smith G7PJJ.

STH DERBYS & ASHBY W ARG, GOSRC. Meets at the Moira Replan Centre, 17 Ashby Road, Moira, Swadlincote, Derbyshire DE12 6DJ. Details from Mrs B. Walley. Tel: (01283) 760822.

STH NORMANTON, ALFRETON & DARC, GOCPO. Meets at the New St. Community Centre, New Street, South Normanton, Derbyshire. Details from Peter Gething MOCLQ. Tel: 0115-955 5766.

GLOUCESTERSHIRE

CHELTENHAM AR ASSN, G5BK. Meets at the Prestbury Library, Prestbury, Cheltenham. Details from Ivan Wilson G4BGW. Tel: (01452) 731956.

CHELTENHAM CLUSTER SUPP GP, GB7DXC. Details from Mr A.M. Davies GOMDB. 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, G4MEN. 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 G3ILO.

WHITE NOISE LISTENING GOWNL. Details from Adrian Deane G7KCG.

HEREFORD & WORCESTER

BROMSGROVE & DARC, G3VGG. Meets at the Avoncroft Arts Centre, Bromsgrove, Worcs. Details from Mr J.F. Burford G4OAZ.

BROMSGROVE ARS, G4TUI. Meets at the Likey End WMC, Bromsgrove, Worcs. Details from Barry Taylor GOTPG. Tel: (01527) 542266.

DROITWICH ARC, G4PVO. Meets in the Community Hall, Doitwich Spa, Worcs. Details from Hector Wragg M1BUV. Tel: (01905) 794399.

HEREFORD ARS, G3YDD. Meets at the Civil Defence HQ, Magistrates Court, Gaol Street, Hereford. Details from Tim Bridgland-Taylor GOJWJ. Tel: (01432) 279435.

KIDDERMINSTER & DARS, GOKRC. Meets at the Sutton Arms, Sutton Park Road, Kidderminster, Worcs. Details from Mr A.W. Saunders GOOZB. Tel: (01299) 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@allenson.fsnet.co.uk

REDDITCH RC, G4ACZ. Meets at the WRVS Centre, Ludlow Road, Redditch, Worcs. Details from Mr R.J. Mutton G3EVT. Tel: (01789) 762041.

VALE OF EVESHAM RAC, GOERA. Meets at the BBC Club, High Street, Evesham, Worcs. Details from Mr A.C. Lindsay G4NRD. Tel: (01386) 41508.

LEICESTERSHIRE

1F ATC, G7MCD. Details from Sqn. Cmdr. Adrian Utting G1WZQ.

BEAUMANOR ARC, G3BMR

DEMONTFORT UNIVERSITY, G3SDC. Open to past & present students. Details from Mr R.G. Titterington. Tel: 0116-257 7059.

HINCKLEY AR & ES, G3VLG. Meets at the United Services Club, St. Mary's Road, Hinckley. Details from Mr R.A. Bennett G8BFF. Tel: (01455) 846493.

LEICESTER RS, G3LRS. Meets at Gilroes Cottage, Groby Road, Leicester LE3 9QJ. Details from Mr S.P. Hay G3HYH. Tel: 0116-224 2598.

LOUGHBOROUGH & DARC, G3RAL. Meets at Hind Leys College, Shepshed, Loughborough, Leics. Details from Chris Walker G1ETZ. Tel: (01509) 504319.

MELTON MOWBRAY ARS, G4FOX. Meets at the St. John Ambulance Hall, Asfordby Hill, Melton Mowbray, Leics. Details from Mr R. Winters G3NVK. Tel: (01664) 63369.

NATIONAL SPACE CENTRE ARS, M1NSC. Details from Mr J. Heath G7HIA.

TAMWORTH ARS, G8TRS. Details from Mr A.I. Dyson GOHJW. Tel: (01827) 830437.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The Secretary.

LINCOLNSHIRE

EAGLE RADIO GROUP, MOERG. Meets at the Eagle Hotel, Victoria Road, Mablethorpe. Details from Terry Stow GOSWS. Tel: (01507) 478590.

FIVE BELLS GROUP, G4SIV. Details from Mr B.K. Tatnall G4ODA.

GRANTHAM RC, GOGRC. Meets at the Kontak Social Club, Barrowby Road, Grantham, Lincs. Details from the Secretary. Tel: (01476) 657436.

LINCOLN SHORT WAVE CLUB, G5FZ. Meets At The Railway Club, Triton Road, Lincoln. Details from Mrs Pam Rose G4STO. Tel: (01427) 788356.

RAF CONINGSBY ARC, G3LQS. Meets at Essex Block, RAF Coningsby. Details from Peter Hanson GONVY.

RAF WADDINGTON ARC, G0RAF. Meets at Pyewipe Inn, Fossebank, Saxilby 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, RS91468. Details from Clive Ironmonger G6HYF. Tel: (01790) 752712.

NORTHANTS

KETTERING & DARS, G5KN. Meets at The Lilacs Public House, 39 Chuch 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 G0GBZ. Tel: (01327) 349188.

NORTHAMPTON SCOUT ARG, G6NDS. Meets at Overstone Scout Activity Centre, Northampton. Details from Ian Rivett G8WPU.

PARALLEL LINES CG, G4LIP. Details from Mr P.S. Lidsay G4CLA.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM, G3EKW. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XOU. Tel: 0115-919 9177.

DUKERIES ARS, G4XTL. Meets at Ambleside Community Centre, Ambleside, New Ollerton, 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 G4JSM.

MANSFIELD ARS, G3GQC. 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. G0WNN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8IGQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chris Archer G4VFK. Tel: 0115-943 3387.

SOUTH NOTTS ARC, G0OAU. Meets at the Fairham Community College, Famborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop G0WUG. Tel: (01509) 672846.

WORKSOP ARS, G3RCW. Meets at the Club House, 59-61 West Street, Worksop, Nottinghan S80 1JP. Details from Terry Caivert G4GBS. Tel: (01302) 743130.

SHROPSHIRE

OSWESTRY & DARC, G4TTO, G1ORA. Meets at the Sweeney Hall Hotel, Sweeney, Oswestry. Details from Ant Astley GW0AJA. Tel: (01691) 860545.

SALOP ARS, G3SRT, M1AXW. Meets at the Telepost Club, Railway Lane, Abbey Forgate, Shrewsbury. Details from John Bumford G0GTN. Tel: (01743) 249943. E-mail: john.bumford@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 G4HBY.

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 Swinfen Officer's Club, Swinfen, Lichfield, Staffs. Details from Bernard Jayne G8BFL. Tel: (01543) 268569.

