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The SHORT WAVE Magazine SWM

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66th year of publication

The SHORT WAVE Magazine

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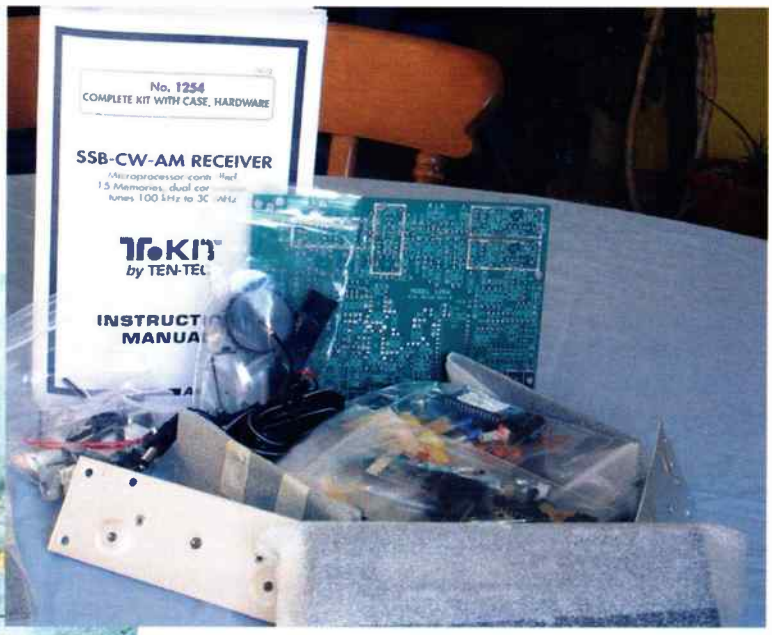

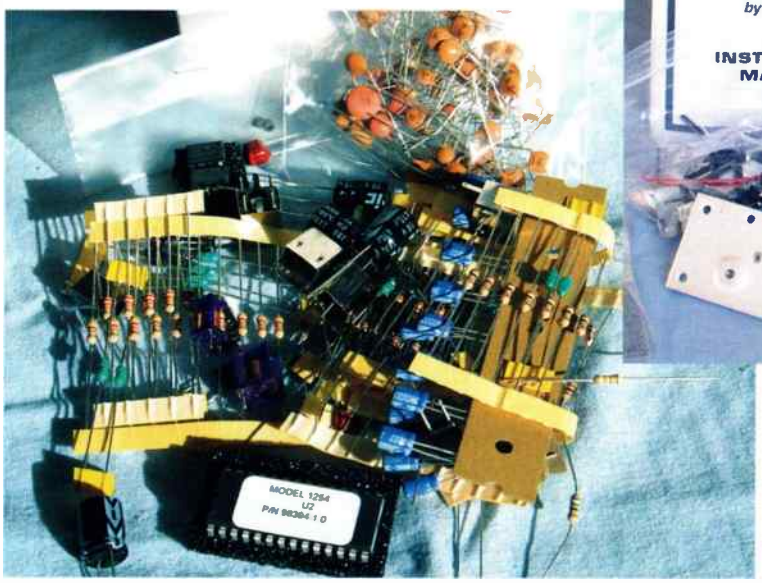

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- *Building a TT1254 with the Ed - Conclusion.*
- *G3SWM on air for a day.*
- *Keep on top of the world of monitoring with SWM.*
- *and much more...*

**contents subject to change*

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

Photocopies & Back Issues
We have a selection of back issues, covering the past three years of *SWM*. If you are looking for an article or review that you missed first time around, we can help. If we don't have the whole issue we can always supply a photocopy of the article. Back issues for *SWM* are £3.25 each and photocopies are £2.50 per article.
Binders are also available (each binder takes one volume) for £6.50 plus £1.50 P&P for one binder, £2.75 P&P for two or more, UK or overseas. Prices include VAT where appropriate.
A complete review listing for *SWM/PW* is also available from the Editorial Offices for £1 inc P&P.

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

ED's comments

Just two days ago on 'Star Wars Day', G3SWM was on air for twelve hours in support of the first ever *SWM* listening contest and the memory of the day's operating are still very fresh in my mind - so is getting up at 0500 after a mere four hours sleep to get to the station caravan a couple of kilometres up the road in Portland to be there for the 0600 (local) start. (Thanks Toby, for the loan of the very comfortable lounge floor to bed down on).

In spite of the day proving very successful, with everyone involved seeming to have enjoyed the exercise greatly, things did start rather slowly.

The 40m band was awash with very loud Italian stations involved in local contest activities, we had tremendous difficulty finding a clear slot for our day's activity. It was after 38 minutes of calling CQ the first contact was made. The very loud activity that surrounded us, made copying anything other than big signals very difficult indeed so sadly, the DX we'd anticipated didn't materialise and the day saw the station working mainly UK stations and EIs. Lots of stations that we did work told us that there were many stations calling at all times. I discovered today via *PW*'s Editor Rob G3XFD that at least one G0 station patiently tried for two hours before he was able to make himself heard by G3SWM.

I'd like to thank everyone who had a similar experience for their perseverance. For that matter, I would like to express my thanks to everyone who made the event possible, the guys from the Dorset Police Amateur Radio Club, who willingly gave their time to both organise many aspects of the day's station and spend time operating and logging. What a fantastic job they did. They also provided the accommodation in the shape of the caravan, the rig and generator to name but a few of the items. This really does show the generous spirit of amateur radio. Also deserving a huge thanks are Bob Burrows and the staff of the Shortwave Shop, who willingly gave their time to assist with delivering the caravan to the Portland location and in helping to erect the h.f. antennas on the Saturday before the on-air day. David Wilkins at Kenwood is also to be thanked for providing the headphones for the station, he would have provided more kit, but we ended up not needing anything else.

I've yet to judge how many entries for the listening contest we're likely to receive, but I can say without hesitation that the G3SWM aspect of the event was a fantastic success and based on this I have every intention of running a similar event in 2004.

Read a full account of the days proceedings in next month's *SWM* and if you missed out on the day's fun this year, then look out for next year's contest only in *Short Wave Magazine*!

Some of the people who made it all happen.

With the action in the 'van. G4SLU, G0SKR and G7TZC.
Photo Richard Newton.

D-STAR

Recently, I was invited to a product launch at Icom (UK) Ltd.'s Herne Bay headquarters. There was a useful presentation regarding two new interesting amateur transceivers, but the real purpose of the event was to demonstrate D-STAR, an all new digital radio system for radio amateurs.

The D-STAR system looks very interesting indeed, it could well end up providing the kind of coverage that we currently enjoy from the cellular telephone providers' but without the usage costs! Unlike the services that the mobile 'phone companies provide, there is real scope for high bandwidth datacoms, the like of which that will make the current crop of 'picture 'phones' seem very inadequate indeed. The system is effectively a cellular one due to the frequencies employed. There are two links employed in a network, a local user 'cell' operating in the 1.2GHz amateur band and a 10GHz 'backbone' link providing both interconnectivity between the 1.2GHz cells and higher bandwidth - up to 10Mb/s - entry points.

Icom's D-STAR mobile digital transceiver.

Off The Record

Sadly, Andy Cadier has decided that after writing 'Off The Record' for the past 13 years, it's time to leave the keyboard alone and pass the job to someone else. I've already had some enquiries from readers who are interested in taking over the bi-monthly column, but I'd like to cast the net a little wider and ask that anyone who feels they would like to take the column on, please contact me via the usual methods as listed on the contents page. That just leaves me to thank Andy for his sterling efforts in bringing us 'Off The Record' for all those years. Many many thanks Andy and good luck with the future.

73 Kevin

qsl

Is there something you want to get off your chest? Do you have a problem fellow readers can solve? If so then drop a line to the Editor at QSL, Short Wave Magazine, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.

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

topqsl

Dear Sir

I really enjoy reading *SWM*. I am the proud owner of a Yaesu FRG-7 from which I get some excellent listening, however, as I live at a small seaport, which handles a lot of coastal shipping, I would really love to get to learn of some good reasonable priced or second-hand radios with a shipping band, for receiving only. I would be greatly pleased for any useful information.

James Taylor
N. Ireland

James, your FRG-7 will give you access to all the h.f. ship-to-shore frequencies. For v.h.f. traffic, you need a receiver that covers 156-164MHz n.b.f.m. Take a look through the adverts in this issue and you'll find many that will suit. ***- Ed.***

Dear Sir

I felt I had to respond to the letter from Howard Grundey on the Isle of Man regarding the exchanging of QSL cards from, as he put it, 'The upper echelons of radio operators'.

I was a CBer for a good many years and in one year alone, sent out 1963 cards, plus telephone card exchanges, an offshoot hobby of working the skip on 27MHz. The response, 1750 cards with almost the same amount in 'phone cards by return.

Now that I have an M3 call and proud of it, I find that many promises regarding such cards are given over the amateur bands. The strange thing is most of the time I don't ask for one and yet get '100% my card via the bureau' ending a QSO. My ploy is if I really want a card, is from the moment of contact ask, "Is it possible to obtain your QSL card Old Man?", this may put him on his guard or wake him up to the fact that you wish to carry on with this long tradition. Do not right away give a signal report that is unless you like saying '5 and 9' all the time, if you have made contact with an let's say an echelon of advanced years, the response may well be, "QSL cards, I have 20 shoe boxes full of them", followed by" gave up sending those out many years ago" whether you then wish to continue with the QSO is up to you, but don't be rude.

I feel that if all M3s - of which I understand there are now well over 6000 took the same approach, then the interest in QSL card exchanging would be renewed. I also feel sure someone will pick up on that comment, with some silly remark, most likely referring to amateur radio as a contact hobby, not a hobby for collectors, but that is what the verification card was and still is and Howard on the Isle of Man must have an equally nice card to obtain, let's hope I make the trip r.f. wise to your QTH soon.

Of course, the main problem of people not sending QSL cards is the cost, for instance, the cost of printing the most basic QSL card in black and white at a run of 500 (minimum order) is unfortunately about 9.45p a card (yes, one card), that's £47.25 if you say it quickly, so yes, sending these cards is costly - envelopes, postage, time consuming, but costs can be cut to a fraction with a scanner - printer - copier, four cards on a A4 sheet or thin card costs 5p and in colour, so what's the problem? My wife and I really must thank Simon M3SDT who sent me the programme QSL maker - it is brilliant!

The one thing that has spoilt QSL card sending by 'snail mail' is the Internet and **www.qsl.com** I alone have had 125 visits to my very basic freely designed card and it's rubbish, now I too could download all my QSOs card from there, but hardly personal is it?

"Please QSL direct, I am in the Callbook" is the way forward for me now, it's quicker and it will show your sincerity, forget the bureau, according to my logbook and the promises, I should have those 125 cards here and at three cards an s.a.s.e., why are these not with me? I can't blame my M3 QSL Manager as I only have to see how many he has by E-mailing him. **No**, they have just not been sent. Even Special Event Station cards don't turn up. OK, a lot said about QSL card exchanging, some would say, "It's out of date", others, "Get some wall paper and don't rely on cards to decorate your shack", you might say "Get on with the QSO and forget the card", after all, it's only proof of contact and your log shows that, but it takes time and effort doesn't it gentlemen, so why say '100% my card no problem'?.

For the most part CBers had time, dedication, sending their cards without fail within days world-wide, mind you, a PO Box helped. Amateur radio is the same as CB most definitely not unfortunately, a verification of contact in the way of a self-designed card is important to me and I feel a lot of others. Am I disappointed in becoming an M3 for the most part? No, but time will tell, if sincerity improves and not just with the humble QSL card.

But to sidestep and enjoying long meaningless QSOs, the likes of which I have never heard on let's say any other bands, try tuning to 7.097 on a Wednesday and join the chaos that reigns there, true echelons of the airwaves or what! Try asking them for a QSL card.

As for pile-ups, contesting, and joining the whatever group, to get their QSL card, not for me, I have better things to do with my 10W, apart from Alan G0GPO sked, on a Thursday starting at 1500 local on either 7.090 or 7.050 working the M3s will I join in and hope you can join him. My QSL card "100% my friend no problem" has always been a motto I have stuck too.

M3EMB or as some frown upon me saying: M3 empty milk bottles.

M. Evans
Suffolk

Dear Sir

I've had a scanner for a while now, seven to eight years (with approximately two year break), then I decided to start short wave listening - I find it all very interesting. Anyway, I was on the look out for a scanner that would do the job of both scanner and s.w. all in one. My father told me he would give me his scanner, which is a Yupiteru MVT-7100, but he has lost the user manual. Could you tell me where I could get a copy?

Also in the future I'll be looking for a new scanner, since my two year break things have changed, there are a lot more available now. Which scanner would you recommend that I could use for short wave and u.h.f./v.h.f.?

My current radios are the Yupiteru MVT-7100, a Sangean ATS909 and a Realistic PRO-2045 which gets the most use. On the Realistic there was an option of a CTCSS board that was not legal in this country at the time. However, now I see that there are scanners available with it. Is it possible to get this board fitted now and what would it be used for?

Whilst looking through the ads it does seem a tad confusing, what is audio descrambler, alpha tag and trunk track? Any information that you could pass on will be much appreciated. Many thanks.

Aeron
via E-mail

To be honest Aeron, the radios you have should cater well for your needs - unless you feel you need a smaller set. Regarding CTCSS decoding, I'm not sure whether you'll be able to obtain the card you refer to as a new item, but I'll wager that second-hand items are available. I hope you realise that any signals that carry the continuous tone coded sub-audio squelch information can be received without the decoder board. The use of the system is normally to ensure that groups of users aren't bothered by calls for others on the same frequency, by selecting a unique code per user pair/group. Audio descramblers as fitted to some radios allow the 'decoding' of simple encryption systems. Alpha logging relates to being able to give a name to each of your radios memories and lastly, Trunk Tracking is a facility provided by some radios and as software to follow trunked radio 'talk groups'. Fo more information see SWM *December 2002 and 'Getting To Grips With Trunked Radio'* ***- Ed.***

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IC-R10

• The ICOM R10 handheld receiver covers 0.5MHz~1300MHz in all-modes and boasts a real-time bandscope function to make the finding of busy frequencies easy. The passband width of the scope is selectable. Voice-scan function (VSC) pauses scan when modulated signals are received.

IC-PCR1000

• The explosive growth of the Internet has brought a wealth of information to PC users the world over. However, long before the Internet even existed, the airwaves have been filled with communications of all kinds - broadcast radio and television, Ham, special services and aviation to name just a few. The WindowsXP-compatible IC-PCR1000 is a versatile radio interface that lets you listen to this exciting world from your computer.

IC-R75

• All-Mode 30kHz/60MHz-USB-LSB-CW-RTTY-AM-FM-S-AM! This superb receiver is designed to suit a range of market sectors from the demanding 'decoder' to the interested SWL. The IC-R75 incorporates Icom's leading-edge technology and offers a range of features that make it exceptional in many ways. It sets a new standard for performance and value, and will become a popular choice for SWL's everywhere.

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Summer Edition

The Summer 2003 edition of Broadcasts in English is now available from the British DX Club. It was compiled by Alan Pennington and includes details of all currently known international broadcasts in English on short wave and medium wave for the Summer A03 schedule period. It is in time order throughout and covers all target areas. Transmitter sites are listed where known. A comprehensive guide to DX and Media Programmes is also included, plus schedules for WorldSpace and World Radio Network for Europe.

Copies are available at the following prices (postage included): £2 UK, Europe - five International Reply Coupons; five Euros or $4 US, Rest of the World - six International Reply Coupons or $5 US. UK cheques/Postal Orders should be made payable to British DX Club. Payments in Dollars or Euros are only accepted in cash.

All orders/enquiries to: **British DX Club, 126 Bargery Road, Catford, London SE6 2LR,** E-mail: **secretary@bdxc.org.uk** or visit **www.bdxc.org.uk**

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With its top loading CD player comes a 20 Track Programme selector. The stylish design has simple to use features with the electronics volume control and bass boost. At just £129 retail, the Goodmans GPS280 is probably the best value around when it comes to the DAB choices. For stockists, telephone **0239-231 3090** or visit **www.nevada-radios.co.uk**

Special Event Station

During the weekend of **21/22 June 2003**, the **Southport & District Amateur Radio Club** (SADARC) will be running a special event station under the callsigns **GB0MLR** and **GB5MLR**. The station will be located in Princes Park, Southport, to celebrate the running of the 25th National Model Lifeboat Rally alongside the adjacent marina.

SADARC ran GB0MLR for the first time at last year's National Model Lifeboat Rally. It was the first event that the club had staged for many years and was a great success. Over 100 contacts were made and visitors to the station were able to see a live slow scan television demonstration, in addition to the h.f. station.

As well as the special event station, SADARC will also have a stand at the rally itself for the distribution of publicity materials and to direct visitors to the station. Special QSL cards will be sent to all operators contacted during the weekend. Further details of this event can be obtained from **Derek Hughes** on **(01695) 573870** or E-mail: **derek@g7lfc.co.uk**

The GB0MLR Special Event Station in operation.

The National Model Lifeboat Rally is traditionally run annually on the third full weekend of June. Modellers exhibit their model boats and, optionally, enter them for 'sea' handling competitions on the marina. All monies raised, after expenses, are split between the Royal National Lifeboat Institution (RNLI) and local charities. Further details of the rally can be obtained from their website - see **www.lifeboatrally.org.uk**

For further details about the club, please contact **Don Atkins M1BUL** on **(01704) 227726**. You can also E-mail Don at **donatkins@lineone.net** or write to him at **79 Roe Lane, Southport PR9 7HR.** Alternatively, visit the club's website at **www.southportarc.org.uk**

The GB0MLR Special Event Station tent.

Club Corner

Annual BBQ & QRP Evening

Members of the **Bangor and District Amateur Radio Society** meet on the first Wednesday of every month in 'The Stables', Groomsport, County Down at 2000. On Wednesday 4th June, they are holding their Annual BBQ & QRP evening. The venue for this meeting is the Scout Camp in Crawfordsburn Country Park. This should be a great night with lots of QRP fun and good food. Visitors and new members are (as always) most welcome.

Also, don't forget the date of **Sunday 22nd June** - this is Bangor's Summer Radio Rally. There will be a good selection of radio and computer traders and not forgetting the excellent Bring & Buy too. The rally will be located at the Crawfordsburn Country Club, which is near Bangor, County Down. Doors open at 1200. Further details from club website **http://welcome.to/bdars** or **Mike GI4XSF** on **0284-277 2383** or E-mail **mike@gi4xsf.com**

GLARES Events

The **Great Lumley Amateur Radio & Electronics Society** meet every Wednesday at the Community Centre, Front Street, Great Lumley, Chester-le-Street, Co. Durham from 1930 to 2130. There are lots of up and coming events, so for more details, contact the Society's Secretary **Nancy Bone** on **0191-477 0036** (home), **(07990) 760920** (mobile) or E-mail: **nancybone2001@yahoo.co.uk** Alternatively, visit **www.glares.fsnet.co.uk**

Society Reformed

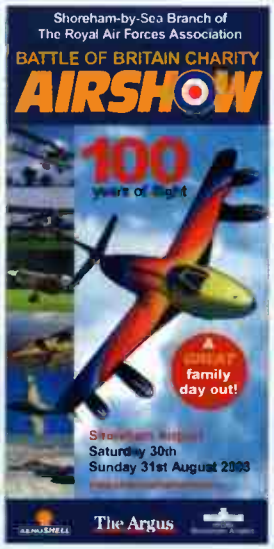
The **Antrim & District Amateur Radio Society** was reformed in November 2002, although the society have been running for over 20 years. Meetings take place in the Clotworthy Arts Centre in the Castle Grounds in Antrim on the 2nd Thursday of each month. Meetings run from 1915 to 2130. Membership is currently over 30 and the society recently ran a foundation licence class at Antrim Grammar School and all 15 candidates passed their foundation licence exam. The youngest member of the class was 12. Currently being organised is an 80m N.I.championship Fox Hunt on Saturday 14th June, which the club are currently building equipment to run this d.f. hunt. Details of all activities can be found on at **www.gn4siw.co.uk**

Up & Coming

Members of the **Cambridge & District Radio Club G2XV** meet (almost) every Friday from 1930 to 2130 at the Coleridge Community College, Radegund Road, Cambridge. Morse code class is available from 1930 if requested. Talks start from 2000. Just a few of the up and coming events are: May 23: Video Evening - Black Propaganda, June 6: Natter night, 13th: Assembling your a.t.u., 15th: Fun radio day at Wimpole Hall Fete, 20th: G3BYW Morse evening, 27th: Testing your a.t.u. Visit **www.cdarc.org.uk** for more details.

communiqué

Battle of Britain Airshow



Well, it's that time of year again and plans are up, up and away for the 2003 Airshow - to be held on **30/31 August 2003**. Last year saw record crowds, and once again over £100,000 was donated to RAFA funds, making the total to date of over £700,000 - the highest amount raised by any branch world-wide. This year is the celebration of '100 Years of Flight', with an increased flying display time and some new features during the display. Add to that the much larger arena area, which was such a great success last year, as well as some surprise events which will make this year's show more of a family day out. There is also the welcome return of the Catalina flying boat, and for the first time for many years, the Breitling sponsored display team led by Ray Hanna and Nigel Lamb, bringing in the Corsair, Kittyhawk, Spitfire and hopefully the Lavochkin LA9, (the latter being very much a first for the UK). The Royal Air Forces Association have also had interest from Canada who wish to participate - and hopefully for the third year - the welcome return of the Danish F.16, who really enjoy their visit to Shoreham.

Denny Dobson will be attempting a spectacular first with his 'Extra' - watch this space! Add to this the regular slots of the Harrier, Lancaster, Sally B, Utterly Butterly Wing Walking Team, RAF Falcon Parachute Team and a lot more - and you have the makings of a great show.

There is a website, which is now up and running, visit **www.shorehamairshow.com**

Maritime Mobile Operation

The **Southport & District Amateur Radio Club** (SADARC) are planning a Maritime Mobile operation from the ex-survey vessel, *Madog* (ex-Prince Madog), over the weekend starting May 30th. Provisional bookings have been made for three members to make the trip from Liverpool to somewhere off the Manx coast in the Irish Sea.

The boat will be making the trip to enable divers to dive off the coast, but SADARC have been able to secure three berths for their weekend of 'fun'. They hope to be operating on the h.f. and v.h.f. bands, running an APRS station and maybe sending occasional slow scan television pictures during the 'expedition'.

The SADARC 'crew' will be using the club's callsign, GX2OA/MM and a special commemorative QSL card will be available for you to add to your collection.

Operational details have yet to be finalised with the vessel's captain and the final destination is dependent on the weather. However, you can keep up-to-date with plans by visiting SADARC's web-site at **www.southportarc.org.uk** Further details can also be obtained from SADARC's Publicity Manager **Derek Hughes G7LFC** via E-mail at **derek@g7lfc.co.uk**

For general details about the club, please contact **Don Atkins M1BUL** on **(01704) 227726**. You can also E-mail Don at **donatkins@lineone.net** or write to him at **79 Roe Lane, Southport PR9 7HR.**

Lowest Price Ever

World Radio Network (WRN) is now offering its lowest ever price for access to the seven million strong digital satellite households with the acquisition of new capacity on *Eurobird*, the recently launched satellite which is providing extra digital radio, TV and interactive satellite channels in the UK.

The new satellite capacity gives WRN the ability to uplink multiple radio stations in stereo and mono from its recently refurbished and upgraded Master Control Room, located at its central London headquarters. WRN already uplinks a number of radio stations to digital satellite including Ireland's RTE Radio One (channel 892), Club Asia (channel 895), EWTN (channel 897) and Gaydar Radio (channel 908) as well as the company's own station, WRN English (channel 872). It also undertakes the on-screen Electronic Programme Guide service for these stations.

WRN's Director of Development, Jeff Cohen, points out the decision to take this capacity comes as a direct result of the high demand from radio stations wanting to access the huge potential audience in the UK, the new capacity will let more radio stations reach new listeners throughout the UK. Access to digital satellite for radio stations is cheaper than other digital radio platforms and it has a proven listening audience. There is already a long waiting list of stations wanting access to this audience.

By offering its lowest price, WRN is making access to the huge UK digital satellite audience affordable by even small, start-up stations, effectively opening digital satellite radio to new entrants as well as established groups. WRN has already anticipated the likely demand by optioning further Eurobird channel capacity supply. WRN is also equipped with a full multiplexer allowing the company to handle TV data and interactive services for the digital satellite market in the UK.

Personal DAB

Watch out for the sleek design of the new Personal DAB Digital Radio from the Ministry of Sound. It's receiving rave reviews and proving as big a hit as the MoS themselves! The features are all centralised on the front control panel with a four way joystick key and central select function for easy navigation.

As well as 10 preset memories, this little gadget will automatically remember the most listened to stations to compile a favourite list. The digital screen (with a blue backlight) displays what is being listened to along with a clock.

The DR011 comes with special stereo earphones with an integrated antenna for crystal clear reception and a rechargeable battery pack. Retail £149. For stockists telephone **0239-231 3090** or visit **www.nevada-radios.co.uk**

WorldSpace Weather

WorldSpace - the global pioneer in direct-to-receiver digital satellite radio and multimedia services - has revolutionised the content for their new reliable and affordable weather service. The WorldSpace Weather Service offers 24-hour, seven days a week, dedicated weather channel available on land and at sea via the world's first portable digital satellite radio.

Coverage area includes Europe, the UK, the Mediterranean, North and West Africa and offers location specific weather reports for these regions. The weather content provided by WCS Marine Weather, is updated regularly and (since the 19th March), the updated content now covers forecasts in 77 zones within these regions, from latitude 54°N, southwards. You can find more about this service by following the weather link at **www.worldspace.com**

Since legislation was introduced by the MCA (Marine & Coastguard Agency) in July 2002, all mariners are now expected to make a careful assessment of any proposed voyage, taking into account all dangers to navigation, weather forecasts, tidal predictions and other relevant factors.

All you need to benefit from this service is a WorldSpace receiver and an annual subscription. In order to subscribe, please contact WorldSpace on **0207-494 8222** (Mon-Fri from 0900 to 1700) or E-mail: **ukservice@worldspace.com** The annual fee for the WorldSpace Weather Service subscription channel is £59.88.

WiNRADiO Winner

Congratulations to **Chris Inwood G7OGX** who is the winner of our WiNRADiO G-303i competition, which appeared in the March 2003 *SWM*. The prize is on its way to your Chris. Well done!

rallies

May 31/June 1: The London Communication & Computer Show takes place at the Stevenage Leisure Centre, Lytton Way, Stevenage, Hertfordshire. The show will be open from 1000-1700 hours on Saturday and 1000-1600 hours on Sunday (0945 each day for disabled visitors). Show attractions will include: trade stands, special interest groups, Talk-in on 144 & 430MHz, Bring & Buy, lectures, catering and licensed bar. There will be plenty of parking close to the venue and for visitors travelling by train there is a mainline station approximately a minute's walk away from the Leisure Centre. More information from **Steve G3ZVW** at **spwhite@radiosport.co.uk**

June 1: The 7th Red Rose QRP Festival is to be held at Formby Hall, Alder Street (off High Street), Atherton, Manchester. Doors open 1100 till 1600. There will be trade and individual stalls, sales of new and surplus equipment and components, club stands, including RSGB, GQRP and low cost Bring & Buy. Large spacious halls at ground level, huge, free car park with disabled facilities. Delicious refreshments at QRP prices, comfortable, well stocked lounge bar, display of Morse keys and QRP rigs, c.w. sign in, talk-in on S22. Construction competition with prizes. Admission is £1.50. For more information and how to obtain a booking form, contact **Les Jackson G4HZJ** on **(01942) 870634** or E-mail: **g4hzj1@ntlworld.com**

June 8: The Yeovil QRP Convention is being held at the Digby Hall, Hound Street, Sherborne, Dorset *(please note this is a new date!)*. Doors open at 1000. There will be three lectures by notable speakers, also a Bring & Buy, traders, good in-house catering, talk-in on S22 by GB2LOW and free parking. More details from **Derek M0WOB** on **(01935) 414452** or E-mail: **m0wob@tiscali.co.uk**

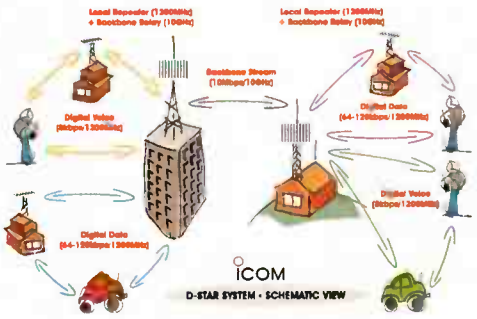
June 8: The 34th Elvaston Castle National Radio Rally takes place at Elvaston Castle Country Park, near Derby. All of the usual traders will be attendance, plus a Dealer Marquee, outside traders, flea market and the famous Bring & Buy marquee. A full program of entertainment, fun fair and children's entertainment will be available, plus a variety of on-site catering to suit everyone. A great day out for all the family. More information from **secretary@elvastonrally.co.uk** or visit **www.nharg.org.uk** and follow the links.

June 15: The East Suffolk Wireless Revival takes place today at the new venue - the Suffolk Showground, Felixstowe Road, Ipswich. The gates open at 0930 hours The main attraction will be the radio car boot sale. In addition, there will be a Bring & Buy sale, Bookstall, Foundation Morse tests, h.f. station and local club stalls. Food and refreshments will also be available. There will be ample car parking and well signposted access. More information is available from **John Quarmby G3XDY** on **(01473) 717830** or **Steve Thomas M1ACB** on **(07720) 412648** or by visiting the website at: **http://www.btinternet.com/~thomassg/eswr.htm**

June 28: The Reddish Rally is to be at held from 1100 at St. Mary's Parish Hall, St. Mary's Drive, South Reddish, Stockport. Admission is just £1, there will be refreshments, a talk-in on S22 and much more. More information from **John G4ILA** on **0161-477 6702** or E-mail: **John@McKae.freeserve.co.uk**

D-STAR Digital Ham Radio

High bandwidth multi-media amateur radio is here at last! Well almost. At a recent trade and press conference, Icom (UK) Ltd. announced and demonstrated the D-STAR concept, a system which is a result of development by the Japanese Amateur Radio League. In essence, Icom have come up with a digital radio system for the amateur community which not only allows integration with the existing analogue voice repeater networks on v.h.f. and u.h.f., but additionally provides the facility to pass high bandwidth (up to 10Mb/s) digital data from any location, fixed or mobile.



The D-STAR concept.

Although in it's prototype stage, there are fully working systems in Japan and the USA. Here in the UK, Icom UK's General Manager Don Turner has a three node system working on 1.2GHz. At the time of the demonstration, Icom were awaiting confirmation of the exact 10GHz allocation for the system to use. Due to the band differences in the UK, the D-STAR system will operate here on different channels to those used in Japan and the USA. This 10GHz channel is used to provide a high bandwidth backbone to link various lower capacity local repeaters which in turn provide the roaming access on 1.2GHz, suitable for mobile and portable access.

Icom's Don Turner Demonstrates D-STAR.

During the demonstration Don showed impressive performance via a mobile D-STAR radio and a repeater at a distance of 10km or so. Internet browsing was rapid via the D-STAR link. The system promises to revolutionise the use of amateur radio by eventually providing an open standard, country wide network that will allow flexible use of high rate data, be that video, voice over IP, E-mail or other file based data.

For more information, contact: Icom (UK) Ltd. Tel: **(01227) 741741** or visit **www.icomuk.co.uk**

Available July!

Due to an oversight, the advertisement for the Roberts Radio RD1 'Gemini 1' DAB radio, which featured in the May issue of *SWM*, omitted to say that the radio will be shipping in July of this year. We are sorry for any inconvenience this has caused.

AR-AIR BAND ANTENNAS

These dedicated civil & military fibreglass antennas are made pre-tuned & dual band trapped for both Air Band frequencies. Easy connection with an SO239 socket (With these antennas you can obtain high dual band gain which is not available on wideband antennas. Just don't miss take off !!!)

AR-30

Freq:Civil & Millitary Gain:3.0/6.0 dB Length:1000mm.
Our Price £39.95 PLUS £6.00 P+P.

AR-50

Freq:Civil & Millitary Gain:4.5/7.0 dB Length:1500mm.
Our Price £59.95
(Both these antennas come complete with 3 ground plane radials 12" stub mast, v-bolts & clamps).

X1-HF VERTICAL

Freq:1-50 Mhz Length: 2005mm
Socket: SO239
The X1 incorporates loaded helical traps, similar to that of a horizontal di-pole, encapsulated in a heavy duty high impact plastic tube, with a top tapered stainless steel whip. (The answer for those enthusiasts looking for short-wave reception but haven't the space for a long wire).
Our Price £49.95 PLUS £6.00 P+P.

DISCONE ANTENNAS

STANDARD DISCONE

Freq: 25-1300 Mhz Length:1000mm
Socket:SO239
This antenna comes with heavy duty centre cone with 16 sturdy aluminium radials, no capacitor coils just pure elements, complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (The discone has been around for over 25 years and is generally recognised as the original and probably the best all round scanner antenna).
Our Price Just £29.95 plus £6.00 P+P.

SUPER DISCONE

Freq: 25-2000 Mhz Length: 1380mm Gain: 3.0dB Socket: SO239
The super discone has enhanced the original discone design with a vertical wire trapped fibreglass vertical element. Comes complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (Experience increase range and upto 3dB gain over standard conventional discone !!! Get more with the Super Discone !!!)
Our Price £39.95 plus £6.00 P+P.

HF DISCONE

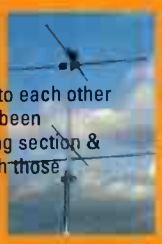
Freq:0.05-2000 Mhz Length:1840mm
Socket: SO239
The HF Discone has the same spec as the Super Discone, but includes a 3ft heavily wire trapped vertical section, encapsulated in fibreglass, Thus enables to obtain a massive receive spectrum within the discone design. Come complete with mounting pole, clamps & v-bolts to mount upto a 2" mast. (Get the best of both worlds, use the HF discone for both scanner and HF receiver)
Our Price £49.95 plus £6.00 P+P.

ROYAL DISCONE 2000 (Stainless Steel)

Freq: RX 25-2000 Mhz TX: 50-52/144-146/430-430/900-986/1240-1325Mhz Length: 1550mm
Socket: N-type
The ultimate discone antenna !!! Highly polished centre cone, with 16 Stainless steel elements, loaded top coil & whip. Complete with mounting pole, clamps & v-bolts to mount up to a 2" mast. (With a WHOPPING 4.5dB Gain over standard discone, this highly sensitive, perfectly matched receiving and transmitting discone is the best there is !!!)
Our Price £49.95 plus £6.00 P+P.
★ *Remember Discones can be placed in the loft with surprising results !!!* ★

BE DEDICATED

TURNSTILE 137



Freq:137.5 Length: 1000mm
This weather satellite antenna has two di-poles adjacent to each other mounted on a 1mtr fibreglass section. Both di-poles have been internally connected, for easy use. Complete with mounting section & clamp to mount up to a 2" mast. (Beam skyward and reach those weather images)
Our Price £39.95 plus £6.00 P+P.
★ *For dedicated Air Band Antennas see AR-Air Band Antennas* ★

BEAM ANTENNAS

MLP32

Freq:100-1300 TX&RX
Gain:11-13 dB
Length:1400mm
Con: N-Type
Our Price £99.95
plus £6.00 P+P

MLP62

Freq:50-1300 Mhz
Gain:10-12 dB
Length:3000mm
Con: N-Type
Our Price £169.95
plus £6.00 P&P.

These two professional quality antennas, come with aluminium booms, aluminium and stainless radial & stainless bolts & fittings. (Don't strain to hear those long distance signals, with near perfect matching of 2:1 SWR across the whole frequency spectrum, make your scanner come to life with the ultimate receiving antenna !!! Sold mainly to our commercial and military customers, you know your getting the best !!!)
AR300XL Rotator for above beams **£49.95** plus £6.00 P+P.

HANDHELD ANTENNAS

SUPER GAINER RUBBER DUCKS

Freq:25-1800 Mhz Length: 400mm
MRW-100 BNC fitting **Our Price £19.95** plus £2.00 P+P
MRW-210 SMA fitting **Our Price £22.95** plus £2.00 P+P
(Going Out ? Don't Miss Out! Replace your existing hand-held antenna with a Super Gainer one).

GETTING RIGGED UP

5' SWAGED POLES

Heavy Duty Ali (1.2mm wall)

SINGLE 1¼"	£7.00
SET OF FOUR 1¼"	£24.95
SINGLE 1½"	£10.00
SET OF FOUR 1½"	£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	RG213	9mm mil spec ....£0.85 per mtr
RG58	6mm mil spec ....£0.60 per mtr	RH200	9mm mil spec ....£1.10 per mtr
RF mini 8	7mm mil spec ....£0.85 per mtr	(Phone for 100 mtr discount price)	

SOMETHING EXTRA

UK SCANNING DIRECTORY 8TH EDITION

The most comprehensive frequency list for the UK. It covers thousands of frequencies from 26Mhz to 1.8Ghz.
Our Price £19.50 PLUS £6.00 P+P.

MRP-2000 (preamp/filter)

Freq: 25-2000 Mhz Pwr: 9-15v imput (battery not included)
Gain: 14dB Complete with joining lead with BNC (For use with any passive antennas ie SuperScan Sticks/Discones and with upto 14dB gain, bring those lost signals to life !!!)
Our Price £49.95 plus £6.00 P+P

Open Monday to Friday 9-6pm
Callers welcome
Order 24hrs A Day Secure On-line at **www.scannerantennas.com**
Postage charges UK mainland only. All major credit cards accepted.