LICHFIELD ARS, G3WAS. Meets at the Queens Head, Sandford Street, Lichfield. Details from Roger Smethers G3NLY. Tel: (01543) 672762.

MOORLANDS & DARS, G4NHT, G1MAD. Meets at the Creda Works, Blythe Bridge, Stoke-on-Trent, Staffs ST11 9LJ. Details from Mr B.J. Butcher G4HKG. 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 ARA, M0RAD. Details from Mr Peter Bradnam G0WXJ. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St. John Ambulance HQ, 61 Emscote Road, Warwick. Details from Bernard Pittaway. Tel: (01926) 420913.

RUGBY ATS, G4APD. Details from Tony Humphries G0OLS. Tel: (01455) 552683.

STRATFORD-UPON-AVON & DRS, G0SOA. Meets at the Home Guard Club, Tiddingham, Stratford-upon-Avon, Warks. Details from Ron Horsley G0MRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, G0NEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore 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, Sedgley, Central Library, St. James Road, Dudley. Details from Tony Lucas G4LVA. 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 & TVS, G3HPP. Meets at the Club Workshop, IMI Ltd., Sportsfield, 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 9DP. Details from Stuart Collins M0BTO. Tel: 0121-561 4663.

SIERRA HOTEL ARCG. G0OBS. Details from Warwick M. Hall G4WMH.

SOLIHULL ARS, G3GEI. 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, G6SRS. 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 Leitch G0PAI. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, G0COP, G1WMP. Details from Steven Jones G6LRL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villiers Street, Willenhall, 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 2E1AUQ.

BRACKNELL AEC, G4BRA. Meets at the Coopers Hill Community Centre, Bagshot Road, Bracknell, Berks. Details from John Ellerton G3NCN.

BURNHAM BEECHES RC, G3WIR. Meets at the Farnham Common Village Hall, Victoria Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G6EIL. Tel: (01628) 625720.

MAIDENHEAD & DARC, G3WKX. 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 Pavillion, Woodford Park, Haddon Drive, Woodley, Reading. Details from Mamoch 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. Thirlwell G0VFW. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4YAN. Tel: (01494) 534216.

MILTON KEYNES ARS, G3HIU. Meets at Bletchley Park Museum (The Green Room, B Block Annexe), Wilton Avenue, Bletchley, Milton Keynes. Details from Malcolm Bay M0MBO on (01525) 874075.

MILTON KEYNES SCOUT ARS, G0SMK. Meets at The Quarries, 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, Croydon. Details from Mr Q.G. Collier G3WRR. Tel: 0208-653 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 G0TLK.

CLIFTON ARS, G3GHN. Meets at the Kidbrooke House, Community Centre, 90 Mycenae Road, London SE3 7SE. Details from Mr J. Veaney G7BKH.

CRYSTAL PALACE & DRC, G3VCP. Meets at the All Saints Church, Parish Rooms, Beulah Hill, London. Details from Bob Burns G3OOU. Tel: (01737) 552170.

DARENTH VALLEY RADIO, G0KDV. Meets at the Crockenhill Village Hall, Swanley, Kent. Details from Mr K.W. Halls G8VJG. Tel: (01322) 663022.

ECHELFORD ARS, G3UES. Meets at The Community Centre, St. Martin's Court, Kingston Crescent, Ashford, Middlesex. Details from Robin Hewes G3TDR. Tel: (01784) 456513.

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 Fairkytes Arts Centre, 51 Billet Lane, Hornchurch, Essex.

RS OF HARROW, G3EFX. Meets at the Harrow Arts Centre, Uxbridge Road, Hatch End, Middlesex. Details from Mr C. Friel G4AUF. 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 ATC Hut, Commonside West, Mitcham, Surrey CR4 4HB. Details from Mr M. Knott G0WCR.

SOUTHGATE RC, G3SFG. Meets at the Winchmore Hill Cricket Club, Firs Lane, London N21 3ER. Details from Mr D.F. Berry G4DFB.

ST. DUNSTANS 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 Waldrons, Croydon, Surrey. Details from Maurice Fagg G4DDY. Tel: 0208-669 1480.

WEST LONDON ARS, RS95599. Details from Robin Clay G0VJI.

WHITTON ARG, 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, G7RIH, G0WIH. Meets at the Guide Meeting Rooms (next to the Royal British Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton G0TCD. Tel: (01442) 211925.

HODDESDON RADIO CLUB, G0TSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3JNJ. Tel: 0208-292 3678.

MIMRAM CONTEST GP, M0ABC. Details from Alan Holdsworth G8OO. Tel: (01707) 392950.

RADIO SCOUTING TEAM, GB2RST. Meets at Tolmers Scout Camp, Tolmers Road, Cuffley, Herts EN6 4JS. Details from Mill Livens G2CKB. 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, G8VER. Meets at the RAF Association HQ, New Kent Road, St. Albans, Herts. Details from Walter Craine G3PMF. Tel: (01923) 262180.

VERULM (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 G7PKF. Tel: (07973) 560649.

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, Grovelands Road, Purley, Surrey. Details from Andy Briers G0KZT. Tel: (01737) 552139.

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBOROUGH & DRS, G4FRS. Meets at The Community Centre, Meudon Avenue, Famborough, Hants. Details from Mr M. Hearsey G8ATK. Tel: (01252) 715765.

GUILDFORD & DRS, G6GS. Meets at the Guildford Model Engineers HQ, Stoke Park, Guildford, Surrey. Details from Stella Whitbourn G0SWE.

KINGSTON & DARS, G3KIN. Details from Mrs Mary Ashdown G0BQV.

REIGATE ATS, G5LK, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

SUTTON & CHEAM RS, G2XP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock G0BWV. Tel: 0208-644 9945.

THAMES VALLEY ARTS, G3TVS. Meets at the Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton, Surrey. Details from Cdr. J. Pegler G3ENI. Tel: (01483) 284279.

WIMBLEDON & DARS, G3WIM. Meets at St. Andrews Church Hall, Herbert Road, Wimbledon, London. Details from Mr Reg Blackwell M1EEK. Tel: 0208-696 9857.

SOUTH & SOUTH EAST

EAST SUSSEX

BRIGHTON RADIO CLUB, G4GQR. Meets at Vallance Community Centre, Sackville Road, junction of Connaught Road, Hove.. Details from Hon. Sec G0RNS. Tel: (01273) 699104.

CROWBOROUGH DARS, G0CRW. Meets at the Plough & Horses, Walshes Road, Jarvis Brook. Details from Mrs M. Clark. Tel: (01892) 663666.