■ BRIAN ODDY G3FEX, THREE CORNERS, MERRYFIELD WAY, STORRINGTON, WEST SUSSEX RH20 4NS

LM&S

To compensate for seasonal changes in propagation and other factors many of the international short wave broadcasters made a considerable number of changes to their transmission schedules for the period 30 March to 26 October 2003. The information herein is based upon reports of actual reception which were compiled during March. However, in an attempt to ensure that the short wave data herein would be as up-to-date as possible, numerous reception checks were made on the entries in the reports when they arrived here in early April. Very few of the new transmission schedules were then to hand and daily variations in propagation made some of the reception checks quite difficult - it was not always possible to be sure if the schedule changes had rendered a particular log entry 'no longer applicable' or if it was due to reception conditions.

Any of the entries in the reports which were affected by the schedule changes were excluded from the data and only those which will continue to be effective for the summer period were included therein. Unfortunately, very few of the s.w. entries in some reports could be used, so I hope the contributors concerned will not let that deter them from sending reports to me in the months ahead. Some contributors foresaw this problem and they re-checked the entries in their report at the end of March to ensure they would still be applicable for the summer period. If you encounter any changes when searching the s.w. bands, could you please send the details to me at the above address so that other listeners can benefit from your findings.

Perhaps I should mention at this point that there is an excellent description of the structure of the Ionosphere and the effects of daily (diurnal) and seasonal changes. You will find it in the May edition of *Radio Active* magazine, on pages 5 to 8 of the final part of the Home Study Course for the Radio Amateurs Exam (RAE), available by mail order from PW Publishing in Broadstone, Tel: 01202 659930)

Long Wave Chart

kHz	Station	Country	Power (kW)	Listener
153	Bechar	Algeria	1000	D*,E
153	Donebach DLF	Germany	500	A,B*,C,D*,E,F*,G
153	Bod	Romania	1200	C*
162	Allouis	France	2000	B*,C,D*,E,F*,G*
171	Nador Medi-1	Morocco	2000	D*,E
171	B'shakovo etc	Russia	1200	A,C,D*,G
177	Dranienburg	Germany	500	A*,B*,C,D*,E,G
183	Saarlouis	Germany	2000	B*,C,D*,E,F*,G
189	Gufuskalar	W.Iceland	150	A*,C*,E*
189	Caltanissetta	Italy	10	D*
198	Raszyn	Poland	200	A*
198	Droitwich BBC	UK	500	B,C,E,G
207	Munich DLF	Germany	500	A,B,C,D*,E,F*,G*
207	Eidar	E.Iceland	100	C*,E*
207	Azilal	Morocco	800	A*,D*,E
216	Roumoules RMC	S.France	1400	A,B,C,D*,E,F*,G
225	Polskie R-1	Poland	?	B*,C,D*,E,F*,G*
234	Beidweiler	Luxembourg	2000	B,C,D*,E,F*,G*
243	Kalundborg	Denmark	300	A,B*,C,D*,E,F*,G
252	Tipaza	Algeria	1500	A,B,C*,D*,E,F*,G*
261	Burg(R.Ropa)	Germany	85	C*,D*,G
261	Taldom Moscow	Russia	2500	D*,E*
270	Topolna	Czech Rep	1500	A,C,D*,E,F*,G
279	Ashgebat	Turkmenistan	150	C*
279	Sasnovy	Belarus	500	B*,C*,D*,E*

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

Listeners:-
(A) Simon Hockenhull, E.Bristol.
(B) Sheila Hughes, Morden.
(C) Eddie McKeown, Newry.
(D) Fred Pallant, Storrington.
(E) Ernie Strong, Ramsey, Cambs.
(F) Thomas Williams, Truro.
(G) Fred Wilmshurst, Northampton.

Long Wave Reports

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT). Unless otherwise stated, all logs were compiled during March.

Above average conditions were observed in this band during some days in March. On the 7th, **Simon Hockenhull** (E.Bristol) was surprised to find the transmission from Azilal, Morocco on **207kHz** peaking SINPO 33433 at 1942. During daylight on the 21st he heard a co-channel transmission from Raszyn, Poland, under Droitwich on **198kHz**. It became audible again during the evening and rated 22441 at 1902. On the 26th, Rikisutvarpid (RUV) via Gufuskalar, W.Iceland on **189** and Azilal, Morocco on **207** were both audible between 0025 & 0030.

An excellent signal was received from Sasnovy, Belarus (500kW) on **279** during the evening of the 25th by **Eddie McKeown** in Newry, Co.Down. At 2226 it was peaking 45344. He checked again on other nights around the same time without similar results.

During the evening of the 31st **Fred Pallant** (Storrington) picked up the sky waves from the Radiotelevisione Italiana (RAI) 10kW outlet at Caltanissetta, Italy on **189kHz**, which he rated 14342 at 2010. With the exception of Tipaza, Algeria on **252kHz** (1500/700kW), the stations in N.Africa which Fred logged during that evening were heard as co-channel interference - see chart.

Medium Wave Reports

The sky waves from some of the many m.w. stations in the Middle East, N.Africa, Europe and Scandinavia were picked up after dark by several listeners - see chart.

Some listeners searched the band for distant local radio stations. Quiet conditions during the day enabled Simon Hockenhull to compile quite an extensive log - see chart. However, he says his best catch was during the evening of the 19th, when he heard BBC R.Cornwall via Bodmin on **657** and via Redruth on **630kHz** - at about 1955 he rated the transmissions respectively as 23422 and 22322.

During the morning of the 28th **Sheila Hughes** (Morden) logged ILR Classic Gold via Gloucester (0.14kW) on **774** as 21222 at 1120 - the co-channel interference came from BBC R.Kent via Littlebourne (0.7kW)!

Short Wave Reports

The broadcasts in the **25MHz (11m)** band from Deutsche Welle (DW), Germany on **25.740** (Ger to Asia 0800-1400) and **25.700** (Eng to Africa 1100-1145) ceased when their transmission schedule for the summer period was introduced on March 30.

Radio France International (RFI) is now the only occupant of this band. Their broadcasts to E/C.Africa may be heard on **25.820** (Fr, Eng 0830-1300) and no doubt reception reports from listeners in those areas would be welcomed by RFI. Reports on them for this column would also be very welcome here - please send them direct to me at the above address.

Daily variations in the reception of the broadcasts from RFI have been noted by listeners in the UK - they were not unexpected because the transmissions are beamed away from the UK and back scatter and other unreliable propagation modes are involved. From time-to-time the effects of solar activity were also evident and high noise levels marred reception. The SINPO ratings quoted in the reports were 33333 at 1035 by **Thomas Williams** in Truro; 55445 at 1100 by **Bernard Curtis** in Stalbridge; 22222 at 1100 by **Vic Prier** in Seaton; 25232 at 1110 in Newry; 25444 at 1125 by **Fred Wilmshurst** in Northampton; 25333 at 1147 by **Ian Evans** in Ebbw Vale; 35522 at 1228 in E.Bristol.

From time to time solar activity also affected reception in the **21MHz (13m)** band. During favourable conditions R.Australia's early morning transmission to Pacific areas via Shepparton on **21.725** (Eng 0200-0900) reached the UK. It was rated 24212 at 0830 in Newry. Later, their broadcast to Asia via Shepparton on **21.820** (Eng 0900-1400) was rated 45434 at 1154 in Ebbw Vale.

Other broadcasters taking advantage of the propagation conditions in this band include the BBC via Rampisham, UK **21.830** (Eng to S.Asia 0800-0900), rated 55555 at 0810 in Stalbridge; R.Pakistan, Islamabad **21.465** (Ur, Eng to Eur 0700-1010) 34422 at 0820 by **Rhoderick Illman** in Oxted; BSKSA Riyadh **21.705** (Ar to Eur 0550-1500) 55545 at 0820 in Seaton; Swiss R. Int (SRI) via Sottens **21.770** (Eng, It, Ger, Fr to Near East, Africa 0830-1030) 24333 at 0820 in Oxted; R.Ext.Espana via Noblejas, Spain **21.570** (Sp to S.America 0800-1700) 34333 at 1000 in Morden; DW via Nauen **21.840** (Ger to M.East 1000-

Tropical Bands Chart

MHz	Station	Country	UTC	DXer
3.200	TWR Manzini	Swaziland	0335	A
3.223	AIR Simla	India	2020	A
3.240	TWR Manzini	Swaziland	0340	A
3.255	BBC via Meyerton	S.Africa	2052	A,B,D,H
3.279	La Voz del Napo	Ecuador	0410	A,D
3.300	R.Cultural	Guatemala	0350	A
3.315	AIR Bhopal	India	1731	A,H
3.320	SABC (RSG) Meyerton	S.Africa	0345	A
3.365	GBC R-2	Ghana	2047	A,H
3.365	AIR Delhi	India	1730	A
3.390	AIR Gangtok	India	2040	A
3.900	Hulun Buir	China	1740	E
3.915	BBC via Kranji	Singapore	2210	A,E,L
3.930	KBS Seoul	Korea	1735	E
3.950	Qinghai PBS, Xining	China	1732	A,E
3.955	R.Korea via Skelton	England	2100	C,E,I
3.955	R.Taipei via Skelton	England	1800	B,C,F,I,J,K,L
3.965	RFI Paris	France	1920	B,E
3.975	R.Budapest	Hungary	1900	F
3.985	Nexus, Milan	Italy	1725	E
3.985	China R.Int via SRI	Switzerland	2040	A
3.990	Xinjiang BS, Urumqi	China	1727	E
3.995	DW via Julich?	Germany	1927	B,E,F,L
4.005	Vatican R.	Italy	1902	E,L
4.190	CNR Minority Sce	China	2215	A
4.330	Xinjiang BS, Urumqi	China	0105	A
4.460	CPBS 1, Beijing	China	2035	A
4.500	Xinjiang BS, Urumqi	China	0100	A
4.702	R.Eco, San Borja	Bolivia	2345	A
4.747	R.Huanta 2000	Peru	2355	A
4.750	Hulun Buir-Mo	China	2355	A
4.750	PBS Xining	China	2300	G
4.755	R.Educ CP Grande	Brazil	0005	A
4.760	AIR Port Blair	India	0020	A
4.765	R.Rural, Santarem	Brazil	0205	A
4.765	RTV Brazzaville	Congo	1845	H
4.770	FRCN Kaduna	Nigeria	0545	A
4.790	AIR Itanagar	India	0045	A
4.790	Azad Kashmir R.	Pakistan	1805	A
4.795	Nova Difusora	Brazil	0025	A
4.800	CPBS 2 Beijing	China	2303	A,E,G,L
4.800	AIR Hyderabad	India	1744	A,H
4.805	R.Nac.Amazonas	Brazil	2355	A
4.815	R.Difusora, Londrina	Brazil	2340	A
4.820	R Botswana, Gaberone	Botswana	0400	A,D
4.820	Xizang, Lhasa	China	2102	A,G,H,L
4.820	AIR Calcutta	India	0045	A
4.825	R.Cancao Nova	Brazil	2345	A
4.830	R.Tachira	Venezuela	2310	A,L
4.832	R.Litoral, La Ceiba	Honduras	0400	A
4.835	RTM Bamako	Mali	2059	A,H,L
4.840	AIR Bombay	India	0100	A
4.845	R.Cultura Ondas,Trop	Brazil	0215	A
4.845	ORTM Nouakchott	Mauritania	2059	A,E,G,H,L
4.850	CNR 2	China	2215	A
4.850	AIR Kohima	India	0120	A
4.856	R.La Hora, Cusco	Peru	2355	A
4.860	AIR Delhi	India	1740	A,H
4.865	R.Alvorada, Londrina	Brazil	2345	A
4.875	R.Roraima, Boa Vista	Brazil	2305	A
4.880	AIR Lucknow	India	0105	A
4.885	R.Clube do Para	Brazil	0140	A
4.885	KBC East Sce Nairobi	Kenya	1745	H
4.895	AIR Kurseong	India	1724	A,E
4.905	Xizang-Tb, Lhasa	China	2311	A,E,G
4.910	Tennant Creek	Australia	2135	A
4.910	AIR Jaipur	India	0055	A
4.910	R.Zambia, Lusaka	Zambia	0350	D
4.915	R.Anhanguera	Brazil	0020	A
4.915	R.Difusora, Macapa	Brazil	0235	A,D
4.915	GBC-1, Accra	Ghana	2045	A,H,L
4.915	KBC Cent Sce Nairobi	Kenya	0545	D
4.920	Xizang-Tb, Lhasa	China	2314	A,G
4.920	R.Quito, Quito	Ecuador	0510	A
4.920	AIR Chennai	India	1733	A,H
4.927	RRI Jambi	Indonesia	2325	A
4.930	R.Costena Ebenezer	Honduras	0341	D
4.935	R.Capixaba, Vitoria	Brazil	0310	A
4.950	AIR Srinagar	India	1734	A,H
4.950	VOA via Sao Tome	Sao Tome	2054	A,H,J
4.955	R.Cultura, Campos	Brazil	2355	A
4.960	AIR Ranchi	India	0105	A
4.960	VOA via Sao Tome	Sao Tome	0411	A,B,D
4.965	Christian Voice	Zambia	1940	A
4.970	AIR Shillong	India	2030	A
4.975	R.Uganda, Kampala	Uganda	2054	A,D,H
4.980	PBS Xinjiang, Urumqi	China	0020	A
4.980	Ecos del Torbes	Venezuela	0030	A
4.985	R.Brazil Central	Brazil	0640	A,D
4.990	Hunan 1, Changsha	China	2250	L
4.990	AIR Itanagar	India	1745	A
5.005	R.Nepal, Kathmandu	Nepal	1736	A,H
5.010	AIR Thiru'puram	India	0040	A
5.020	R.Horizonte	Peru	2345	A
5.025	R.Rebelde, Bauta	Cuba	0415	D
5.025	R.Pakistan, Quetta	Pakistan	2210	A,L
5.025	R.Uganda, Kampala	Uganda	1852	H
5.030	R.Burkina	Burkina Faso	2320	G
5.030	AWR Latin America	Costa Rica	0320	A
5.035	R.Aparecida	Brazil	0340	A
5.040	PBS Fujian, Fuzhou	China	2300	A
5.040	Jeypore	India	1740	A,L
5.047	R.Togo, Lome	Togo	2145	A
5.050	AIR Aizawl	India	0125	A
5.060	PBS Xinjiang, Urumqi	China	0111	A,D
5.100	R.Liberia, Totota	Liberia	2025	A

DXers:-
(A) Jim Edwards, Wigan.
(B) Ian Evans, Ebbw Vale, Gwent.
(C) Stan Evans, Herstmonceux.
(D) David Hall, Morpeth.
(E) Simon Hockenhull, E.Bristol.
(F) Robert Hughes, Liverpool.
(G) Rhoderick Illman, Oxted.
(H) Fred Pallant, Storrington.
(I) Clare Pinder, Appleby.
(J) Clare Pinder, while in Glasgow.
(K) Peter Pollard, Rugby.
(L) Vic Prier, Seaton.

1355) 33333 at 1023 in Truro; BSKSA Riyadh **21.505** (Ar to N.Africa 0600-1500) 44444 at 1205 by **David Hall** in Morpeth; R.Portugal Int, S.Gabriel **21.830** (Port to W.Africa 0700-1655, Sat/Sun) 55555 at 1335 by **Jim Brown** in Dreghorn; Channel Africa via Meyerton, S.Africa **21.620** (Eng to W.Africa 1300-1500 Sat/Sun) 44233 at 1407 in Newry; BBC via Cyprus **21.660** (Eng to E.Africa 1400-1700) 35553 at 1415 by **John Parry** in Larnaca, Cyprus; UAE R.Dubai **21.605** (Ar, Eng to Eur 0600-1630) 33343 at 1450 by **Robert Hughes** in Liverpool; BBC via Ascension Is **21.470** (Eng to S.Africa 1300-1900) 44433 at 1515 by **Stan Evans** in Herstmonceux; R.Ext.Espana via Noblejas **21.700** (Sp to C/S.America 1200-1800, 1800-2100 Sat/Sun?) 35423 at 1905 in E.Bristol.

The occupants of the **18MHz (15m)** band now include VOA via Sri Lanka on **19.010** (? to W/S.Asia 1030-1230), rated 33333 at 1048 in Truro; R.Norway Int, Sveio **18.950** (Norw to N/C.America 1100-1130) 55444 at 1130 in Stalbridge; R.Denmark via Sveio, Norway **18.950** (Da to N/C.America 1130-1155) 35333 at 1154 in Storrington; R.Sweden via Horby **18.960** (Eng to N.America) 43333 at 1247 in Ebbw Vale; Christian Science Herald via WSHB

Listeners:-
(A) Simon Hockenhull, E.Bristol.
(B) Sheila Hughes, Morden.
(C) Ernie Strong, Ramsey, Cambs.
(D) Fred Wilmshurst, Northampton.
(X) Robert Frost, Felixstowe.
(Y) Geriant Gill, Llanfairfechan.