EAST SUSSEX AMATEUR TV GROUP, RS178475 was GB3VX. Details from Keith Ellis G8HGM. Tel: (01323) 720220.

SOUTHDOWN ARS, G3WQK. Details from Jim Harris G4DRV. Tel: (01323) 728479.

THE QRZ ARG OF SUSSEX, GB3VX. Meets at the Coach Station, Wartling Road, Eastbourne. Details from Stuart Constable M0CHW. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER RAC, G0ARC. Meets at the Village Hall, Wildhern, Andover, Hants. Details from Mr R.S. Coleman G0WYD.

BASINGSTOKE ARC, G3TCR, G8JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown M0CJJ.

FAREHAM & DARC, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair G0AMS. Tel: (01329) 235397.

HIGHFIELD PARK RC, G4WD. Meets at Highfield Park RC, National Air Traffic Service, Highfield Park, Heckfield, Hants RG27 0LD. Tel: (01734) 225019.

HORNDEAN & DARC, G4FBS. Meets at Lovedean Village Hall, Lovedean Lane, Lovedean, Hants. Details from Stuart Swain G0FYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, G0IVR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants. Details from Sheila Williams G0VNI. Tel: (01703) 813827.

SONY BROADCAST ARC, G4SZC. 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, G3BZU. Meets at HMS Collingwood, Newgate Lane, Fareham, Hants PO14 1AS. Details from Mr W.S. Blyth G0PPH. Tel: (01329) 232386.

THREE COUNTIES ARC, G4WWR. Meets at the Bramshott Parish Inst. & Club, Headley Road, Liphook, Hants. Details from Damian Kamm G7RFV. Tel: (01428) 724456.

WATERSIDE ARS, G4JYN. Meets at the Applemore Scout HQ, Applemore, Hythe, Southampton. Details from Tony Horton G0LKG. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, G0BAR. Meets at Brickfields Horse Country Cent, Newnham Road, Binstead, Isle of Wight. Details from Mr Pebody.

ISLE OF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bembridge. Details from Alan 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 G1YSY. Tel/FAX: (01295) 253509.

HARWELL ARS, G3PIA. Meets at the Social Club, Harwell Laboratory, Didcot, Oxon. Tel: (01235) 223250.

OXFORD & DARS, G5LO. Meets at the Grove House Club, George Street. Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALE OF WHITE HORSE ARS, G5RP, G4VWH, G6VWH. Meets at The Fox, Steventon. 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 18, Tilgate Forest, Crawley, West Sussex. Details from Keith Farrow G8KZZ, 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 Marle Place, Leylands Road, Burgess Hill, West Sussex. Details from Mr C. Childs 2E1DCP. Tel: (01444) 244689.

T.S. VINDICATRIX ASN, G0WVB. Details from Don Still G0OOC.

WORTHING & DARC, G3WOR. Meets at the Lancing Parish Hall, South Street, Lancing, West Sussex.

WORTHING & DISTRICT VIDEO RG, GB3VR. Details from the Treasurer. Tel: (01903) 211919 (w).

WILTSHIRE

CHIPPENHAM & DARS, G3VRE. Meets at the Sea Cadet HQ, Chippenham. Details from Jon Ainge G4LGZ. Tel: (01249) 462610.

SWINDON & DARC, G3FEC. Meets at the Eastcott Community Centre, Savenake St., Swindon. Details from Den Forrest M0ACM.

TROWBRIDGE & DARC, G2BQY. Meets at the Southwick Village Hall, Southwick, Trowbridge, Wilts. Details from Ian Carter G0GRI. Tel: (01225) 864698.

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTOL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingswood, Bristol. Details from Dave Bendrey G7BYN.

GORDANO ARG, G6GRG. Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NORTH BRISTOL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bristol. Details from David Coxon G0GHM. Tel: (01275) 790448.

SEVERNSIDE TV GRDUP, GB3ZZ. Meets at NBARC, Filton, Bristol. Details from Paul Stevenson G8YMM. Tel: 0117-965 5386.

SHIREHAMPTON ARC, G4AHG. Meets at the TS Enterprise Sea Cadet Unit, Station Road, Shirehampton. Details from Mr R.G. Ford G4GTD. Tel: 0117-985 6253.

SOUTH BRISTOL ARC, G4WAW. Meets at the Whitchurch Folk House, East Dundry Road, Bristol. Details from Mr L.F. Baker. Tel: (01275) 834282.

THORNBURY & SOUTH GLOS ARC, G4ABC. Meets at the United Reform Church Hall, Rock Street, Thornbury, Bristol. Details from Stan Greenhill G0RYM. Tel: (01454) 413177.

WESTON-SUPER-MARE RS, G4WSM. Meets at the Woodspring Hotel, High Street, Worle, Weston-Super-Mare. Details from Stephen Cole G3YOL. Tel: (01934) 843144.

CORNWALL & SCILLY IS

CORNISH RAC, G4CRC. Meets at the Perran-ar-Worthal Village Hall, Perranwell, Nr Truro, Cornwall. Details from Mrs Cheryll Hammett 2E1ADQ. Tel: (01726) 882758.

NEWQUAY & DARS, G4ADV. Meets at the Trevigdas School, Newquay. Details from Mrs Maggie Reed G0KEM. Tel: (01726) 882752.

POLDHU ARC, GB2GM. Meets at the Club House, Poldhu Cove, Mullion, Cornwall TR12 7JB. Details from Mrs Carolyn Rule M0ADA. Tel: (01326) 240144.

SALTASH & DARC, G4GXK, G8SAL. Meets at the Toc H Hall, Warraton Road, Saltash, Cornwall. Details from Brian Giles. Tel: (01752) 844321.

ST AUSTELL ARC, G0ECC. Meets at Poltair School. Details from Reg Pears G4TRV. Tel: (01726) 72951.

DEVON

APPLEDORE & DARC, G2FKO. Meets at the Appledore Football Club. Details from Mr B. Jewell M0BRB.

AXE VALE ARC, G8CA, G7AXE. Meets at the George Hotel, Axminster, Devon. Details from Pat Cross G0GHH. Tel: (01297) 33756.

DARTMOOR RADIO CLUB, G1RCD, G0DRC. Meets at the Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Details from Ron Middleton G7LLG. Tel: (01822) 852586.

EXETER ARS, G4ARE. Meets at the Moose Centre, Spinning Path Lane, Blackboy Road, Exeter. Details from Ray Donno G3YBK.

EXMOUTH ARC, G0XRC. Meets at The Scout Hut, Marlpool Hill, Exmouth.

NORMAN LOCKYER OBSERVATORY ARG, G0AXC. Meets at the Norman Lockyer Observatory, Salcombe Hill, Sidmouth. Details from Ron Hamson G0NOC. Tel: (01395) 515349.

NTE (PAIGNTON) ARS, G0OSH. Meets at Paignton Community College, Upper School, Waterleat Road, Paignton. Details from Rod Maude G0SWM. Tel: (01803) 521066.

TORBAY ARS, G3NJA. Meets at the Highweek Family & Social Club, Highweek, Newton Abbot, Devon. Details from John Olway G3RMA. Tel: (01803) 556425.

UNIVERSITY OF PLYMOUTH ARS, G0UOP. 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. Marriott G0GFL. Tel: (01258) 860741.

BOURNEMOUTH RS, G2BRS. Meets at the Kinson Community Centre, Kinson, 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, G4PRS. Meets at the Bournemouth & 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 G1WIK. Tel: (01305) 788591.

SOUTH DORSET RS, G3SDS. Meets at the Church Hall, Chickerell, Weymouth, Dorset. Details from John Rose M0BQO. Tel: (01305) 832057.

SWANAGE & PURBECK ARC, M0BLJ. 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 G1NCG. Tel: (01202) 549376.

JERSEY

JERSEY ARS, GJ3DVC. Meets at the German Signal Station, Rue Baal, La Moye, St. Brelade. Details from Mrs Anne Mourant MJ0BJU. Tel: (01534) 734948.

SOMERSET

PRESTON COMMUNITY SCHOOL ARC, G0PCS. Details from Craig Douglas G0HDJ. Tel: (01935) 71131.

TAUNTON & DARS, G3XZW. Meets at The Memorial Hall, Trull, Taunton. Details from David Rosewarn M0CIF.

WEST SOMERSET ARC, G0OWX. Meets at the West Somerset Community College, Minehead, Somerset. Details from Robert Bonar G1ONV/M3ONV. Tel: (01643) 863462.

WINCANTON ARC, G0WRA. Meets at King Arthur's Community School, West Hill, Wincanton. Details from Mr G.A. Fingerhut G0ENW. Tel: (01963) 370506.

YEOVIL & DARC, G3CMH, G8YEO. Meets at the British Red Cross HQ, 72 Grove Avenue, Yeovil, Somerset. Details from George Davis G3ICO. Tel: (01935) 425669.

ESSEX

BRAINTREE & DISTRICT AMATEUR RADIO SOCIETY, G3XG. Meets at the Braintree Hockey Club, Church Street, Bocking, Braintree. Details from John M5AJB. 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@g0mwt.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 G3FU. Tel: (01206) 851189.

DENGIE HUNDRED ARS, G0UTT, G7SDH. Meets at the Henry Samuel Hall, Maryland, Essex. Details from Mrs Christine Wade. Tel: (01621) 772986.

HARLOW & DARS, G6UT. Meets at the Mark Hall Barn, First Avenue, Harlow, Essex. Details from Len Brackstone G7UFF. Tel: (01279) 832700. FAX: (01279) 864973.

HARWICH ARIG, G0GRH. Meets at the Park Pavillion, Barrack Lane, Harwich. Details from Eugene Kraft G4FTP.

LOUGHTON & EPPING FOREST ARS, G4ONP. Details from Marc Litchman G0TOC. Tel: 0208-502 1645/(07803) 023501.

SOUTH ESSEX ARS, G4RSE. Meets at the Paddocks, Long Road, Canvey Island, Essex. Details from Mrs Betty Maynard G6LUO. Tel: (01268) 695474.

SOUTHEND & DRC, G5QK. Meets at the Alexandra Yacht Club, Cliftown Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TTM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Parish Rooms, Scratton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 671238.

VANGE ARS, G3YCW. Meets at the Bamstable Community Centre, Basildon, Essex. Details from Mrs D. Thompson. Tel: (01268) 552606.

KENT

BREDHURST RX & TX SOC., G0BRC. Meets at Rock Avenue Working Mans 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, Eltham, London SE9. Details from Richard Perzyna G8ITB. Tel: (01689) 602948.

DOVER RADIO CLUB, G3YMD. Meets at the Dover Grammer School for Boys, Astor Avenue, Dover. Jim Cairns M1BKI. Tel: (01304) 852773.

EAST KENT RADIO SOCIETY, G0EKR. Meets at St. Bartholomew's Church Hall, Herne Bay. Details from Paul Nicholson G3VJF. Tel: (01227) 743070, FAX: (01227) 742288.

HASTINGS ELEC. & RC, G6HH, G1HHH, G6LL. Meets at West Hill Community Centre, Croft Road, Hastings, East Sussex. Details from Mr J. Boothroyd G0MTJ. Tel: (01233) 732656.

HILDERSTONE ARS, G0HRS. Meets at Hilderstone A.E.C., Broadstairs, Kent. Details from Mr G. Shaw M0AQA.

HOME COUNTIES ATV GRP, G6HCT. Meets at the Binfield Club, Binfield (near M4/J10). Details from Mr A. Brooker G4WGZ.

MAIDSTONE YMCA ARS, G3TRF. Meets at YMCA Sports Centre, Melrose Close, Maidstone, Kent. Details from Colin Wilson G0VAR. Tel: (01622) 736636.

MEDWAY ARTS, G5MW, G8MWA. Meets at Tunbury Hall, Catkin Close, Tunbury Avenue, Walderslade, 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. Fribbens G8MLQ. Tel: (01474) 365694.

SWALE ARX, G4SRC, G6SRC. Meets at the Ivy Leaf Club, Dover Street, Sittingbourne, Kent. Details from Gordon Powell M0AKA. Tel: (01795) 665559.

THE MORSE CLUB, GX0OXE. Meets at The Five Wents Memorial Hall, Swanley/Hextable Road. Details from Ken M3CZA. Tel: 0208-306 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, G0TXV. 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. Besford G3NHU.

GRESHAM'S SCHOOL ARC, GX3PXO. Details from Rev. R.N. Myerscough G3PXO.

KINGS LYNN ARC, G3XYZ. Details From Derek Franklin G0MQL.

NORFOLK ARS, G4ARN. Meets at Norwich Aviation Centre, Norwich Airport. Details from John Wadman G0VZD. Tel: (01953) 604769.

NORTH NORFOLK ARG, GB2MC. Details from Tony Smith G4FAI. E-mail g4ai@connectfree.co.uk

SUFFOLK

BURY ST. EDMUNDS ARS, G2TO. Meets at the Culford School Culford, Bury St. Edmunds, Suffolk. Details from George Woods G3LPT.

FELIXSTOWE & 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 G7CIY. Tel: (01394) 420226.