Local Radio Chart

kHz	Station	ILR BBC	e.m.r.p (kW)	Listener
558	Spectrum, London	I	0.80	A,B*,C,D,X
603	C.G,Litt'brne	I	0.10	A,C,D,X
630	R.Bedfordshire(3CR)	B	0.20	A,C,D
630	R.Cornwall	B	2.00	A*,C
657	R.Clwyd	B	2.00	C
657	R.Cornwall	B	0.50	A*,C
666	Cl.Gold 666, Exeter	I	0.34	A,C,D
666	R.York	B	0.80	C
729	BBC Essex	B	0.20	A,C,D
738	Hereford/Worcester	B	0.037	A,C,D
756	The Magic 756,Powys	I	0.63	A,C,D
765	BBC Essex	B	0.50	A,C*,D
774	R.Kent	B	0.70	B,C,D,X
774	R.Leeds	B	0.50	C
774	Cl.Gold 774, Glos	I	0.14	B,D
792	Cl.Gold 792,Bedford	I	0.27	C,D
801	R.Devon	B	2.00	A,C
828	Cl.Gold 828, Luton	I	0.20	B,C,D
828	Cl.G 828 Bournem'th	I	0.27	A
837	Asian Net Leicester	B	0.45	A,D
855	R.Devon	B	1.00	C*
855	R.Norfolk, Postwick	B	1.50	C,X
855	Sunshine 855,Ludlow	I	0.15	A,D
873	R.Norfolk, W.Lynn	B	0.30	C,D
936	Brunel CG, W.Wilts	I	0.18	B,D
936	Fresh AM, Hawes	I	1.00	C
945	Cl.Gold GEM, Derby	I	0.20	C,D
945	Capital G, Bexhill	I	0.75	B,X,Y*
954	Cl.Gold 954 via ?	I	?	C
954	Cl.Gold 954,Torquay	I	0.32	A
954	Cl.Gold 954, H'ford	I	0.16	A,D
963	Asian Sd, E.Lancs	I	0.80	A
963	Liberty R, Hackney	I	1.00	A,C,D,Y*
972	Liberty R, Southall	I	1.00	C,D
990	R.Devon, E.Devon	B	1.00	A
990	Cl G, Wolverhampton	I	0.09	C,D
999	C.Gold GEM Nott'ham	I	0.25	C,D
999	Valley R, Aberdare	I	0.300	A
1017	Cl.G,WABC,Shr'shire	I	0.70	A,D
1026	R.Cambridgeshire	B	0.50	A,C,D,X
1026	R.Jersey	B	1.00	A
1035	Mean Country 1035	I	1.00	A,C,D
1116	R.Derby	B	1.20	C,D
1116	R.Guernsey	B	0.50	A
1116	Valley R, Ebbw Vale	I	0.50	A,Y*
1152	Cl.G Amber, Norwich	I	0.83	C
1152	LBC 1152, London	I	23.50	C,D,X
1152	Cl.G, Birmingham	I	3.00	A
1161	R.Bedfordshire(3CR)	B	0.10	C,D
1170	Cl.G Amber, Ipswich	I	0.28	B*,C*,X
1170	Capital G,Portsm'th	I	0.50	A,B
1170	Swansea Snd,Swansea	I	0.58	A,C
1242	Capital G,Maidstone	I	0.32	C
1251	C.G Amber,Bury StEd	I	0.76	C
1260	Brunel CG, Bristol	I	1.60	C
1260	SabrasSnd,Leicester	I	0.29	C,D
1278	Cl.Gold 1278 W.York	I	0.43	C
1296	Radio XL,Birmingham	I	5.00	A,C,D
1305	Premier via ?	I	0.50	C,D
1323	Capital G,Southwick	I	0.50	B
1332	Cl.Gold 1332,Pt'bo	I	0.60	C,D,X
1359	Cl.Gold 1359, C'try	I	0.27	B*,C,D
1368	R.Lincolnshire	B	2.00	C,D
1413	R.Gloucester via ?	B	?	D
1413	Premier via ?	I	0.50	C
1431	Breeze,Southend	I	0.35	B*,C
1431	Cl.Gold, Reading	I	0.14	D,Y*
1449	Asian Net Peterbro	B	0.15	C,D
1458	Sunrise, London	I	50.00	A*,C,D,Y*
1458	Asian Net Langley	B	5.00	A,C,D
1485	Cl.Gold, Newbury	I	1.00	A,D
1485	R.Humberside (Hull)	B	1.00	C
1485	Southern Counties R	B	1.00	D
1503	R.Stoke-on-Trent	B	1.00	A*,C
1521	Cl.Gold, Reigate	I	0.64	B,D
1530	R.Essex, Southend	B	0.15	C
1530	Cl.Gold Worcester	I	0.52	A,D
1548	Capital G, London	I	97.50	C,D
1557	Cl.Gold 1557,N.hant	I	0.76	C,D
1566	CountySnd,Guildford	I	0.50	A*,B,C,D
1566	SomersetSnd,Taunton	B	0.63	A,Y*
1584	London Turkish R	I	0.20	C
1584	R.Nottingham	B	1.00	D
1584	R.Shropshire	B	0.50	A
1602	R.Kent	B	0.25	C

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

Cypress Creek **18.910** (Fr, Eng to E/S.Africa 1600?-2200?) 25444 at 1805 in Northampton & 25422 at 1903 in E.Bristol; Family R, WYFR via Okeechobee FL, USA **18.980** (Eng to Eur 1800?-2140?) 44333 at 1830 in Morden.

In the **17MHz (16m)** band R.Australia's transmission from Shepparton on **17.750** (Eng to E/SE.Asia) was rated 22222 at 0830 in Seaton & 25444 at 0935 in Northampton. Noted from other areas were R.Pakistan, Islamabad **17.835** (Ur, Eng to Eur 0700?-1010) rated 34322 at 0821 in Oxted; Israel R. Jerusalem **17.535** (Heb to W.Eur, N.America 0600?-1900?) 44333 at 1037 in Truro; AIR via Delhi **17.510** (Eng to Australia 1000-1100) 44333 at 1011 in Ebbw Vale; R.Sweden **17.840** (Eng to SE.Asia, Oceania 1130-1200) 43222 at 1130 in Morden; Voice of Turkey, Ankara **17.830** (Eng to Eur 1230-1330) 44444 at 1242 in Newry; Channel Africa via Meyerton **17.725** (Eng, Fr to Africa 1500-1555) 43333 at 1510 in Herstmonceux; Israel R. Jerusalem **17.535** (Heb to Eur, N.America 0600-0000) 55555 at 1515 in Liverpool; R.Nederlands via Bonaire, Ned.Antilles **17.605** (Eng to C/W.Africa 1830-2025) 44444 at 1915 in Stalbridge; VOA via Botswana **17.895** (Eng to Africa) 34553 at 1630 in Larnaca, Cyprus & 24343 at 1957 in Storrington; RCI via Sackville **17.870** (Eng to Eur, M.East, Africa 2000-2130) 35333 at 2045 in Storrington.

R.Australia has also been reaching the UK in the **15MHz (19m)** band. Their broadcasts were heard on two frequencies from Shepparton: **15.240** (Eng to Pacific, Western N.America 0700-0900), rated 34333 at 0820 in Northampton; **15.415** (Eng to SE.Asia 2330-0900) 24212 at 0835 in Newry.

Also mentioned in the reports were KTWR Guam, Pacific **15.330** (Eng to Australasia 0815-0930?), rated 34333 at 0815 in Morden; VOA via N.Mariana Is **15.150** (Eng to E.Asia 0800-1000) 44444 at 0900 in Morpeth; China R.Int, Beijing **15.210** (Eng to Australia 0900-1100) 43433 at 0905 in Herstmonceux; BBC via Antigua **15.190** (Eng to C.America 1100-1700) 45344 at 1120 by Ian Pakeman in Folkestone; Israel R, Jerusalem **15.760** (Heb to W.Eur, N.America) 44334 at 1447 in Oxted; UAE R.Dubai **15.395** (Ar, Eng to Eur 0600-2045) 54555 at 1605 in Liverpool; British Forces Broadcasting Service (BFBS) via ? **15.530** (Eng - relay of BBC-R2) 34553 at 1620 in Larnaca, Cyprus; R.Japan via Moyabi, Gabon 15.355 (Eng to S.Africa 1700-1800) 34334 at 1700 by Gerald Guest in Dudley; BBC via Ascension Is **15.400** (Eng to W.Africa 1500-2300) 44323 at 1845 in Seaton; RCI via Sackville **15.325** (Fr, Eng to Eur, M.East, Africa 1900-2200) 54445 at 1930 in Stalbridge; R.Ext.Espana via Noblejas, Spain **15.290** (Eng to Eur 2000-2100) 44232 at 2000 in Newry; HCJB Quito, Ecuador **15.185** (Eng to Eur 2000-2200) 34322 at 2020 in Ebbw Vale; Voice of Nigeria via Ikorodu **15.120** (Eng to N.Africa, Eur

Listeners:-
(A) Simon Hockenhull, E.Bristol.
(B) Sheila Hughes, Morden.
(C) Eddie McKeown, Newry.
(D) Clare Pinder, Appleby.
(E) Clare Pinder, Glasgow.
(F) Harry Richards, Barton on Humber.
(G) Ernie Strong, Ramsey, Cambs.
(H) Fred Wilmshurst, Northampton.
(X) Robert Frost, Felixstowe.

Medium Wave Chart

kHz	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600/300	G*
531	Berg	Germany	20	C*
531	RNE5 via ?	Spain	?	A*
531	Beromunster	Switzerland	500	A*,C*,G*,H*
540	Wavre-Overijse(VRT)	Belgium	150/50	A,C*,G*,H
540	Sidi Bennour	Morocco	600	C*,G*
549	Les Trembles	Algeria	600	G*
549	Nordkirchen (OLF)	Germany	100	G*
549	Thurnau (OLF)	Germany	200	H*
558	Espoo	Finland	50	C*,G*
558	Valencia(RNE5)	Spain	20	G*
567	Tullamore(RTE1)	Eire	500	A,C,G*,H
576	Muhlacker(SDR)	Germany	500	A*,C*,G*,H*
576	Barcelona(RNE5)	Spain	50	C*,G*
585	Paris(FIP)	France	8	A,C*,G*
585	Madrid(RNE1)	Spain	200	A*,C*,H*
585	Dumfries(BBCScot)	UK	2	C
594	Frankfurt(HR)	Germany	1000/400	A*,C*,G*,H*
594	Oujda-1	Morocco	100	C*,G*
594	Muge	Portugal	100	G*
603	Lyon	France	300	A*,C*
603	Sevilla(RNE5)	Spain	50	G*
612	Athlone(RTE2)	Eire	100	A,C,G*,H*
621	Wavre (RTBF)	Belgium	80	A,C*,G*,H,X
621	Batra	Egypt	2000	G*
621	RNE1 via ?	Spain	10	G*
621	Barcelona(OCR)	Spain	50	C*
630	Vigra	Norway	100	C*
630	Sta. Isabel	Portugal	50	G*
630	Tunis-Djedeida	Tunisia	600	A*,C*
639	Praha(Liblice)	Czech	1500	A*,C*,G*,H*
639	RNE1 via ?	Spain	?	A*,C*,G*,H*
648	RNE1 via ?	Spain	10	C*,G*
648	Orfordness(BBC)	UK	500	A,C*,G*,H,X
657	Madrid(RNE5)	Spain	20	A*,C*,H*
657	Wrexham(BBCWales)	UK	2	A,C*,G,H
666	MesskirchRohrd(SWF)	Germany	150	A*,C*,G*,H*
666	Lisboa	Portugal	135	C*,G*
675	R10 FM	Holland	120	A,C*,F,G*,H,X
684	Sevilla (RNE1)	Spain	500	A*,C*,G*,H*
684	Avala(Beograd-1)	Yugoslavia	2000	C*
693	Zehlendorf (Mega R)	Germany	?	C*
693	Droitwich (BBC)	UK	150	F,G*,H,X
702	Flensburg (NDR)	Germany	5	C*
702	TWR via Monte Carlo	Monaco	300	A*,C*,G*
711	Rennes (R.Bleu)	France	300	A,C*,G*,H*
711	Heidelberg	Germany	5	C*
720	Langenberg	Germany	200	G*
720	Crystal Palace BBC4	UK	0.75	A,G,H
729	Cork(RTE1)	Eire	10	A*,C*
729	RNE1 via ?	Spain	?	A*,C*,H*
738	Paris	France	4	C*
738	Barcelona(RNE1)	Spain	500	A*,C*,G*,H*
747	Flevo(NOS-1)	Holland	400	A,C*,G,H,X
756	Braunschweig(OLF)	Germany	800/200	A*,C*,G*,H*
756	Bilbao(EI)	Spain	5	C*
765	Sottens	Switzerland	500	A*,C*,G*
774	Abis	Egypt	500	G*
774	Enniskillen(BBC)	N.Ireland	1	C
774	RNE1 via ?	Spain	?	A*,C*,G*,H*
783	Leipzig(MDR)	Germany	100	A*,C*,G*,H*
783	Barcelona (COPE)	Spain	50	A*,G*
792	Limoges	France	300	A*,C*,H*
792	Sevilla(SER)	Spain	20	C*
801	Munchen-Ismaning	Germany	300	B*,C*,G*
801	RNE1 via ?	Spain	?	A*,B*,C*,G*
810	Madrid(SER)	Spain	20	C*,G*
810	Westerglen(BBCScot)	UK	100	A*,C,G*,H*
819	Batra	Egypt	450	C*,G*
819	Trieste	Italy	25	A*
819	S.Sebastian(EI)	Spain	5	C*
828	Heinencord(Cl.Rock)	Holland	20	B,C*,X
837	Nancy	France	200	A*,C*,G*
837	COPE via ?	Spain	?	C*,G*
846	Rome	Italy	1200	C*
846	Noginsk	Russia	150	A*
855	Berlin	Germany	100	C*
855	RNE1 via ?	Spain	?	C*,H*
864	Paris	France	300	A,C*,G*,H*,X
864	Socuellamos(RNE1)	Spain	2	C*
873	Frankfurt(AFN)	Germany	150	A*,B*,C*,F,H*
873	Zaragoza(SER)	Spain	20	A*,C*,B*,H*
873	Enniskillen(R.UI)	UK	1	C
882	Barcelona	Spain	20	G*
882	COPE via ?	Spain	?	C*
882	Washford(BBCWales)	UK	100	C,F,G*,H
891	Algiers	Algeria	600/300	A*,C*,G*,H*
891	Hulsberg	Netherlands	20	C*,G
900	Brno(CRo2)	Czech Rep	25	C*,G*
900	Milan	Italy	600	A*,C*,H*
900	COPE via ?	Spain	?	G*
909	B'mans Pk(BBC5)	UK	140	F,G*,H,X
918	Domzale	Slovenia	600/100	A*,C*,H*
918	Madrid(R.Int)	Spain	20	C*,G*
927	Wolvertem	Belgium	300	C*,G,H,X
936	Bremen	Germany	100	C*,H*
936	RNE5 via ?	Spain	?	C*
936	Lvov	Ukraine	500	G*
945	Toulouse	France	300	C*,G*,H*
954	Brno (CRo2)	Czech Rep.	200	C*,G*
954	Madrid(CI)	Spain	20	A*,C*,G*,H*
963	Pori	Finland	600	A*
972	Hamburg(NDR)	Germany	100	C*,G*,H*
981	Alger	Algeria	600/300	A*
990	Berlin	Germany	100	C*,G*,H*
990	R.Bilbao(SER)	Spain	10	C*
999	Schwerin (RIAS)	Germany	20	C*
999	Madrid(COPE)	Spain	50	A*,C*,G*,H*
1008	SER via ?	Canaries/Spain	?	C*
1008	Flevo(NOS-5)	Holland	400	A,C*,G,H*,X
1017	Rheinsender(SWF)	Germany	600	A,C*,G*,H*
1017	RNE5 via ?	Spain	?	C*
1035	Milan	Italy	50	G*
1035	Lisbon	Portugal	120	A*,C*
1044	Oresden(MDR)	Germany	20	A*,C*,H*
1044	Sebaa-Aioun	Morocco	300	C*
1044	S.Sebastian(SER)	Spain	10	A*
1053	Talk Sport via ?	UK	?	C*,F,G,H,X
1062	Kalundborg	Denmark	250	A*,C*,G,H*
1062	R.Uno via ?	Italy	?	C*
1071	Bilbao(EI)	Spain	5	A*,C*,H*
1071	Talk Sport via ?	UK	?	C*,G,H
1080	SER via ?	Spain	?	A*,C*,G*,H*
1089	Talk Sport via ?	UK	?	C*,F,G,H,X
1098	Nitra(Jarok)	Slovakia	1500	A*,C*,H*
1098	RNE5 via ?	Spain	?	C*
1107	AFN via ?	Germany	10	A*,C*
1107	Talk Sport via ?	UK	?	C*,G,H
1116	Pontevedra(SER)	Spain	5	C*,H*
1125	La Louviere	Belgium	20	C*,G
1125	Deanovec	Croatia	100	A*,H*
1125	El Beida	Libya	500	G*
1125	Llandrindod Wells	UK	1	A
1134	Zadar(Croatian R)	Croatia	600/1200	A*,C*,H*
1134	COPE via ?	Spain	2	C*
1143	AFN via ?	Germany	1	C*
1143	COPE via ?	Spain	2	C*,H*
1152	RNE5 via ?	Spain	10	A*
1179	SER via ?	Spain	?	A*
1179	Solvesborg	Sweden	600	A,B*,C*,F,H
1188	Kuurne	Belgium	5	C*
1188	Marcali(VOA/RFE)	Hungary	500	A*,C*,F,H*
1197	Munich(VOA)	Germany	300	A*,B*,C*,F,H*
1197	Virgin via ?	UK	?	C,H,X
1206	Bordeaux	France	100	A,C,H*
1215	Virgin via ?	UK	?	C,F,H,X
1224	Vidin	Bulgaria	500	C*
1224	COPE via ?	Spain	?	C*
1233	Litomysl(R.Prague)	Czech Rep	100?	A*
1233	Nitra	Slovakia	40	A*,C*
1233	Virgin via ?	UK	?	C*,G,H
1242	Marseille	France	150	A,C*
1242	Virgin via ?	UK	?	C*,G,X
1251	Huisberg	Netherlands	10	C*
1260	SER via ?	Spain	?	C*
1269	Neumunster(OLF)	Germany	600	C*,H
1278	Dublin/Cork(RTE2)	Eire	10	A,C*,G*,H*
1278	Strasbourg	France	300	A
1287	Lerida(SER)	Spain	10	A*,C*,H*
1296	Valencia(COPE)	Spain	10	A*,G,H*
1296	Orfordness(BBC)	UK	500	A*,G,H*
1305	RNE5 via ?	Spain	?	C*
1314	Kvitsoy	Norway	1200	A*,C,G,H
1314	RNE5 via ?	Spain	?	A*
1323	W'brunn (VOR)	Germany	800/150	C,H
1332	Rome	Italy	300	A*,C*,H*
1341	Lisnagarvey(BBC)	N.Ireland	100	A*,H*,X
1341	Tarrasa(SER)	Spain	2	A,H*
1359	Madrid(RNE-FS)	Spain	600	A*,B*,C*,H*
1368	Foxdale(Manx R)	Is of Man	20	C,E*,H*
1377	Lille	France	300	A,C,G,H*,X
1386	Bolshakovo	Russia	1200	A*,B*,C*,F,H*
1395	Fllake	Albania	500	C*,X*
1395	Lopic (Biz Nieuws)	Netherlands	120/40	A,C,F,G,H*
1404	Brest	France	20	A*,C*,H
1413	RNE5 via ?	Spain	?	C*
1422	Heusweiler(OLF)	Germany	1200/600	C*,F,H*
1431	Wilsduff (Mega R.)	Germany	250/150	A,C*
1440	Marnach(RTL)	Luxembourg	1200	A*,B*,F,G,H
1440	Qammam	Saudi Arabia	1600	C*
1467	Monte Carlo(TWR)	Monaco	1000/400	B*,C*,H*
1476	Wien-Bisamberg	Austria	600	A,B*,C*,D*,H*
1494	Clermont-Ferrand	France	20	A*,C*,H*
1494	Krasnyy Bor	Russia	1200	C*
1503	Bashehr	Iran	50	C*
1512	Wolvertem	Belgium	300	B*,C*,D*,F,G,H*
1521	Kosice(Cizatice)	Slovakia	600	C*,H*
1530	Vatican R	Italy	150/450	A*,C*,H*
1539	Mainflingen(ERF)	Germany	350(700)	A,C*,H*
1557	Nice	France	300	A*,C*
1575	Genova	Italy	50	A,C*
1575	SER via ?	Spain	5	C*
1602	SER via ?	Spain	?	C*
1602	Vitoria(EI)	Spain	10	C*,H*
1611	Vatican R	Italy	15	A

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

1900?-2300) 44322 at 2230 in Dreghorn.