LEISTON ARC, GX6FS. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Paul Cattermole 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, Martlesham Heath, Ipswich, Suffolk. Details from Darren Hatcher. Tel: (01473) 644475.

SUDBURY & DRA. G0SWI, G7SRA. Meets at the Old School, Wells Hall Road, Great Comard, Sudbury, Suffolk. Details from Bryan Panton G1TWY.

SUFFOLK DATA GROUP, GB7MXM. Details from Peter Pryke G8HUE. Tel: (01473) 631313.

NORTH WALES

CLWYD

CONWAY VALLEY ARC, GW6TM. Meets at the Studio, Penrhos Road, Colwyn Bay, Clwyd. Details from Mr R.W. Evans GW6PMC. Tel: (01745) 855068.

HALKYN & DARS, GW3HRG. Details from Mr D. Austin GW1XHG.

NORTH WALES RS, GW0NWR. Meets at the Old YMCA, Queen's Drive, Colwyn Bay, Clwyd. Details from Ted Shipton GW0DSJ. Tel: (01745) 336939.

WREXHAM ARS, GW4WXM. Meets at the Community Centre, Maesgwyn Road, Wrexham. Details from Mr P. Moran GW0WER.

GWYNEDD

MEIRION ARS, GW4LZP. Meets at the Royal Ship Hotel, Dolgellau, Gwynedd. Details from Gervase Chavasse GW4URJ. Tel: (01341) 421028.

PORTHMADOG & DARS, GW0MVI. 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 Graig, Llanfaipwll, Isle of Anglesey. Details from Stewart Rolfe GW0ETF. 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

ABERPORTH YMCA, GW4SZV. Meets at the Hut B17, The Airfield, Aberporth. Details from Mr G. Carruther GW4HGJ. Tel: (01239) 811205.

ABERSYSTWYTH & DARS, GW0ARA. Meets at the Scout Hut, Plascrug Avenue, Aberystwyth. Details from John Woodward GW6IDK. Tel: (01970) 890657.

CARMARTHEN ARS, GW4YCT. Meets at The Aelwyd Care Home, Carmarthenshire County Council, Tregynwr Road, Llangunnor, Carmarthen SA31 3BS. Details from Mr W.D. Hughes GW4ZXL. Tel: (01267) 231359.

CLEDDAU ARS, GW0SYG. Details from Trevor Perry GW4XQK. Tel: (01646) 600725.

LLANELLI ARS. GW0EZQ. Meets in the Furnace Community Hall, Furnace Square, Llanelli. Details from Roy Jones GW0KJZK. Tel: (01554) 820207.

PEMBROKESHORE RS, GW0EJE. 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 GW0DQY. Tel: (01633) 483186.

BLACKWOOD & DARS, GW6GW. Meets at the Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Details from John Evans GW8ITI. Tel: (01495) 225178.

EBBW VALE COLLEGE RS, GW0IIW. Meets at the Gwent Tertiary College, Ebbw Vale Campus, College Road, Ebbw Vale, Gwent. Details from Mr T. Hayden GW0HCN. Tel: (01495) 305192.

NEWPORT ARS, GW4EZW. Meets at the Bryngias Community Centre, Bryngias Road, Newport, Gwent. Details from Paul Nicholls.

PONTYPOOL ARS, GW3RNH. Meets at the Settlement, Rockhill Road, Pontypool, Gwent. Details from Graham Smith GW0OLZ.

MID-GLAMORGAN

BRIDGEND & DARC, GW4LNP. Meets at the Club Brynmenyn, Brynmenyn, Bridgend. Details from Alun Hulmes. Tel: (01656) 721574.

HOOVER (MERTHYR) ARC, GW3RDB. Meets at the Hoover Sports Pavillion, Hoover Ltd., Pentrebach, Merthyr Mydfil, Mid Glamorgan. Details Robert Cummings GW0RVG.

MID GLAMORGAN ARG, MW0CNA. Meets at Aberkenfig Sports & Social Club. Details from Mervyn Carey GW4VSE. Tel: (01656) 734668.

SOUTH GLAMORGAN

BARRY ARS, GW3VKL. Meets at Sully Sports & Leisure Club, South Road, Sully, S. Glamorgan. Details from Richard Mortimore GW4BVJ. Tel: (01446) 738756.

HIGHFIELDS ARC, GW4LFO. Meets at the Highfields Physically Handicapped Centre, Allensbank Road, Cardiff. Tel: (01222) 561542.

WEST GLAMORGAN

PORT TALBOT (BS PLC) ARS, GW3EOP. Meets at the British Steel PLC Sports & Social Club, Margam, Port Talbot, West Glamorgan. Details from Mr J. Chinnock MW0AGE.

SWANSEA ARS, GW4CC. Meets at the Applied Sciences Building, Swansea University. Details from Frank Burrow GW8BME. Tel: (01792) 390233.

SCOTLAND WEST & WESTERN ISLES

CENTRAL REGION

FALKIRK & DARS, GM0FRC. Meets in the 62nd Forth Valley Scouts Hall, Denny Road, Larbert, Nr. Falkirk. Details from Brian J. Waddell GM4XQJ, QTHR or E-mail: gm4xqj@btinternet.com

STIRLING & DARS, GM6NX. Meets at Bandeath Industrial Estate, Throsk, Nr. Stirling. Details from John Sherry GM0AZC. Tel: (01324) 824709.

DUMFRIES & GALLOWAY

WIGTOWNSHIRE ARC, GM4RIV. Meets at the Aird Unit, Stranraer Academy, Stranraer, (entrance from Calmport Road). Details from Neil Macdonald GM4LQS.

STRATHCLYDE

AYR ARG, GM0AYR. Meets at the University of Paisley, University Campus, Beech Grove, Ayr KA8 0HN. Details from John Shankland MM1JAS. Tel: (01292) 445599.

CENTRAL SCOTLAND FM GROUP, RS38728. Details from Thomas Stalker GM7TZU. Tel: (01698) 816793.

DALRY ARG, MM0ARG. Meets at The Turf, In Dalry Court, Hill Street, Dalry. Details from Alex McKeeman MM0ABM. Tel: (01294) 823295.

DUNOON & DARS, GM0COD. Meets at the Edward Street Community Centre, Edward Street, Dunoon. Details from A.B. Horton GM0BUL. Tel: (01369) 840217.

HELENSBURGH ARC, GM4HEL. Details from G. Capstick GM7OAF. Tel: (01436) 675922.

INVERCLYDE ARG, GM0GNK. Meets at the Cardwell Bar, Cardwell Road, Gourock, Strathclyde. Details from Andrew Givens GM3YOR. Tel: (01475) 638226.

KILMARNOCK & LOUDOUN ARC, GM0ADX. Meets at the Hurlford Community Centre, Cessnock Road, Hurlford. Details from Steve Campbell GM4OSS. Tel: (01560) 483800.

LARGS & DARS, GM0VKG. Details from Mr J. Clough GM0MDD. Tel: (01475) 568584.

LORN ARS, GM0LRA. Details from T. Olsen GM0EQW. Tel: (01866) 2580.

MID LANARK ARS, GM3PXK. Meets at the Newarthill Community Ed. Cent., High Street, Newarthill, Motherwell, Lanarkshire ML1 5GU. Details from John Neary GM0XFK. Tel: (01698) 822860.

MILTON OF CAMPSIE ARS, GM0MOC. Meets at The Red Cross Hall, Kirkintilloch. Details from John MacKenzie GM0HJU. Tel: (01360) 312954.

PAISLEY ARC, GM0PYM. Meets at the Paisley YMCA Hall, 5 New Street, Paisley PA1 1XU. Details from John Quigley GM0TQA. Tel: 0141-889 6860.

SCOTTISH DIGITAL COMMS. GRP, GM7VSR. Details from Stuart Clink GM1VBE. Tel: (01698) 884803.

WEST OF SCOTLAND ARS, GS4AGG. Meets at the Multi Cultural Centre, 21 Rose Street, Glasgow. Details from Hon. Sec.

SCOTLAND EAST & HIGHLANDS

BORDERS

BORDERS ARS, GM0BRS. Meets at the St. John Ambulance Hall, Berwick-upon-Tweed. Details from A.M. McCreadie GM0BPY. Tel: (018907) 50492.

GALASHIELS & DARS, GM4YEQ. Meets at the Focus Centre, Galashiels. Details from Jim Keddie GM7LUN.

KELSO ARS, GM4KHS. Meets at the Abbey Row Community Centre, Kelso. Details from Margaret Chalmers GM0ALX. Tel: (01573) 226372.

FIFE

GLENROTHES & DARC, GM4GRC. Meets at the Football Pavillion, Station Road, Thornton, Fife. Details from Alexander Adam GM0FVD. Tel: (01592) 874374.

GRAMPIAN

ABERDEEN ARS, GM3BSQ. Meets at the Red Cross HQ, 22 Queens Road, Aberdeen. Details from Robert Duncan. Tel: (01224) 896142.

BANFF & DARC, GM0PYC. Meets at the Princess Royal Park Football Ground, Conference Room (Deveronvale F.C.), Banff. Details from Steve Roberts GM4HWS. Tel: (01888) 551377.

MORAY FIRTH ARS, GM3TKV. Meets at the Grant Arms Hotel, Fochabers. Details from Geoff Crowley GM7SJC. Tel: (01542) 882818.

HIGHLAND REGION

FORT WILLIAM ARG, GM0FRG. Details from R. Johnstone GM1YGV. Tel: (01397) 703046.

INVERNESS ARC, GM4TPF. Meets at The Emergency Operations Centre, Inverness (except July and August). Details from R.F. Goodall GM0OGZ. Tel: (01463) 811701.

LOTHIAN

COCKENZIE & PORT SETON ARC, RS177035. Meets at the Thorntree Inn, Lounge Bar, Old Cockenzie High Street. Cockenzie, E. Lothian. Details from Mr Bob Glasgow GM4UYZ. Tel: (01875) 811723.

LOTHIANS RS, GM3HAM. Meets at the Orwell Lodge Hotel, Polwarth Terrace, Edinburgh EH11 1NH. Details from Thomas G. Main, Sec.

ORKNEY

ORKNEY ARC, RS181749. Details from Mrs Terry Penna. Tel: (01856) 741233.

SHETLAND ISLANDS

LERWICK RC, GM3ZET. Meets at the Islesburgh Community Centre, King Herald Street, Lerwick, Shetland. Details from Ian C. Millar GM7RKD. Tel: (01950) 460306.

TAYSIDE REGION

DUNDEE ARC, GM4AAF. Meets at the Dundee College, Graham Street Annex, Dundee. Details from Martin Higgins MM0DUN, c/o Dundee ARC, 60 Duns Crescent, Dundee DD4 0RZ

PERTH & DARG, GM4EAF. Meets at the Perth Sports & Social Club, 18 Leonard Street, Perth. Details from Ron Harkess GM3THI. Tel: (01738) 643435.

STRATHMORE & DARC, GM3GBZ. Meets at 2231 Sqdn ATC, 1 Lochside Road, Forfar. Details from Graham Scattergood MM0BSX. Tel: (01307) 468824.

N. IRELAND

CO. ANTRIM

ANTRIM & DARS. Meets at the Clotworthy Arts Centre in the Castle Grounds in Antrim. Details from David Hutchinson GI4FUM or visit www.gn4siw.co.uk

BALLYMENA RC, GI3FFF. Meets at 70 Nursery Road, Gracehill, Ballymena, Co. Antrim. Details from Jeffery Clarke GI4HCN. Tel: (01266) 659769.

CARRICKFERGUS ARG, GI0LIX. Meets at the Downshire Community School, Downshire Road, Carrickfergus. Details from John Branagh GI3YRL. Tel: (01960) 367208.

GLENGORMLEY ELECTRONICS ARS, GN0XYZ. Meets at Knockagh Lodge, 236 Upper Road, Greenisland, Co. Antrim. Details from James Hoey GI0BJH, E-mail: gi0bjh@ntlworld.com

LAGAN VALLEY ARS, GI4GTY. Meets at the Harmony Hall Arts Centre, Harmony Hill, Lisburn, Co. Antrim. Details from Ron McCaughey GI4NTO.

ROYAL NAVY (ULSTER) ARC, GI0URN. Club affiliated to the Royal Navy Amateur Radio Society. Details from Alex Miller GI4SFV.

CO ARMAGH

ARMAGH & DARC, GI0ADD. Meets at County Armagh Golf Club, 7 Newry Road, Armagh City. Details from John A. Murphy. Tel: 0283-752 2153.

CO. DOWN

BANGOR & DARS, GI3XRQ. Meets at The Stables, Groomsport, Co. Down. Details from Terry Barnes GI3USS. Tel: 0289-147 3948.

NEWRY & MOURNE ARC, GI4MBO. Meets at the Shamrock Social Club, Newry.

ULSTER DX ARG, MI0UDX. Details from Mr P.G. Mercer GI4VIV.