Noted in the **13MHz (22m)** band were R.Norway via Sveio **13.800** (Norw to S.America, Australasia 0800-0830), rated 24433 at 0816 in Oxted; R.Denmark via R.Norway 13.800 (Dan to S.America, Australasia 0930-1000) 34433 at 0938 in Oxted; Family R. (WYFR) via Okeechobee, USA **13.695** (Eng to N.America 1200-1300) 23322 at 1218 in Storrington; Voice International, Australia via Darwin **13.685** (Eng to Asia 0900-1300) 24222 at 1240 in Newry; R.Austria Int via Moosbrunn **13.730** (Fr, Eng, Ger to Eur 1100-1300) 55544 at 1255 in Herstmonceux; Voice Int, Australia **13.690** (Eng to Asia 1300-1630) 45554 at 1415 in Larnaca, Cyprus; Croatian R, Deanovec **13.830** (Cr to Eur) 32323 at 1420 in Liverpool & 23111 at 1920 in Dreghorn; R.Austria Int, via Moosbrunn **13.730** (Ger to Eur 1430-1500) 44434 at 1435 in Truro; VOA via Sao Tome? **13.600** (Eng to C/E.Africa 1600-1700) 23222 at 1638 in Ebbw Vale; All India R. (AIR) via Bangalore **13.620** (Ar to M.East 1730-1945) 44434 at 1730 in Seaton; All India R. (AIR) via Bangalore **13.605** (Eng to W/N.Africa 1745-1945) 32322 at 1745 in Seaton; BFBS via Rampisham **13.760** (Eng - relay of BBC R-5) 55445 at 1800 in Stalbridge; Voice of Vietnam, Hanoi **13.740** (Fr, Eng to Eur 1800-2000) 43334 at 1815 in Stalbridge & 33333 at 1920 by **Geriant Gill** in Llanfairfechan; China R.Int via Kunming? **13.790** (Eng to M.East, Africa 1900-2000) 44333 at 1900 in Morden; R.Nederlands via Flevo **13.700** (Eng to Africa 1830-2025) 43333 at 1906 in Newry; R.Damascus, Syria **13.610** (Eng to Eur 2005-2100) 45444 at 2118 in Llanfairfechan.

Broadcasts from many areas reach the UK in the **11MHz (25m)** band. Those from R.Australia, which are beamed to SE.Asia from Shepparton on **11.660** (Eng 1330-1700), have often been received here quite well - they were rated 34434 at 1510 in Llanfairfechan.

Also received here were R.Finland via Pori **11.755** (Fin to Eur), rated 44434 at 0917 in Oxted; R.Nederlands via Petropavlovsk **12.065** (Eng to Asia, Far East, Pacific 0930-1125) 34232 at 1022 in Newry; BBC via Woofferton, UK **12.095** (Eng to Eur 0700?-1800?) 44434 at 1035 in Truro; Voice of Korea, Pyongyang **11.335** (Eng to Eur 1300-1400) 33433 at 1337 in Morpeth; R.Nederlands via Tashkent, Uzbekistan **12.075** (Eng to S.Asia 1430-1625) 44454 at 1535 in Liverpool; R.Kuwait **11.990** (Ar, Eng to Eur, N.America 1415-2100) 54445 at 1755 in Stalbridge & 55544 at 1940 in Herstmonceux; All India R. (AIR) via Bangalore **11.620** (Eng to Eur 1745-1945) 44434 at 1800 in Seaton & 33233 at 1853 by **Peter Pollard** in Rugby; Voice of Russia. Moscow **11.630** (Eng to Eur 1800-1900) 33333 at 1800 in Morden; Israel R, Jerusalem **11.605** (Eng to Eur, N.America 1900-1930) 55555 at 1900 by **Clare Pinder** in Appleby; Voice of the Mediterranean via Russia **12.060** (Eng to Eur, N.Africa 1900-2000) 44333 at 1910 in Newry; VOA via Udon Thani, Thailand **12.015** (Eng to S/SE.Asia 1900-2000) 35533 at 2000 in Larnaca, Cyprus; VOA via Ascension Is **11.855** (Eng to Africa 2000-2030) 45434 at 2024 in Ebbw Vale; China R.Int via ? **11.790** (Eng to Eur 2000-2200) 34344 at 2030 in Llanfairfechan; R.Tashkent, Uzbekistan **11.905** (Eng to Eur 2130-2200) 35444 at 2130 in Northampton; WWCR Nashville, USA **12.160** (Eng to N.America, Eur 1200-2300?) 23222 at 2200 in Dreghorn.

Some of the broadcasts in the **9MHz (31m)** band also travel long distances to reach the UK. R.Australia may be heard on two frequencies from Shepparton: **9.475** (Eng to Asia 1330-1858), rated 35444 at 1650 in Northampton & 33323 at 1755 in Stalbridge; **9.500** (Eng to Asia 1900-2130), noted as 34434 at 2015 in Seaton.

Other users of this busy band include HCJB Quito, Ecuador on **9.860** (Eng to Eur 0600-0630), rated 34333 at 0602 in Ebbw Vale; R.Vilnius, Lithuania **9.710** (Eng to W.Eur 0830?-0900?) 55445 at 0840 in Stalbridge; Croatian R, Deanovec **9.830** (Cro to Eur) 44333 at 0858 in Oxted; DW via Nauen, Germany **9.545** (Ger to Eur, S.America 0600?-2000?) 55555 at 0940 in Rugby; R.Nederlands via Bonaire, Ned.Antilles **9.785** (Eng to Asia, Far East, Pacific 0930-1125) 24121 at 1020 in Newry; R.Nederlands via Wertachtal, Germany **9.860** (Eng to Eur 1030-1225) 55555 at 1215 in Herstmonceux; R.Nederlands via Flevoland **9.895** (Eng to Africa 1830-2025) 33343 at 1935 in Liverpool; Voice of Russia **9.775** (Eng to Eur 1700-2100) 43333 at 1846 in Ebbw Vale; Voice of Armenia **9.960** (Eng to Eur 1940-2000) 44444 at 1940 in Appleby; China R. Int, Beijing **9.440** (Eng to Africa 1900-2100), noted as SIO 333 at 2012 by **Francis Hearne** in N.Bristol; Africa No.1 via Moyabi, Gabon **9.580** (Fr to C.Africa 0500?-2300?) 33343 at 2015 in Storrington; All India R. (AIR) via Bangalore **9.950** (Eng to Eur 2045-2230) 44333 at 2100 in Morden; R.Cairo, Egypt **9.990** (Eng to Eur 2115-2245) 45444 at 2115 in Folkestone & 55445 at 2135 in Llanfairfechan; All India R. (AIR) via Panaji **9.705** (Eng to SE.Asia 2245-0045) 23322 at 2246 in E.Bristol; R.Mediterranee Int [Medi-1], Morocco **9.575** (Ar, Fr to N.Africa, S.Eur 0500-0400) 55555 at 2250 in Dreghorn; Swiss R. Int (SRI) via Sottens **9.885** (Fr, Ger, It, Eng to S.America 2200-0000) 43333 at 2330 in Truro.

Noted in the **7MHz (41m)** band were RTV Tunisienne, Sfax **7.275** (Ar to W.Eur 0400-0800), rated 45444 at 0522 in Ebbw Vale; Family R. (WYFR) via Okeechobee FL, USA **7.355** (Eng to Eur 0600-0750?) 44444 at 0620 in Morden; R.Japan via Woofferton, UK **7.230** (Eng 0500-0700) 43333 at 0655 in Herstmonceux; KTBN via Salt Lake City, USA **7.505** (Eng to N.America 0100-1500) 32333 at 1030 in Truro; Sudwestfunk via Rohrdorf **7.265** (Ger to Eur 24hrs) 55545 at 1330 in Stalbridge; RTV Tunisienne, Sfax **7.225** (Ar to W.Eur 1700-2300) 54444 at 1850 in Liverpool; R.Nederlands via Madagascar **7.120** (Eng to Africa 1730-2025) 43443 at 1908 in Newry; Voice of Greece, Athens **7.475** (Gr to Eur) 43444 at 1930 in Seaton; R.Thailand, Udon Thani **7.155** (Eng to N.Eur 1900-2000) 44444 at 1935 in Llanfairfechan; R.France Int via Issoudun **7.315** (Fr to Eur) 43444 at 2015 in Rugby; All India R. (AIR) via Bangalore **7.410** (Hind, Eng to Eur 1745-2230) 44333 at 2122 in E.Bristol; R.Bulgaria, Sofia **7.500** (Various, Eng 2100-2200) SIO 333 in N.Bristol; World Harvest Radio (WHRA) via Maine, USA **7.580** (Eng to Eur, M.East 2300-0500) 44433 at 2302 in Northampton & 54444 at 0130 in Morpeth; R.For Peace Int, Costa Rica **7.445** (Eng to N.America, Eur 2200-0800) 54444 at 2322 in Dreghorn, 24222 at 0520 in Newry & 34433 at 0756 in Oxted.

Many of the broadcasts in the **6MHz (49m)** band are intended for listeners in Europe. Some come from R.Japan via Skelton, UK **5.975** (Eng 0500-0600), rated 44444 at 0500 in Appleby; Bayerischer Rundfunk, Germany **6.085** (Ger 24hrs) 44444 at 0835 in Seaton; Sudwest Rundfunk, Germany **6.030** (Ger) 43333 at 0840 in Oxted; R.Nederlands via Julich, Germany **6.045** (Eng 1030-1225) 55544 at 1225 in Herstmonceux; Deutsch Welle (DW) via Julich **6.140** (Eng 0600?-1900?) 45333 at 1620 in Dreghorn; R.Polonia [Polish R] Warsaw **5.995** (Eng 1700-1800) 44443 at 1730 in Morden; R.Slovakia Int, Bratislava **5.920** (Eng 1830-1900) 55545 at 1855 in Stalbridge; BBC via Rampisham, UK **6.195** (Eng 1700?-?) 34444 at 1907 in Northampton & 44444 at 2003 in Rugby; R.Canada Int via Skelton, UK **5.995** (Eng 2000-2100) 45554 at 2021 in Storrington; Deutschland R, Berlin **6.005** (Ger 24hrs) 43333 at 2008 in Ebbw Vale; R.Sweden Int, Stockholm **6.065** (Eng, Sw 1930-2200) SIO 444 at 2034 in N.Bristol; R.Canada Int via Horby, Sweden **5.850** (Eng 2000-2130) 43333 at 2112 in Truro; R.Budapest, Hungary **6.025** (Eng 2100-2130) 53434 at 2125 in Folkestone; R.Ukraine Int, Kiev **5.905** (Eng 2100-2200) 53444 at 2200 by Clare Pinder, while in Glasgow.

Some to other areas may also be received here. They include R.Nederlands via Bonaire, Ned.Antilles **6.165** (Eng to N.America 2330-0125), rated 23222 at 2330 in Newry; R.Havana, Cuba **6.000** (Eng to N.America 0100-0500) 33333 at 0400 in Morpeth; American Forces Network (AFN) via Puerto Rico **6.458** (Eng [u.s.b.]) 44444 at 0405 in Morpeth.

The SINPO code is used for broadcast station reports, here is an explanation of the code.

Signal Strength
5 excellent
4 good
3 fair
2 poor
1 barely audible

Interference
5 nil
4 slight
3 moderate
2 severe
1 extreme

Noise
5 nil
4 slight
3 moderate
2 severe
1 extreme

Propagation Disturbance
5 nil
4 slight
3 moderate
2 severe
1 extreme

Overall Merit
5 excellent
4 good
3 fair
2 poor
1 unusable

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Optional map (Europe) ~~£129.00~~ £75.00

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Includes 128 meg card. Also includes European map CD.

OUR PRICE **£999.99**

PD-293

Touch screen display memory pad, credit card size. Stores more than 10,000 addrsses includes PC docking station & lead to PC. 200 year calendar + world time for 100 cities. £29.99.

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State of the art, cable free thermometer. Supplied with one outdoor (waterproof) sensor. Will measure min/max indoor/outdoor temp. Up to three extra sensors can be used (available @ £19.99 each). SSP £49.99.

PRICE **£34.99** P&P £5.00

gizmos

MFJ-115

24 hour quartz clock. Major cities shown on rim. World map on face. "Know what time it is around the world"

£29.95 P&P £4.50

RM-983

Radio controlled clock. (Synchronised from rugby). Double line display, user selectable, time format 12/24hr, back illumination, indoor temperature. SSP £16.99.

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NEW 8th EDITION THE UK SCANNING DIRECTORY

Britain's best selling scanner book now larger than ever. Nearly 700 pages packed full of frequencies from 25MHz-1.8GHz. *Order yours today!*

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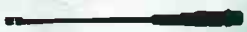
A brilliant new compact indoor antenna that covers 0.1-3GHz and is just 24" when collapsed. Features "horizontal or vertical" adjustable elements. Ideal for table top mounting or by the window. Patch lead with BNC plug fitted. (Frequency range: 0.1-3GHz).

£59.95 P&P £6.00

items of interest

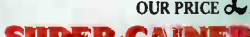
REGULAR-GAINER RH-9090



SMA 40cm flexible whip that is ideal as replacement.

OUR PRICE **£26.95** P&P £1.50

SUPER-GAINER RH-9000



BNC 40cm flexible whip for the ultimate in gain. (Rx:- 25MHz-2GHz).

OUR PRICE **£21.95** P&P £1.50

REGULAR-GAINER RH-770

"BNC" 21cm flexible whip that is ideal as replacement. (Rx:- 25MHz-2GHz) (TX:- 2m/70cms).

OUR PRICE **£16.95** P&P £1.50

RH-790 As above with SMA £21.95

WATSON HUNTER

Frequency counter covers 10MHz-3GHz. Incl's nicad, charger, antenna.

ONLY **£59.95** P&P £6.00

Optional case ~~£14.99~~ £7.50

DB-2000

A superb "BNC" black telescopic whip. Ideal for scanners. Folds neatley away. (0.1-2GHz).

OUR PRICE **£14.99** P&P £1.50

DA-2000 SMA ..... With SMA adapter £19.99

QS-200

Superb quick fit dash mount for hand-helds. £9.99.

OUR PRICE **£4.99** each P&P £2.00

3 for **£10.00** P&P £3.50

QS-300

A fully adjustable desk top stand for use with all hand-helds. Fitted coaxial lead with BNC + SO239 connections.

OUR PRICE **£10.00** P&P £3.00

ALKALINE STARTER KIT

Starter kit includes charger & 4 x AA cells.

SALE PRICE **£9.99** + £3.00 P&P.

Please note that only the special cells can be recharged with this charger.

Extra cells available @ 8 x AA pack £10.99 £1 P&P. 4 x AA pack £5.99 £1 P&P. Rechargeable Alkaline. No memory effects. 1.5V cells. 3 x capacity of nicads.

Accessory items

New RF Grounding wire (10m pack)	12.50
ER-1 4 foot earth rod	£13.99
CX-201 2-way (SO239) switch	£21.95
AA 700mAH nicads	£1.99
50m roll flexweave (heavy duty antenna wire)	£30.00
20m roll flexweave (heavy duty antenna wire)	£15.95
50m roll PVC coated (stranded wire)	£10.95
30m roll nylon guy rope (4.4mm)	£10.00
Nylon "Dog Bone" insulators	£1.00
Roll self-amalgamating tape (25mm x 10m)	£6.50
Ferrite rings	£2.00

MICRO MAG ANTENNA MM-1

Micro magnetic base with (19") whip. Rx:- 0.5MHz-2GHz. Ideal for all scanners supplied with miniature coax lead & BNC (all fitted).

OUR PRICE **£24.95** P&P £5.00

BNC to PL-259 adaptor £3.49

BNC to N-type adaptor 33.95

EP-300

A high quality superb 'police style' earpiece that hangs over the ear. (3.5mm straight plug fitted).

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SP-350 STATIC PROTECTOR

Designed to reduce static build-up during electrical storms. (Gas discharge fuse is replaceable). DC-500MHz (SO-239 sockets). PWR up to 400W.

£24.95 P&P £2.50

MAST HEAD PULLEY

A simple to fit but very handy mast pulley with rope guides to avoid tangling. (Fits up to 2" mast).

£8.99 + P&P £2.50

30m pack nylon guy rope £10.00

32m pack nylon guy rope £35.00

LOW LOSS PATCH LEADS

Connectors	Length	Price
PL-259 - PL-259	0.6m	£5.99
PL-259 - PL-259	4m	£9.99
BNC - BNC	1m	£6.99
BNC - BNC	1.5m	£8.99

+ £2.50 P&P

All patch leads use low loss coax

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A superb TDK 'snap fix' ferrite clamp for use in Radio/TV/ Mains/PC/Phone etc.

Simply close shut over cables and notice the difference! Will fit cables up to 13mm diameter. Ideal on power supply leads/mic leads/audio leads/phone leads.

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On thin cable simply wind cable round clamp 1-to-2 times. Simple yet effective!

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(Airband base)

Prof quality base antenna for AIRBAND. (Civil & military). With SO-239 fitting (1.7m long). Gain 4.5/7dB.

PROFESSIONAL QUALITY **£79.95** P&P £11.00

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Q-TEK SS-2000

50-2600MHz Covert apperance

Compact - indoor/outdoor scanning antenna. (50MHz-2.6GHz). Superb glass fibre constuction. Ideal in areas affected by "nosey neighbour syndrome". This antenna can be put in the loft or outside on the building. Initial tests show this to far outperform a discone at "VHF". SO-239 socket (PL-259 plug needed) 1.3m long (mast clamps supplied).

50MHz-2.6GHz and under 1.3m long **£49.95** DEL £11.00

★ NEW ★ Q-TEK DSL-2500

Superb directional antenna for the real scanner enthusiast. This antenna benefits from an extraordinary tight 'lobe' resulting in an incredably high gain figure. Freq range: 60-2500MHz. T/radius: 1.4 mtrs. Fitting: N-type. Gain: 12-16dB. 16 elements. ~~£149.95.~~

£129.99 DEL £10.00

NEW Q-TEK INTREPID 2000

TOP PERFORMANCE FOR SCANNERS

An amazing vertical (glass fibre) colinear antenna. Quality construction with incredible performance. For the serious scanner enthusiast.

Freq range: 0.5-2GHz. PL-259 fitting (not supplied). *Length* 3m. Mast clamps supplied. (Gain up to 9dB is easily obtained). SO-239 fitting. Requires PL-259 plug (not supplied).

ONLY **£89.95** P&P £11.00

Q-TEK D.C. 2000 DISCONE

SIMPLY THE BEST

0.2-2000MHz

A high performance wideband discone offering superb performance from 0.2-2000MHz. Transmit range:- 6m, 2m, 70cm, 32cm & 23cm (power handling 200W). Fitted with low loss 'N' type socket. Supplied with mounting brackets. (N-plug & coax not supplied).

OUR PRICE **£54.95** P&P £11.00

Comments from John Griffiths

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.

ROYAL DISCONE

0.2-2000MHz

(Stainless steel)

Frequency range: receives 0.2-2000MHz, transmit 6/2/70/23cm, connector N type. High sensitivity with an amazing range of transmitting frequencies. Comes complete with mounting hardware & brackets. (N-plug & coax not supplied).

OUR PRICE **£44.95** P&P £11.00

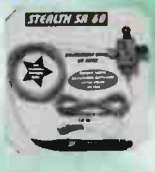
DX-1 PRO (R.F. SYSTEMS)

SEND SAE FOR DATA SHEET

This is a professional wide band receiving antenna with a very high intercept point that ensures a low noise level allowing even the weakest signals to be heard. Constructed of high-impact plastic and aluminium alloy - the amplifier is protected inside a waterproof stainless steel vessel. The unit is supplied complete with mounting hardware and an indoor controller with PSU (coax not supplied). Freq. 20kHz-54MHz. Gain: +6dB (ref dipole). Intercept points: ≥+75dBm (2nd ord), ≥ + 50dBm (3rd ord). (Static protection included). For the true professional.