CO. FERMANAGH

LOUGH ERNE AMATEUR RADIO CLUB GI0LEC. Meets at the Railway Hotel, Forthill Street, Enniskillen, Co. Fermanagh. Details from Herbie Graham GI8JPO. Tel: 02866 387761.

TYRONE

THE FOYLE & DARS, MI0AKU. Meets at 159 Victoria Road, Bready, Co. Tyrone. Details from Trevor Campbell GI1XGA. Tel: 0287-134 5405.

International Radio Clubs

AMSAT-UK (G0AUK)
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)
Contact Membership Secretary Andrew Thomas G8GNI, M5AEX, Dame School House, 103 High Street, Stony Stratford, Buckinghamshire MK11 1AT, E-mail: members@bartg.demon.co.uk or visit www.bartg.demon.co.uk

British Amateur Television Club (BATC - RS38114)
Enquiries to Dave Lawton G0ANO, 'Grenehurst', Pinewood Road, High Wymcombe, Bucks HP12 4DD. Tel: (01494) 528899. E-mail: memsec@batc.org.uk or visit www.batc.org.uk

British DX Club (BDXC-UK)
Enquiries to Club Secretary Colin Wright, 126 Bargery Road, London SE6 2LR. E-mail: secretary@bdxc.org.uk or visit www.bdxc.org.uk

Danish Shortwave Club
Information from Treasurer Bent Nielsen, Egekrogen 14, DK-3500 Vaerloese, Denmark or visit www.dswci.org

International Listeners' Association (RS88763)
Details from Trevor Morgan GW4OXB, 1 Jersey Street, Haford, Swansea SA1 2HF. E-mail: gw4oxb£net.ntl.com

International Short Wave League (ISWL - G4BJC)
Information from Honorary Secretary Bill Mackie G-9137/G4AIE, 23 College Park, Horncastle, Lincs LN9 6RE. E-mail: bill.mackie@zetnet.co.uk or visit www.iswl.org.uk

Military Wireless Amateur Radio Society (G0PTZ)
Further details from John Taylor-Cram, 7 Hart Plain Avenue, Cowplain, Waterlooville, Hampshire PO8 8RP. Tel: 0239-225 0463.

Radio Amateurs Invalid and Blind Club (RAIBC - G4IBC, GB0IBC, GB1IBC)
Enquiries to Honorary Treasurer/Membership Secretary Mrs Shelagh Chambers, 78 Durley Avenue, Pinner, Middlesex HA5 1JH. Tel: 0208-868 2516.

***Radio Amateur Old Timers' Association**
Enquiries to Membership Secretary Ted Rule, G3FEW,15 Norwich Road, Lenwade, Norwich NR9 5SH. Tel: (01603) 872309, E-mail: edit@raota.fsnet.co.uk or visit www.raota.supanet.com/

Remote Imaging Group (RS88803)
Further details from the Membership Secretary John Din, 59 Woodend Road, Coalpit Heath, Bristol BS36 2LH. FAX: (01454) 887880. E-mail: membership @rig.org.uk

Royal Air Force Amateur Radio Society (RAFARS - G8FC, G8RAF)
Details from the Administrator, HQ RAFARS, RAF Cosford, Wolverhampton WV7 3EX. Tel: (01902) 372722, E-mail: administrator@rafars.org

Royal Navy Amateur Radio Society (RNARS - GB3RN, G3CRS, G1BZU)
Enquiries to Secretary Philip Manning G1LKJ/M3LKJ, 1 Wavereley Gardens, Ash Vale, Surrey GU12 5JP. Tel: (01252) 334929, E-mail: g1lkj@amsat.org or visit www.rnars.org.uk

Royal Signals Amateur Radio Society (RSARS - G4RS)
More information from General Secretary, HQ RSARS, Cole Block, Blandford Camp, Dorset DT11 8RH. Tel: (01258) 482814, E-mail: gensec@rsars.org.uk or visit www.rsars.org.uk

The Medium Wave Circle
Details from c/o C. Rooms, 59 Moat Lane, Luton LU3 1UU. E-mail: contact@mwcircle.org

Shack Web

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

Hello and welcome once again to 'ShackWeb' with a round-up of radio, computer, kit and home-brew oriented web stuff. First up this time is, I'm sorry to say, a disappointed reader from Hampshire, so without further ado...

The Last Amstrad

Following on from the potted history of Amstrad's excellent CP/M computers from the mid-1980s in the last instalment of ShackWeb, I had an E-mail from **James Taylor** of Ringwood, Hampshire, who writes: "I read your history of the Amstrad computers with great interest because I acquired one of these (a PCW8512) in 1988 and enjoyed many years of computing with it (and yes I built the Lowe HF-225 keypad adapter from the November 1994 issue) before it finally went 'kaput'. I was then told it would be cheaper to get a new PC clone than repair a 'non-standard' computer. This I did although I now realise that all that was wrong with my Joyce was the disc drive belt - a simple thing to replace. Alas I was a lot less knowledgeable then about computers and I was persuaded to buy a PC! That was the end of my Amstrad computing until a few years ago (six to be exact) when I saw a new Amstrad machine in the window of my local Dixon's electrical shop which was being offered at a big discount as it was a discontinued model. On a whim I bought the computer, known as a PCW16, but apart from a day or two of 'playing' with it, it has sat in a cupboard ever since. The computer has built-in software and uses a mouse and a 3.5in disk drive but can't run *CP/M* and seems limited to being just a word processor. Imagine my disappointment then when, reading your column and discussion of the Amstrads, you dismissed the PCW16 with the phrase: 'Two or three more incarnations followed before the range was shelved in the mid 1990s'! Could you therefore correct the situation and provide some details of the machine or point me to some Internet resources before the few remaining owners including myself feel compelled to bin them?".

Well, James, I'm truly sorry to hear that a 'ShackWeb' instalment gave disappointment and I will certainly redress the situation forthwith! The PCW16 was indeed the last in a long line of Amstrad dedicated word processors which began back in the middle 1980s with the PCW8256 and culminated in the computer you have in your cupboard. Amstrad's belief in a reasonably-priced, well-spec'd computer that would do exactly what it's owners wanted without them having to take a degree in computer science was certainly a sound one and the company's products fared very well and lasted long beyond the Spectrums, C64s and the like. Indeed, many happy users continued well into the 1990s and generally only gave up because their computers broke and were unrepairable due to a lack of spares or some such.

The logic that led Amstrad to create the Joyce was also behind the launch of the PCW16, another computer with a dedicated range of tasks and designed to be used by the non-computer literate.

At the heart of the PCW16 is that venerable old 8-bit CPU, the Zilog Z80, though this time in 16MHz guise. The compact and nicely-styled computer features a 3.5in disk drive (Amstrad had abandoned its support of the 3in variety by the 1990s) which can swap disks with the PC and the PCW range (retro-fitted with 3.5in mechs) and at the rear there are ports for a mouse and a parallel printer.

The PCW16 sports a custom GUI operating system known as *Rosanne*, which is reminiscent of the pre-*OSX* Macintosh. The OS is loaded from a 1Mb flash ROM which can be updated from floppy disk and appears as soon as the computer is powered up. A non-volatile 1MB RAM provides working space and means that you can switch the machine off mid-click as it were and back on again later without losing data. There's a real-time clock, diary, word processor, spreadsheet and cardfile, calculator and an address book available from a front-end menu screen, but no *CP/M* which, at first glance, would seem to cripple the computer for 'serious' use.

In fact, that Z80 means that *CP/M* is a possibility and it wasn't long before a chap called John Elliot, interested in all things Digital Research (the company behind *CP/M*) provided a version (2.2 but it can be updated to 3 if you have access to a Joyce). The Elliot *CP/M* does not run natively (i.e. it runs like an emulator) but it works very well and gives access to many excellent *CP/M* programs.

In the computer world, 'dedicated' can sometimes equate to 'limited' and it's fair to say that the PCW16 appeared too late in the day to make a dent in the market. It was soon discounted, the remaining stocks were sold off to Dixons and then the machine disappeared altogether. Today, they occasionally come up for sale on auction sites, but most probably ended up as landfill.

There are websites devoted to the machine but they're dwindling all the time. So, for those owners who want to fish them out of the attic, dust them off and have a tinker, the first point of call is John Elliot's PCW16 pages at **www.seasip.demon.co.uk/Cpm/pcw16.html** where you can freely download *CP/M* as well as soak up some excellent technical information. For the less technically-oriented, the 16 Storm site at **www.aster.fsnet.co.uk/pcw16.htm** offers lots of detailed information, programming tips, software to download and insights. For both these sites my advice is to see 'em while you can!

Discrete Information

Though the comforting glow of a valve in full fettle is for some radio enthusiasts the ultimate in hardware, it is arguably the humble and far more prosaic transistor which is synonymous with the listening experience. Indeed, in much the same way that vacuum cleaners are known as Hoovers, pocket-sized receivers were, until very recently, known simply as 'transistors' (shortened from 'transistor radio') - think sixth-form common room and the week's new top 20 record chart on a Tuesday lunchtime (which dates me horribly I know!). *Me too, I remember huddling around a radio in the classroom just before one o'clock!* **- Ed.**

At the heart of those eponymous transistors were simple *npn* and *pnp* silicon or germanium junctions which exhibited the curious property of passing electrons in a predictable way which could be put to use at its simplest as a switch and, with a bit more effort, as an r.f. or audio amplifier. The first transistor was built in 1947 at the American Bell labs and by the 1950s, they were being manufactured in quantity and used in applications as diverse as radios and computers.

As you might imagine there are those who collect early transistors - i.e. the discrete components - and, given the wonderful and infinite variety of the web, their activities can be read about and enjoyed. And it is enjoyable too. The story of the invention, information about the various types of transistor and the applications in which they're used makes for fascinating reading and is for most of us s.w.l.s an extension of the technology we're all interested in.

One of the most enjoyable sites devoted to transistors is that of Mister Transistor, **Andrew Wylie**, who lives in Purley not far from London. Andrew's website is packed with pictures and details of pre-1970 transistors including variants from major and obscure manufacturers and even a home-made example - apparently, a number of texts were available which encouraged amateur experimenters to create their own transistors from germanium diodes!

Another excellent site is the Transistor Museum at **www.semiconductormuseum.com/Museum_Index.htm** which offers images and information on many rare and interesting devices as well as Historic Construction Projects one of which details an audio amplifier built they way it would have been in 1956. The 'museum' also supplies a Germanium Transistor Experimenter's Pack (priced at a very reasonable $20) which includes four 1950s-60s vintage germanium transistors and plans for using them in several classic construction projects - fantastic stuff!

For those whose interest is directed to the east, point your browser at **www.leninburg.com/trans** the web pages of Sergei Frolov which sport much information on classic Soviet devices (you'll need a translation service unless you speak Russian - Babelfish at **babelfish.altavista.com** is the best).

And Finally

If the kind of transistor you're interested in is the gaily-coloured plastic affair clamped to the ears of teenagers from the 1960s to the 1980s, there are any number of fabulously informative web pages and next time I hope to present URLs for some of the best alongside the usual blather about web casts, old technology and downloadable software. Until then good surfing and good listening.

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***AOR AR8200 MkII receiver**, mint condition, unwanted gift, little used, £175 o.v.n.o. Roger Lee, Leicester. Tel: 0116-233 1308.

Icom IC-R75 DX receiver, all-modes, d.s.p. plus voice synthesiser fitted, p.s.u., handbooks, exellent condition, ill health forces sale, £475. Tel: 0191-488 8338.

***Icom R8500**, APL2003, v.g.c.,

buyer collects, £750 cash only. Tel/FAX: 0208-310 7162.

MFJ optimiser, c.w./notch filter, model MFJ-723, plugs into record/speaker jack, w/spkr or headphone output, £30. Tel: Northampton (01604) 830176.

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Sanyo 9-band receiver RF8880 b.f.o., n/wide bandwidth, £90 o.n.o. Buyer collects. Tel: 0208-561 8853.

SWL FRG-100, bought '03, mint, FL3 filter, two AD370 Datong antennas, NES10-2 digital speaker, mint AR60 antenna, receipts, manuals, buyer to dismantle please, hence, £330. Tel: 0191-526 7902.

***Ten-Tec RX-340 d.s.p. receiver**, mint, £2500. Racal RA1772, clean, £300. Icom IC-R71E, fair condition, £250. Wanted AOR AR7030+ with

Collins filter, may swap deal above, boxed, mint only. Tel: Essex (01279) 815020.

WANTED

Marconi Canadian No. 52 wireless set, must be working and original condition, modified to 240V a.c. acceptable. Tom, Scarborough. Tel: (01723) 870933.

Universal decoder M8000 MkII. Tel: N. Ireland 028 38324855.

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SWM Jul '04 TP

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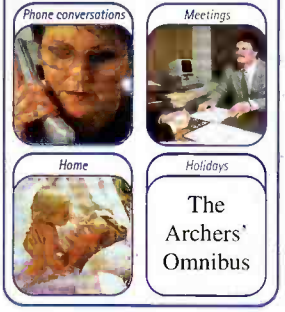

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