£329.95 DEL £15.00

★ NEW ★ Q-TEK STEALTH SR-60



Superb, ready assembled wire antenna system. Not only is this end fed for ease of installation, it is also constructed from extremely high quality components. New 'plyweave' PVC coated wire makes this virtually invisible. It comes ready assembled including a 'noise filter system'. A 10m down lead with PL-259 is also fitted (both antenna & down lead are adjustable in length). Overall length 20mtrs (adjustable down to 6m).

SIMPLY SLING UP AND LISTEN IN OUR PRICE **£69.95** DEL £10.00

DX-10 (R.F. SYSTEMS)

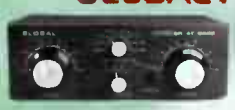
SEND SAE FOR DATA SHEET

A superb quality active antenna with a very high intercept point ideal for weak signal reception without increases in radiated noise. A truly amazing antenna! Freq: 100kHz-30MHz.

Bomb-proof over loading figures, 90cm long, mains PSU + controller supplied (coax optional). Atmospheric-noise compensated sensitivity.

£169.95 DEL £11.00

GLOBAL AT-2000



Deluxe SW ATU 0-30MHz. SO239 fittings.

ONLY **£89.00** P&P £6.00

(Probably the best ATU around)

PL-259 to PL-259 patch lead (0.6m).....£5.99
PL-259 to PL-259 patch lead (4m long).....£9.99
BNC adaptors.....£3.95
BNC to PL-259 patch lead £9.99

MLB (R.F. SYSTEMS)

SEND SAE FOR DATA SHEET

The MLB contains a special impedance matching transformer which converts any piece of wire between 6 and 20 metres long into a wide band receiving antenna. 100kHz-40MHz. Low noise - probably the best there is!

£42.95 POST £3.00

E.M.F. ANTENNA

A low cost, superb passive broadband (500kHz-30MHz) antenna useable down to 150kHz. Ideal for indoor or outdoor use and at only 4mtrs long you most certainly will find the space! Using magnetic transfer technology, interference & noise is minimised. Ready assembled + PL-259/coax.

SEND SAE FOR DATA SHEET ONLY **£62.95** P&P £4.00

Q-TEK PL-25

0.2-2GHz. An easy to use PL-259 (right angled) telescopic whip. Ideal for all receivers.

OUR PRICE **£19.95** P&P £2.50

PL-30

As above with 'rotary hinge'. £29.95

BNC adaptor £3.49
N-type adaptor.....£3.95

WA-50 'AMPLIFIER'

SEND SAE FOR DATA SHEET

Broadband amplifier for short wave, medium & long wave. 50kHz-50MHz. 10dB gain. Superb low noise amplifier. Ideal for short wave improvement. Requires 12V (150mA).

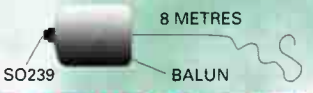
OUR PRICE **£99.95** P&P £7.50

Optional AC adapter.....£16.99

Q-TEK SKY-WIRE MkII

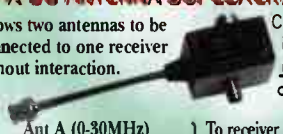
Ideal for any receiver. Receives all short wave bands (all mode). No ATU required. Built-in balun, PL-259 connection (0-52MHz). Ideal for flats/caravans/holiday homes/hotels.

ONLY **£32.95** P&P £3.00



DPX-30 ANTENNA DUPLEXER/COMBINER

Allows two antennas to be connected to one receiver without interaction.



Can be used in reverse

£54.95 P&P £3.50

Ant A (0-30MHz)
Ant B (30-2000MHz) } To receiver low insertion loss

SEND SAE FOR DATA SHEET

SP-1 TWO WAY COMBINER (PROFESSIONAL)

SEND SAE FOR DATA SHEET

Very high quality combiner allows two short wave receivers to be connected to one antenna without interaction. 50kHz-30MHz (SO-239 fitting).

Can be used in reverse **£59.95** P&P £3.50

SP-3 (PROFESSIONAL)

SEND SAE FOR DATA SHEET

Two way combiner. one antenna feeds two scanners (without mismatch). 10-2500MHz. High isolation (BNC sockets).

Can be used in reverse **£59.95** P&P £3.50

HAYDON Communications

See previous page for address

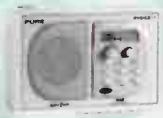
Mail order: 01708 862524

NEXT DAY DELIVERY TO MOST AREAS, £10.00.

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. PLEASE VERIFY BEFORE ORDERING. E&OE.

dab radios

EVOKE-1



Using the latest third-generation D.A.B. technology, Evoke-1 delivers outstanding digital sound quality at an affordable price. A stylish, mains powered receiver without the normal hiss, crackle and fade of old AM/FM broadcast. Transform your listening.

OUR PRICE **£99.95**

Car DC lead.....£14.99 Optional spkr.....£29.99

EVOKE-2

PORTABLE DAB DIGITAL AND FM RADIO

Enjoy DAB digital indoors and out with the 'battery/mains powered' Evoke-2. High quality, interference-free DAB digital audio (stereo) without hiss, crackle or fade. (Subject to suitable area coverage).

OUR PRICE **£159.99**

portable receivers

SANGEAN ATS-909

A superb performance portable/base synthesized world receiver with true SSB and 40Hz tunning for ultra clean reception. The same radio is sold under the Roberts name at nearly twice the price. Other features include RDS facility, 306 memories and more.

£139.95 P&P £10 Optional PSU.....£16.95

SANGEAN ATS-505

NEW! Wins Dutch "Automobile" award. Excellent small short wave receiver (digital). 0.15-30MHz (AM, USB, LSB, CW). 88-108MHz FM stereo. Includes carry case.

£79.95 P&P £10.00 Optional PSU.....£16.95

SONY SW-100E

★ Miniature portable all mode SW receiver ★ Station presets for 50 frequencies ★ Single side band system ★ Synchronous detector ★ Tuning in 100Hz + 1kHz steps ★ Includes compact antenna/stereo earphones/ carrying case.

£159.95 P&P £10 Optional PSU.....£24.95 AN-100 active aerial ..£64.95

SONY SW-30

The ideal holiday partner!
★ Fully digital world receiver ★ FM/MW/SW ★ Covers all short wave broadcast/MW plus FM stereo (on h/phones) ★ Programmable memories ★ Sleep timer + alarm function ★ 1kHz tuning for short wave.

RRP £79.95.

HALF PRICE **£39.95** P&P £8.50

desktop receivers

JRC NRD-545 DSP

The ultimate short wave receiver with DSP - for the real perfectionist.

OUR PRICE **£1299.00** Del £10.00

NVA-319 Extention speaker £189.00
CHE-199 VHF/UHF converter.....£269.00

ICOM IC-R75

The short wave receiver for the true enthusiast. Includes free PSU.
- 0.03-60MHz (all mode)
- Synchronous AM detection
- PC control capability.

OUR BEST SELLING HF RECEIVER

OUR PRICE **£589.00**

Optional DSP audio filter £85.00
Optional extension speaker £74.99
Optional voice synthesiser £32.95

REALISTIC DX-394

★ Superb performance SW receiver ★ 0.2-30MHz (all mode) ★ Selectable tuning steps (down to 100Hz) ★ 240 or 12V ★ Digital S-meter ★ Attenuator ★ Key pad entry ★ 160 memories ★ Noise blanker.

OUR PRICE **£199.95** P&P £10

OUR BEST SELLING LOW PRICED RECEIVER

HD-1010 optional headphones £9.99

hand-held scanners and more

NEW ICOM IC-R5

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

NEW LOW PRICE **£149.99**

P&P £10.00

Plus free EP-300 earpiece worth £9.95

BATTERIES AND CHARGER INCLUDED

ICOM IC-R3

'A first!' TV/video picutre & sound! Certainly a gadget for the future – see things you didn't know existed! A wide-band scanner covering 0.5-2.3GHz (AM, FM/WFM) with "TFT" colour display.

FOR THE TRUE ENTHUSIAST

OUR PRICE **£349.99**

Soft case for IC-R3 .....£17.99

M-75 SCANNER PRE-AMP

Superb BNC in-line amplifier to boost signals! Fits on top of your scanner and away you go. (Powered by PP-3 battery - not supplied).
Freq: 24MHz–2.1GHz.
Gain: -10dB to +20dB.

OUR PRICE **£79.95** P&P £5.00

ALINCO DJ-X3

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

£99.95

Soft case.....£15.99
Cigar power lead £19.99

Optional battery pack and drop in charger £39.99

ALINCO DJ-X10

Full-featured handy. 100kHz-2GHz all mode. Includes SSB/CW band scope, alphanumeric display plus loads more. (Includes battery/drop-in charger).

OUR PRICE **£269.95**

Optional case £15.00
Optional battery box.....£14.99
PC interface £42.95
Cigar power lead £19.99

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 & loads more.

Includes 8.33kHz spacing

£449.95

Optional case.....£15.00
Optional battery box.....£14.99
Cigar lead £19.99
PC interface £42.95

YUPITERU MVT-7100

Wideband hand-held scanner covers 500kHz-1650MHz. (All mode). Includes nicad/car charger/charger/antenna. Extremely user-friendly hand-held reciever with outstanding performance unmatched by its rivals.

OUR PRICE **£199.95**

Soft case for 7100EU/9000 - specify ...£19.99
MVT-9000 MkII .....Sale price £325.00
MVT-7300EU .....Sale price £219.00

MVT-7300EU

- Compact wideband hand-held receiver
- Covers 521kHz-1300MHz (all mode)
- 8.33kHz steps
- Includes nicads and car charger

SPECIAL OFFER **£219.99**

Optional mains adapter £14.99

AOR AR8200MkIII

Never before has one hand portable offered so much. ★ Covers 100kHz-3GHz (all mode) ★ Computer control capability ★ 8-33kHz steps for the new airband spacing ★ Reaction tune capability ★ Includes nicads/charger/antenna and car lead.

OUR PRICE **£385.00**

Optional case £19.99
CC-8200 PC interface.....£79.99

SCANNING RECEIVERS FROM OUT OF THIS 'WORLD'

UNIDEN UBC-780XLT

NEW EUROPEAN VERSION

New comprehensive scanner (25-1300MHz) Alpha Tag, PC clonning control. Smart scanner + trunk track facility. Includes PSU.

OUR PRICE **£299.99**

Software 780XLT.....£34.99

YAESU VR-5000

0.1-2.6GHz all mode receiver with (optional) DSP plus band-scope/world clock and too much more to print.

SALE PRICE **£549.99** (incl's PSU)

Optional DSP.....£79.99

AOR AR-8600 MkII

Extremely versatile all mode receiver (100kHz-3GHz). *Now with improved short wave performance.*

SALE PRICE **£625.99**

Optional power supply £19.99

FAIRHAVEN RD-500VX+

Superb wideband receiver (all mode) with over 50,000 memories capable of holding text. 20kHz-1750MHz. Incl's remote control/PSU/PC lead and software.
SSP: £899.00

OUR PRICE **£745.00**

ICOM IC-R8500

Next generation wideband receiver for the true perfectionist.
0.1-2GHz. (All mode).
Includes free PSU.

OUR PRICE **£1149.95**

SP-21 extention speaker £74.99
Voice synth board.....£34.95

HAYDON COMMUNICATIONS

■ Greg Baker, PO BOX 3307, MANUKA, ACT 2603, AUSTRALIA
■ E-MAIL: greg.baker@pwpublishing.ltd.uk

Bandscan Australia

As I write this, the Iraq war appears to be in its final throes and news media are dominated by reports from that country. As well as some news relevant to that war, I have reports on HCJB in Australia, a planning bungle in Sydney, pay television, the Special Broadcasting Service and a possible change for the future of the Communications minister. As well I have reception reports for Radio Australia, Voice International, Radio New Zealand International and HCJB Australia.

HCJB In Australia

Christian broadcaster HCJB has started transmitting from a site near Kununurra in far northern Western Australia. The 100kW transmitter was designed and built by HCJB staff in the USA and the curtain array antennas are supported on 37m towers. HCJB was reported to have been interested in the old Radio Australia site on the Cox Peninsula near Darwin in the Northern Territory eventually bought by Voice International. The high price of power in Darwin, which uses oil-fired power generators, apparently swayed HCJB for the Western Australian site. The 80 hectare site was donated by a local Kununurra landowner.

Programming is currently only in English, but there are plans to expand to include Urdu and Hindi and to Oromo for Ethiopian audiences. Further expansion plans include going to five transmitters and 16 broadcasting towers to reach the more than half the world's population accessible from this site. The current schedule is 11.770MHz 0700-1200 and 15.480MHz 1230-1730.

HCJB has also been active in helping a consortium set up a Christian FM radio station in Port Moresby, Papua New Guinea. The station, Wantok Radio Light, broadcasts in English and the local lingua franca, pidgin, at 5kW to 200,000 people in the area. The station has government permission to install a 100kW short wave transmitter to reach more remote areas of the country. There are also reports that the consortium will set up similar short wave facilities in Vanuatu and the Solomon Islands. HCJB can be found at **www.hcjb.org** Wantok Radio Light is at **www.missionaryradio.info**

RNZI Schedule

J. C. Osborn from St. Albans in Hertfordshire has drawn my attention to the Radio New Zealand International (RNZI) schedule running until 26 October this year. It is: 6.095MHz 1650-1750; 11.980MHz 1750-1850; 15.160MHz 1851-2215; 17.675MHz 2216-0505; 11.825MHz 0506-0705; 9.885MHz 0706-1105 and 1106-1305 and 6.095MHz 1306-1650. Mr Osborn has been a short wave listener for sixty years. Further details are at **www.rnzi.com/pages/listen.htm**

Planning Bungle

Five Sydney a.m. radio stations are being forced to relocate their transmission towers following what seems to have been a planning bungle. The New South Wales state government has given planning permission to the construction of a 1200-unit residential development within 200m of the transmission towers. Within that distance there are serious concerns about the possible effects of electromagnetic radiation. Most discussion has focused on the possibility of interference with electrical and electronic equipment, but some commentators have talked about the possible health risks.

The health risks pointed to include the possibility of burns from touching metal handrails. In addition, the development lies within what is called the drop zone, the area kept clear in case a tower falls over. The broadcasters had occupied the site for 50 years and had between five and ten years remaining on their leases. The government is running from possible compensation claims from the radio stations claiming that the radio industry made no comment at the planning stage.

The industry in its turn strongly makes the case that they warned the government. No doubt this will all end up in the courts. In the meantime a site at Eastern Creek, site of a motor racing circuit, is being considered for the towers.

Reports

Martyn Gardiner from Portsmouth has been listening again to Radio Australia (RA) using his Icom and a long wire antenna. After 0800 RA came in well on 15.415, 17.750 and 15.240MHz. At around 0755 another day, in a particularly technical frame of mind, Martyn received 21.725 (poorer signal), 17.750 (ok), 15.240 (best) and 15.415MHz (good). A short time later at 0810 Martyn noted 15.415 (ok), 9.710 (good), 15.240 (ok) and 21.725MHz (good).

On another occasion, he picked up RA well at 2115 on 9.500MHz. This time, Martyn says, the signal was good enough to hear on a radio with just a radio with a telescopic antenna.

Michael Beesley from Romsey in Hampshire has reported again on RA and RNZI from his location. He says that the usual strong signals of spring are back again. He has picked up RA on 9.475MHz at 1600 (SINPO 25432); 9.500MHz at 2021 (45343); 15.240MHz at 0805 (55544); 15.415MHz at 0825 (35232); 9.710MHz at 0805 (35333); 17.750MHz at 0855 (25222) and 11.660MHz at 1555 (44544). RNZI is as good on 15.175MHz at 1255 (43533); 11.675MHz at 0910 (33433). Michael also reports Voice International from Darwin on 13.685MHz at 1235 (35333). He promises further reports as the spring develops.

John Parry 5B4AFR in Cyprus has been listening to the new HCJB transmitter in Western Australia on 15.445MHz with SINPO 33453 at 1615.

Other News

Pay television. The war in Iraq has boosted the number of viewers of pay television here, with Sky News, BBC World, CNBC, CNN, Fox News and Bloomberg showing strong growth. Sky News is reported to have doubled its audience since the war started at the end of March and BBC World has grown by 300%.

The Minister for Communications, Senator Richard Alston is reported as keen to leave his portfolio and take up his reward for many years serving the Liberal Party in Australia, an ambassadorial posting. Industry sources say that Alston has been ineffective as a minister, failing to enthuse with his policies on the IT industry, on digital television and on media ownership. Senator Alston has, of course, denied the reports.

Effects of war. Apart from the domination of all news media here of the war in Iraq there have been several other less obvious effects. Ratings for news and talk back radio stations have grown significantly. One commentator has said that when people need to be informed they gravitate to news and talk. The other effect has been a decline in advertising revenue for both radio and television stations. On the government side, there has been an increase in expenditure, naturally enough, on counter-terrorism communications systems. The Australian Secure Network ASNET which allows secure communication of classified material between security, intelligence and law enforcement bodies at commonwealth and state level has been given a large increase in funds. Of course details are a bit thin on the ground.

Telecommunications company Optus has signed a deal with multicultural broadcaster Special Broadcasting Service (SBS) to distribute its digital television signals via satellite to 42 transmitter sites across Australia. The SBS digital signal currently reaches three-quarters of Australia and this deal will make it easier for the broadcaster to be in reach of more regional, rural and remote viewers.

Finally

I welcome any news and comments. In particular I am interested in any s.w.l. information on Australian stations heard by *SWM* readers so I can chase up more details and interesting snippets from this end. My address is **PO Box 3307, Manuka, ACT 2603, Australia**. For personal replies please send two IRCs. Those with an Internet connection can get me at **mandg@webone.com.au**

■ **ANDY CADIER, 28 ROMNEY AVENUE, FOLKESTONE, KENT CT20 3QJ**
■ **E-MAIL:** off.the.record@pwpublishing.ltd.uk

Off The Record

In the continuing battle against pirate radio and other unauthorised transmissions, Britain's Radiocommunications Agency (RA) is enlisting the help of Internet Service Providers (ISPs). Their aim is to close down websites that are operated in support of illegal broadcasts.

In the past, RA activities have been limited to just closing down unlicensed stations and prosecuting those involved, apart from actually making pirate broadcasts it is also illegal to provide premises or provide any kind of support. The RA investigators now intend to close websites that support pirate broadcasting and prosecute those concerned. The ISP's that hosts these illegal radio websites, some of which have streamed audio, could also be committing an offence too, but no action will be taken against them.

There are several websites that actively support pirate broadcasting and provide a news service for listeners. These are not run by any particular station and in some respects could be regarded as a part of the hobby radio media. Time will tell if these are targeted too. Radio Galaxy International, a Dutch SW pirate, have recently stated that their Lycos website in Holland had been deleted, the reason for this is so far unknown.

Irish Pirates

A report sent to me by **Ivan Tallow** of Co Meath, Eire, says that their telecommunications regulator ComReg have claimed that aircraft using both Dublin and Cork airports have been placed in grave danger after their radio frequencies suffered interference from two radio pirates. A station at Donnycarney was forcibly closed down by ComReg officers, with the pirate presenters, backers and engineers now facing up to two years in prison and/or a fine not exceeding £25,000. The f.m. band in Dublin has become increasingly congested and the licensing authority is seeking ways of alleviating the problem.

Another station called RLO at Limerick was also reported by the Irish Aviation Authority and had its transmitter site demolished under a court order to stop the transmission. A ComReg official says it is estimated that there are about 70 pirates in Ireland, some of which not only clashed with aviation frequencies, but mobile 'phones, legitimate radio and emergency services.

Ivan also sent me some newspaper cuttings relating to transmitter thefts that are becoming increasingly common in the UK as well as Ireland. Both local and hospital radio stations have been targeted, normally for fairly low powered f.m. transmitting equipment. Interestingly enough, only a small percentage of the stolen gear appears to be found in the possession of UK pirates.

Laser Radio Has Moved

Laser Radio, the music and media news s.w. station, has moved from 5.935 to 9.520MHz and uses a 100kW transmitter near Riga in Latvia and is on air on Sundays from 1200 to 2000. The old frequency was sometimes difficult to hear due to the proximity of Radio Prague, hopefully 9.520MHz will offer better reception.

The Laser Radio's relay to the USA via s.w. station WBCQ is also on Sundays at 2000 to 0000 - this transmission has moved to 9.330MHz to avoid interference from Radio Damascus in Syria. Having monitored both of the new frequencies prior to the change, I have come to the conclusion that unless other stations move too, there may well be problems. Updates on the frequency changes and a programme guide are posted on their website **www.laserradio.net** and they are happy to receive listeners comments and reception reports.

Licences End

Israel Broadcasting Authority employees are voicing their concerns after the Treasury has recommended abolishing the TV tax and they fear about 1,000 lay-offs. It is recommended that the tax be replaced with advertising and direct government funding. The redundancies are mainly likely to affect those involved in the TV tax collection department. There is concern among existing commercial stations that foresee an increased struggle for dwindling advertising revenues and may resort to legal action.

In the UK, proposals have been made for the abolition of Citizens Band radio licences from 2004 and the withdrawal of the original 40 (UK 27/81) channels during 2010. CB operators will be left with just the 40 CEPT European channels, the existing equipment requirements, operational rules and conditions would continue to apply. At present, a licence costs £15 and the Radio Licensing Centre provide a booklet outlining terms, conditions and advice about the use of CB radio. Further information is available from the information centre at the **Radio Communications Agency, Wyndham House, 198 Marsh Wall, London E14 9SX.**

Pirate's Hall Of Fame

The website giving details and sound clips of the 1960s offshore pirates has been updated, with even more personalities and events being included. This site has been going for three years and now includes the launch of Swinging Radio England and Kenny Everett on the Radio London Breakfast Show. You can step back in time by going to **www.offshoreradio.co.uk**

SW Pirate Relays

Jolly Roger Radio has been heard relaying Radio Cochiguaz, Britain Radio International, Laser Hot Hits and Crazy Wave Radio on 6.245MHz usually on Sundays. From Scotland, Weekend Music Radio a very popular station in the past has been heard on 7.526MHz. German pirate Radio Marabu are now broadcasting 24 hours-a-day each Saturday and Sunday on 6.310MHz - their address is **Postfach 1166. D 49187 Belm, Germany**. Also directly from Germany, Crazy Wave Radio have just started tests on 6.955MHz u.s.b., they welcome reception reports sent to **Box 1136, 06201 Merseburg, Germany**.

And Finally

With the Editor's permission, I have decided to cease writing this column after the coming August issue of *SWM*. 'Off The Record' started in July 1991 almost 13 years ago and I feel the time is right to pass the keyboard to another enthusiastic *SWM* author who can continue to promote some of the oddities of the ever-changing radio listening hobby. It has been wonderful experience writing for *SWM* and I will include some light-hearted anecdotes in the August magazine.

*Reluctantly I've agreed. I'm sure all our readers will concur that Andy's contribution will be missed. - **Ed**.*

And you call it 'Amateur' Radio?

John Wilson explains how the hand of bureaucracy squeezes ever tighter on equipment intended for the hobbyist. The increase complexity of testing required for type approval and EMC testing means longer times for equipment in test labs. This of course translates to higher end-user prices. Is this yet another example to Euro 'straight banana' legislation?

Now that the dead hand of European bureaucracy has fallen across most aspects of our lives, the use of the term 'Amateur' can no longer be used when it comes to manufactured equipment for the hobby radio market. Some may say, as indeed they have done ever since the end of WW2, that the use of commercially made transmitters and receivers is a defiling of the term 'amateur', but one has to accept that the hobby of communication with others across the world has been greatly expanded by the growth of readily available equipment from many international manufacturers, British, American and Japanese. Under the stated intention of rationalising electronic equipment performance standards across the European market, which is in itself a laudable objective, the various regulatory authorities in the major European countries agreed to a set of common standards covering EMC (Electro Magnetic Compatibility) and type approval matters. On the face of it, this is a welcome development, since I remember all too well the difficulties of getting type approval in this country and in Germany where the regulations were similar but sufficiently different to make the poor manufacturer jump through a different set of hoops for each market. For manufacturers such as Kenwood, it was a minor nightmare for their commercial radio equipment, but thankfully amateur radio equipment was largely excluded from the necessity for long, complicated and very expensive type approval testing.

Changed Times

However, things changed with the introduction of the European EMC Directive, and more recently the R&TTE (Radio and Telecommunications Terminal Equipment) Directive, and amateur radio equipment was swept into the bag along with all and any equipment which was involved in communications. To say that the regulations are hard to understand at first sight is a massive understatement, even for those who are accustomed to the peculiar language and style of such documents, and when I was muttering to the Editor of this magazine about these difficulties, he asked me if I could try and explain in simpler terms what the regulations comprised and what practical problems are encountered in applying the tests to actual equipment. Well, I'll try, but don't be surprised if you and I get lost in the tangle.

The R&TTE Directive standards are constructed on a modular principle within which 'commercially available amateur radio equipment' appears under two headings. The first, in section 3.2 is concerned with the use of the spectrum and corresponds reasonably well with the old MPT Type Approval standards. Within section 3.2 appear harmonised (i.e. applicable in all countries of the EU) radio standards scoped (that's bureaucratspeak) by frequency and/or equipment type. These standards are in effect product specific, and the current standard for amateur radio equipment is *EN 301 783*, split into two sections. *EN 301 783-1* deals with the technical characteristics and methods of measurement, whilst *EN 301 783-2* is the actual harmonised EN covering the essential requirements under Article 3.2 of the R&TTE Directive. In truth, this second part tells you what tests are required for the equipment to conform to the technical characteristics laid

down in Part 1. Confused? You certainly will be.

Innocuous Tests?

The tests themselves seem innocuous until you have to carry them out, consisting of 'Unwanted emissions, conducted', Unwanted emissions, radiated' and 'Conducted RF Immunity'. These definitions, however, bear little or no relationship with the similarly entitled tests carried out under the EMC Directive for non-radio equipment, and take a great deal more skill, time and effort to carry out. Let's take a look at 'Unwanted emissions, conducted'.

The unwanted emissions to which this refers are all and any emissions conducted out of the equipment via the antenna connector (normally referred to in EMC-speak as a 'port'). In order to measure this, at least in the receive or standby state, the antenna connector of the equipment under test (EUT) is cabled directly to the input of a measuring device, often an EMC test receiver or a spectrum analyser, with the following levels and limits applied:

Frequency Range	Measuring Bandwidth	Level Limit
150kHz - 30MHz	9/10kHz	-57dBm
30MHz - 1GHz	100/120kHz	-57dBm
1 - 12.5GHz	1MHz	-47dBm

Is this difficult to attain? Well, if you look at my article in last month's *SWM* on the d.f. potential of WW2 communications receivers you will note that the TCS-12 receiver blows a hole right through this requirement with an antenna port radiated level of -20dBm, miles above the maximum conducted emission level of -57dBm. Fortunately for we short wave listeners, a stand-alone receiver does not have to conform to these limits, but I did take the opportunity - actually as I was writing this - to pop into my own lab next door and measure the conducted emissions from the antenna port of my favourite Kenwood TS-900. The first conversion oscillator comes out of the antenna socket at a level between -42 and -49dBm depending on the band in use, and between 30MHz and 1GHz there is a little forest of oscillator harmonics which are hovering on the edge of the limit, so the TS-900 would not meet today's test limits under the Eurocratic Regime. Time for a regime change?

So far, so good, but this is only the beginning. The test standard also applies to the conducted emission limits for the transmitter, so the test set-up for this is to connect the antenna socket of the transmitter/transceiver to the input of the measuring receiver or spectrum analyser through a precision attenuator of sufficient power rating to handle the 100W or so of r.f. and get it down to a safe level to apply to the test receiver or spectrum analyser, say below -10dBm. I do this in two stages, by first using a Bird 30dB 1kW attenuator to get the 100W (+50dBm) down to +20dBm and then a further lower powered 30dB attenuator to get down to a sensible and safe level of -10dBm. I know that some people use directional couplers to extract a lower level signal from a terminated transmission line, but after 50 years doing this kind of measurement I can assure you that this can often lead to erroneous results because of introduced variables in the coupler performance. Not recommended nor used by me. Now to the emission limits applied to the transmitter.

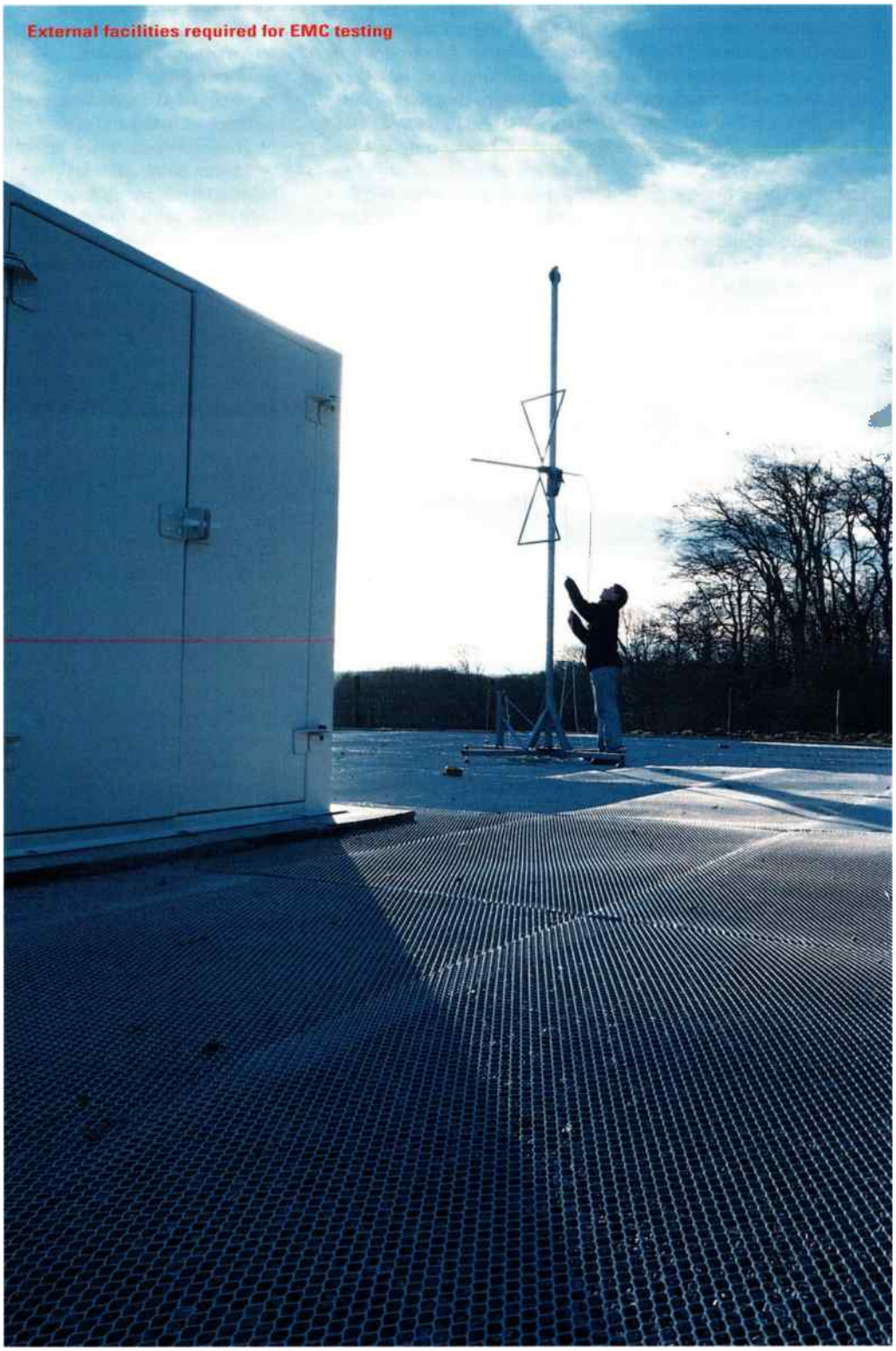
Frequency Range	Measuring Bandwidth	Level Limit
150kHz - 1.7MHz	9/10kHz	-36dBm or -60dBc whichever is higher.
1.7MHz - 35MHz	9/10kHz	-36dBm or -40dBc whichever is higher.
35MHz - 50MHz	100/120kHz	-36dBm or from -40 to -60dBc whichever is higher.
50MHz - 1GHz	100/120kHz	-36dBm or -60dBc whichever is higher.
1GHz - 12.5GHz	1MHz	-30dBm or -50dBc whichever is higher.

What does this all mean? As you can see, the basic emission limit for frequencies below 1GHz is -36dBm, but this cannot possibly apply to transmitters which may have widely varying power outputs, ranging from a flea-power 1W QRP unit to a full power amateur base station transceiver, so the second allowable limit is given in dBc which means that the level is expressed and measured relative to the full power output of the transmitter. In the main operating range of an h.f. transmitter, the limit is -40dBc, so for a transmit power of 100W (+50dBm) a limit of -40dBc would be at a level of +10dBm, much easier to achieve than the -36dBm otherwise to be used. To achieve an emission level of -36dBm with a 100W transmitter would imply a spurious suppression of 85dB, which is nigh on impossible for this type of equipment. I have seen examples of modern amateur radio transceivers which were very close to the limits indeed, and for my own information I went back to the TS-900 and found that the 'old-fashioned' Collins conversion system used in this transceiver gave a very clean output signal, the only significant emission being at the second harmonic of the transmit frequency and even this was down at -55dBc, well below the limit. Not bad eh?

A Matter Of Time

As you may imagine, doing these checks takes quite a long time, and the situation is made worse by the need to check at the mid-point of the lowest, middle and highest frequency band that the transceiver covers. I normally do this on the 80, 20 and 10 metre bands, but there are of course h.f. transceivers on the market today which include v.h.f. bands in the box, so the testing would be even longer. But it gets harder!

Measuring the 'conducted' emissions is the easy bit. Radiated emissions are measured in a different and more time consuming way. What you have to do is place the transceiver on an insulating support 1.5 metres above ground, with the antenna port terminated in a screened resistive load of the correct impedance. At a standard distance from the transceiver you have a measuring antenna which can be raised and lowered from one to four metres above the ground plane. Switching on the transceiver, you have to locate any emissions from it over the full test frequency range of 30MHz to 12.5GHz, and at any emission frequency located, you rotate the transceiver to maximise the emission level and raise or lower the measuring antenna to again maximise the emission. Noting the frequency and level you then move on to the next emission and so on. You repeat this test in both vertical and horizontal polarisation of the measuring antenna and then repeat the whole damned thing again on the three selected bands covered by the EUT. Phew! Then would you believe it, you remove the transceiver and replace it by an antenna and feeder line having accurately calibrated gain or loss at the frequencies measured. Connect a calibrated signal generator to the end of the feeder, go to your list of measured emissions, and adjust the frequency and level of the signal generator to give the same level as that measured in the first place. Doing a little sum involving the antenna gain and feeder loss you then end up with an r.f. level which is equivalent to that generated by the transceiver you tested. Then looking at the table of allowable limits for radiated emissions which is much like that for conducted emissions, you can determine whether or not your transceiver being tested is radiating signals which contravene the standard limits. Do all this on three bands and the time consumed becomes ludicrous (and expensive), but


External facilities required for EMC testing

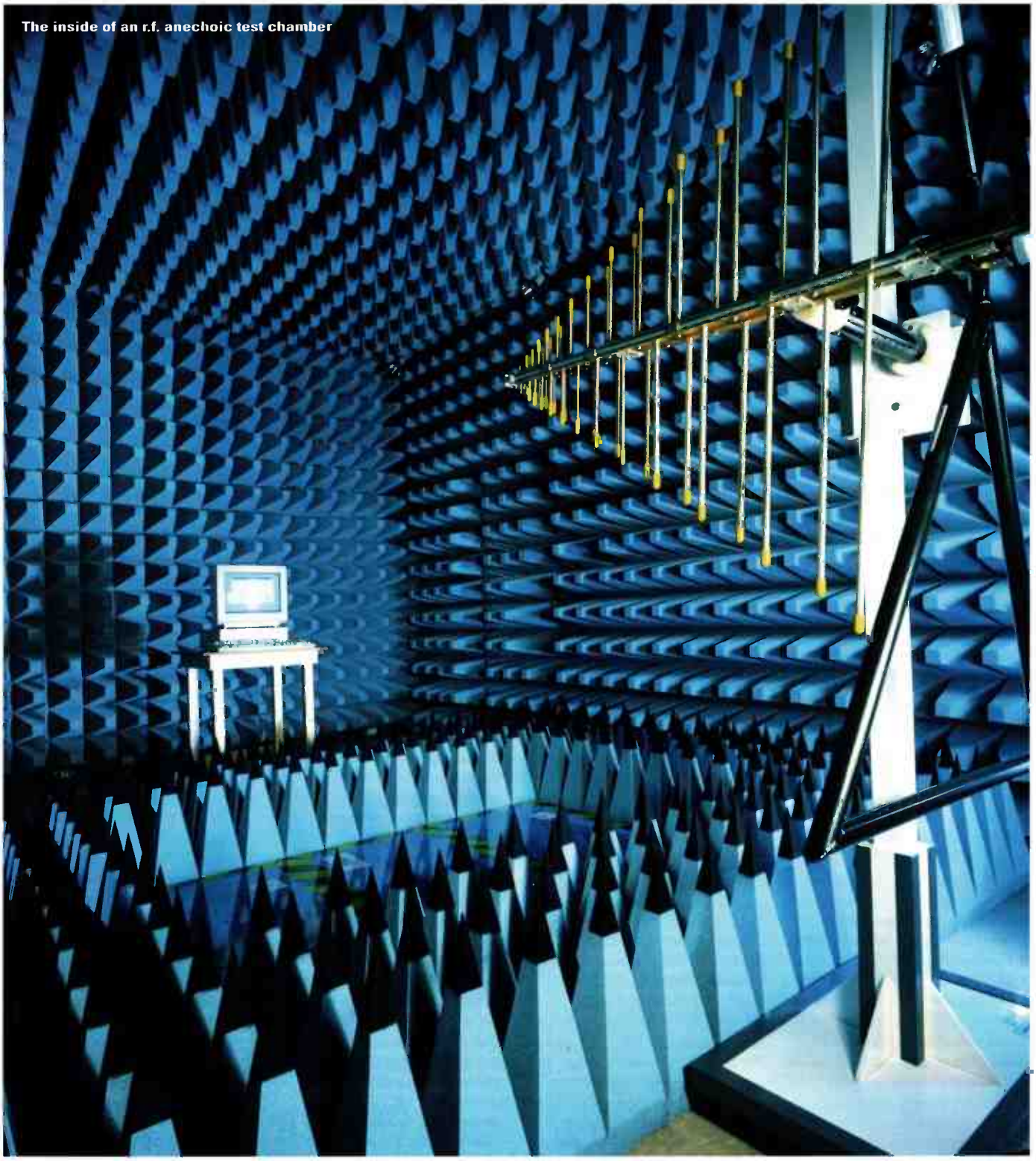
the Eurocratic Law says that it has to be done.

Ludicrously Lengthy

Not only is this (in my own opinion) ludicrously lengthy, it runs the risk of being subject to many variables, such as the screening effectiveness of any feeder used to connect the transmitter under test to a resistive load, not to say the screening capabilities of the load itself. The disposition of the load in relation to the transmitter also has effects, as has the presence or absence of other connecting leads such as the audio feed from the two-tone generator used to generate the s.s.b. signals during the tests. And - once again the tests have to be carried out in transmit and in receive/standby, three bands and two antenna polarisations. And you ain't seen nothing yet.

On to the tests for conducted immunity, which are somewhat more sensible. In this test a wanted signal is applied to the receiver via a two port combiner, with a swept unwanted signal applied via the other port. Whilst listening to and measuring the signal-to-noise ratio of the wanted signal, the unwanted signal at a level of -17dBm is tuned from 150kHz to 1GHz (slightly lower level above 30MHz). The receiver should not show any degradation of the wanted signal below 12dB SINAD for analogue speech (for a.m. and s.s.b.) at any test frequency, but sensibly, discrete spurious signals are ignored, i.e. i.f. breakthrough and second channel effects. I have found that virtually all reasonable receivers can pass this test quite easily, but it does take a surprisingly long time to carry it out, with such a wide test frequency range and of course the inevitable multi-band test requirements. On with the motley.

That completes the test required by Article 3.2 of the R&TTE Directive, but we now have to consider Article 3.1b which covers the EMC requirements as laid down in the multi-part standard *EN 301 489-1* defining the common technical requirements for radio equipment, and *EN 301 489-15* defining the specific conditions for commercially available amateur radio equipment. These standards closely follow the EMC standards applied to most manufactured products and are much more easily carried out and interpreted than the tedious procedures in *EN 301 783*, of which I shall say no more. Basically any manufactured amateur radio product has to conform to the same standards of emissions and immunity as a PC or washing machine or other 'domestic' product, with radiated emission levels measured on a test site and expressed in dB microvolts/metre. The idea of measuring by substitution is cast into outer darkness and life becomes much more pleasant for the weary test engineer. Conducted emissions in EMC terminology are actual emission levels measured on the power supply lines, both a.c. and d.c., together with the same measurements carried out on telecommunications ports. A test known as 'Harmonic current emissions' does not refer to harmonics of a transmitter, but to distortion of the applied a.c. waveform by the equipment



The inside of an r.f. anechoic test chamber

under test, and this is actually quite complex to do if you do not use dedicated low THD a.c. sources and whizzy software to interpret the results. All harmonics of the mains supply frequency up to and including the 40th are measured, and there are quite tough pass/fail limits to meet. With 'linear' power supplies of the type using a chunky mains transformer with a rectifier/capacitor arrangement there are usually no problems, but high powered switched mode power supplies can and do fail this test.

A final test on the mains supply is the effect of dips and interruptions in the supply, and this can be quite dramatic with some equipment since the interruptions take place at the zero crossing point of the mains waveform and have rise and fall times of less than 5µs. You can get quite a loud "thump" from big power supplies with this - great fun (but not for the manufacturer who has to go away and fix the problem).

Same Basis Pattern

Immunity tests follow the same basic pattern as those for domestic and light industrial equipment with exposure to radiated r.f. fields swept from 80MHz to 2GHz, but at a relatively low test level of 3V/metre. Considering the r.f. field in which the average radio amateur sits, this test should not cause the slightest problem to well made equipment, although I have wondered whether the reason most radio amateurs

(including me) are quite, quite mad is the fact that we have been exposed to ridiculously high r.f. fields for most of our lives. You wouldn't believe how high the field strength can be when you are bashing 400W p.e.p. into a G5RV located just above the shack roof. Conducted r.f. immunity tests consist of inducing an r.f. current into all connecting cables as well as the mains (or d.c.) power leads, and sweeping r.f. from 150kHz to 80MHz. You will note the completely different interpretation of this test in the other test standard.

If the equipment under test is mains powered, there are a series of tests designed to replicate the nasties which appear on the a.c. mains distribution system in most European countries. There are two main types, the first being a series of very fast (5ns rise time) bursts at levels up to a few thousand volts which are found in real life superimposed on the normal 230V mains supply; the second being slower high energy surges which replicate the effects of nearby lightning strikes on the domestic mains. This latter test really can be a frightener, and we always offer earplugs and goggles to anyone watching the test take place. Dumping up to 4kV from a 2Ω source impedance directly into a working power supply can have the most amazing and explosive effects, but the test levels are derived from actual measurements carried out across Europe and are therefore perfectly realistic.

Electrostatic Discharge

Finally, the test I always leave to the end of any test session because of its propensity to cause very quiet but usually terminal failure of equipment. I refer you to ESD (Electrostatic Discharge) in which I charge up an artificial finger to anything up to 15kV and then whack it into the equipment under test. This duplicates the effect of the radio operator in his nylon socks walking across a polyester carpet on a dry day, getting himself charged up to the eyeballs and then touching the tuning knob. It's quite astonishing how much current flows during the subsequent '**ouch**' from the human being, and equally astonishing how much damage can be done to sensitive electronic equipment during the '**ouch**' . I have to tell you that older equipment can usually survive without any difficulties at all, whereas modern 'electrickery' full of microprocessor devices and DSPicable devices will go to that great graveyard in the sky. That's why I leave it to the last test of the day.

And there you have it. This whole test procedure for enabling a manufacturer to place his product on the European market takes several days to accomplish, and with commercial Test House rates running at upwards of £1000 per day, it makes me jolly glad that I jumped over the fence, became poacher turned gamekeeper, and got out of manufacturing. As for the necessity for all this testing - my own opinion is that once you hand over the reins from the 'proper' engineers and give control to a shiny-a**ed Eurocrat, we are all in for a hard (and mostly unnecessary) time. The final irony is (and this is why someone called me the Jeremy Clarkson of the radio world), you can still get a few components together, apply a little soldering technique and build a super-regenerative v.h.f. receiver which will wipe out GCHQ at a distance of a few kilometres, and all quite legally. You don't even have to have an amateur radio licence. What a strange world we live in!

And Finally

I get the impression that someone out there is watching me, because on the 19th of March this year when my wife was having photographs taken of her latest prize-winning sheep, we had a visit from the military in the shape of Sea King registration Whisky Romeo dropping over the hedge to see what John Wilson was up to. The photographer turned his lens from the sheep to the sky and the accompanying photograph shows you just what low flying means in this part of the world. The Sea King is actually below the field in which our sheep were safely grazing - until this happened, and much lower than my K9AY antenna. It's easy to get paranoid about these things, but hello Whisky Romeo and I hope the Squadron Commander doesn't look too closely at the logbook for the 19th of March 2003. **Happy testing!**

Win! An AOR Portable active loop worth £198

John Wilson reviewed the compact portable WL500 active loop two month's ago in the April issue of *SWM*. If you read that review and have wished you owned one ever since, then here's a chance to acquire one of these superb antennas - including the m.w./l.w. adapter - for the price of a postage stamp.

Here's a snip of what JW had to say, "...the performance of the WL500 on the h.f. bands is absolutely excellent and AOR are to be congratulated on a very well thought out and carefully executed design. I thoroughly recommend the WL500 system, and for anyone who simply cannot get any kind of antenna outside their house, the WL500 will fill the need perfectly. As an antenna system for the travelling listener, the WL500 could not be more perfect, and with a typical portable receiver having an external antenna jack will provide excellent reception of even weak h.f. transmissions."

Many thanks to AOR for the donation of the WL500 as a prize. They can be contacted by 'phone: **(01773) 880788** or E-mail: **info@aoruk.com** For more details on AOR's products and news of new developments visit: **www.aoruk.com**

The closing date for this competition is 26 June 2003, the winner will be drawn on 30 June 2003 - the first correct answer drawn will win. The winner will be announced in the August 2003 *SWM*. The Editor's decision is final.

entry form

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To enter this prize draw, please fill in your details on the entry form, (photocopies can be accepted with the original corner flash attached), answer the three questions and post your entry to: ***SWM* AOR WL500 Competition, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**

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*eaker 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*

£99.95 B

£79.95 B

ICOM IC-R5 NEW

- 150kHz 1310MHz
- AM, FM, WFM
- 1250 memories
- Built-in ferrite rod antenna
- CTCSS & DTCS tone squelch
- Cloning capability
- 2xAA Ni-Cds + AC Charger
- Flexible Antenna

£159 B

ICOM IC-R3 SCANNER & TELEVISION

- 495kHz - 2450MHz
- AM, FM, WFM, AM-TV, FM-TV
- TV mode PAL (UK)
- 450 memories
- 50.8mm (2in) TFT colour display
- Simple bandscope
- BP-206 Lithium-ion battery
- Telescopic Antenna

£339.95 B

ICOM IC-R10 "ICOM QUALITY SCANNER"

- 500kHz - 1300MHz
- AM, FM, WFM, SSB, CW
- 1000 memories
- 14 tuning steps
- Real-time bandscope function
- CI-V compatibility (option)
- 4.8V DC Ni-Cds
- Flexible Antenna

£259 C

ICOM IC-R75 "BARGAIN S/W RECEIVER"

- 300kHz - 60MHz
- USB, LSB, CW, AM, FM
- 101 memories
- Automatic Notch filter
- RF Gain/Squelch
- Synchronous AM detection
- DSP (with optional UT-106)
- Clock

£599 C

ICOM IC-PCR1000IS

- 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)

£309 B

ROBERTS R-861

- 153kHz-30MHz, 87.5-108MHz
- AM, SSB/CW, FM (Stereo)
- Memories 261SW, 18MW, 18FM
- RDS (Radio Data System)
- Stereo through earphones
- Auto time set • 3 Alarm timers
- 4 x AA cells (Alkaline)
- 110/230V AC adaptor

£199.95 B

ROBERTS R9914

- 153kHz-30MHz, 87.5-108MHz
- AM, SSB/CW, FM (Stereo)
- 45 Station preset memories
- Stereo through earphones
- Dual time
- Clock/Alarm
- 4 x AA cells (Alkaline)
- 230V AC adaptor

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MFJ-461 "INGENIOUS ACCESSORY"

The MFJ-461 is a stand-alone pocket sized Morse code reader. Similar in size to the MFJ Morse tutors, all you do is hold it close to your receiver, and it instantly displays CW on the 32 character high contrast LCD. It has automatic speed tracking and a serial port. Truly pocket sized at 57 x 82.5 x 25.5mm and 158g.

£84.95 B

MFJ-784B DSP FILTER

£259.95 B

The MFJ-784B Tunable DSP filter automatically eliminates all hetrodynes, random noise, white noise, impulse noise, static, ignition noise, power line interference, atmospheric noise etc. There are 16 factory pre-set filters to match all the popular modes which can be re-programmed by the user and saved.

OREGON SCIENTIFIC BAA 898 HG NEW

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.* Optional Thermo-Hydro Sensor:THGR228N

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WS-2300 WEATHER STATION NEW

This professional wireless weather station is a high quality system that receives weather data from 3 outdoor sensors wired directly or through 433MHz signals. **Base receiver station *3 Outdoor sensors- Thermo-hydro transmitter, Wind sensor, Rain Sensor *PC program on CD-ROM *RS-232 serial data transfer *AC/DC power adaptor*

£199.95 C

GARMIN GPS-V DELUXE NEW

Compact Handheld GPS with detailed street-level maps provided from MapSource City Select CD. Will automatically calculate a route and guide you to your destination with turn-by-turn directions and audible beeps to alert you to approaching turns. **Size: 127x59x41mm *Weight: 255g*

£445 B

GARMIN STREETPILOT III DELUXE

It talks to you and is supplied with street level mapping 128Mb storage card and card reader for quick PC programming. Examples of voice info are: "turn left 2 miles," "take 2nd left at next roundabout", "house number 17 is on your left," "turn right in 300ft."

£859 B

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- 8-digit display
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- Whip antenna provided
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- AC charger
- 9V DC 300mA

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SSB Utilities Special

Graham Tanner is back with another 'SSB Special' article.

In previous 'SSB Utilities' special issues I have covered a number of different USAF aircraft types, using the articles to give some more in-depth information about various aircraft types and how they may be heard on h.f. This year it is the turn of the Boeing/McDonnell Douglas C-17A Globemaster III aircraft. In previous years I have written about USAF tail-numbers and callsigns ('Reaching Out', June 1998), the USAF KC-10A Extender (June 2001) and the USAF C-5A and C-5B Galaxy ('The USAF C-5 Galaxy on Short Wave', June 2002); you may wish to refer back to these articles so that you have a better understanding of what this article covers.

Photo courtesy of Photavia Press

C-17 Origins

Back in the 1970s the US military identified a growing demand for rapid deployment of military forces and equipment that would be beyond the capabilities of their existing fleet of transport aircraft. In the late 1970s the US Air Force were investigating an Advanced Medium STOL (Short Takeoff and Landing) Transport (AMST) aircraft, and were planning on a single aircraft which could undertake all aspects of the airlift mission. President Carter's administration cancelled the AMST program and on the same day initiated the 'C-X' program as a follow-on to the C-5 Galaxy and the C-141 Starlifter.

In December 1979 the USA's DoD initiated the Cargo-Experimental (C-X) competition to find a new aircraft design which would incorporate the capabilities to fulfil all strategic airlift needs. The 'C-X' program required an aircraft that could deliver a full range of combat equipment over intercontinental distances; operate through a 910m runway environment; airdrop troops and equipment; have ground manoeuvrability characteristics that would permit routine operations through small, austere airfields; be designed for survivability; have excellent reliability, maintainability and availability and have a low life-cycle cost.

The 'C-X' was expected to carry, over intercontinental distances, military equipment such as the new XM-1 tank and other outsize cargo that could only (at the time) be airlifted by the C-5 Galaxy. The 'C-X' was also to be capable of operating into austere fields, greatly improving the capability to respond to global contingencies. Boeing, Lockheed and McDonnell Douglas submitted variants of civil transports, derivatives of the prototype YC-14 and YC-15 aircraft, and completely new aircraft in response to the competition.

McDonnell Douglas was announced as winner of the competition in August 1981. The winning design incorporated many features proven earlier on the YC-15, a McDonnell Douglas aircraft developed and flight tested in the 1970s as part of the Advanced Medium Short Takeoff and Landing Transport (AMST) program. This design was later designated the C-17A, which was later named the 'Globemaster III'.

The original plan was for the US Air Force to purchase 210 aircraft, but in 1990 this was downgraded to 120 aircraft. After several delays, the C-17A successfully accomplished its first flight on 15th September 1991, nearly 18 months after the date indicated in the contract, and was delivered later that month to the 6517th Test Squadron/6510th Test Wing at Edwards AFB (this unit was re-named 417th TS/412th TW on October 1992).

The first overseas service flight was to the international air show at RAF Mildenhall in May 1994. Initially, only 40 C-17 aircraft were ordered, with further orders pending the correction of some of the program's major problems. The ordering of more than the initial 40 aircraft depended upon the manufacturer getting production costs down and improved production efficiencies.

The C-17 program successfully completed a rigorous reliability evaluation in July 1995. Topping the list of statistics were launch reliability, the plane's on-time departure rate, which exceeded 99%; a mission capable rate of 90%; and a fully mission capable rate of 84%. The aircraft showed outstanding maintenance rates as well. The evaluation, built to compare actual aircraft performance with design requirements and goals, put the aircraft through operationally realistic scenarios, including a week of wartime activities.

As part of the wartime phase, several Globemaster IIIs filled with 57,000kg Army M1A1 main battle tanks flew from

North Carolina to California's Mojave Desert, and then stopped on a short dirt runway in less than 850m. Additional wartime flights were made to RAF Mildenhall, England and Fort Irwin in California. All total, the 437th Airlift Wing and its Reserve partner, the 315th Airlift Wing, flew 513 sorties and 2,252 flying hours.

A USAF Globemaster III making a slow flypast.

The C-17A Today

Of the 120 aircraft, 48 aircraft will be located at Charleston AFB in South Carolina; 48 at McChord AFB, Washington; eight at Altus AFB, Oklahoma; and six with an Air National Guard unit in Jackson, Mississippi. The remaining 10 C-17s will be redistributed as back-up aircraft inventory. This accounts for 120 aircraft, but with announcements of a further 60 aircraft to be ordered it is likely that more units will be involved.

The first operational front-line C-17A unit to acquire the aircraft was the 437th Airlift Wing at Charleston AFB in South Carolina. They received their first aircraft in June 1993 and over the following few years they traded-in their old C-141B Starlifters. The 437th Airlift Wing comprises three Squadrons - the 14th AS known as 'The Pelicans', the 15th AS known as 'Global Eagles' and the 17th AS.

The next unit to convert was the 62nd Airlift Wing at McChord AFB in Washington who started to receive their C-17As in 2000. The Airlift Wing comprises three Squadron - the 4th AS, the 7th AS and the 8th AS. The 7th AS received their first C-17A in July 1999, and by the end of 2003, the Wing had received 21 aircraft.

Crew training on the C-17A aircraft is undertaken with the 56th Airlift Squadron (part of the 97th Air Mobility Wing) at Altus AFB in Oklahoma. They operate a small fleet of aircraft which are regularly rotated with aircraft in other squadrons. The rotation is necessary so as to keep the number of take-offs and landings, and flying-hours of the training aircraft fairly close to those in front line units. The 97th AMW aircraft spent a lot of their time flying local to the base and practising take-offs and landings, whereas the front-line units may fly for longer, but perform (numerically) less take-offs and landings.

The US Air force currently (April 2003) operates a fleet of just over 100 C-17A Globemaster IIIs, with a further 20 on order for delivery in the next few years. Aircraft on contract bring the Air Force C-17 fleet to 120. Based on a buy of 120 aircraft, the last C-17 delivery would be in November 2004. In addition, the 1998 Air Mobility Master Plan (AMMP) has stated a requirement for 15 more aircraft.

As of late 2000, the plan was to replace 270 C-141s with 134 C-17s. As of early 2000 fourteen additional C-17s had been programmed at the end of the 120-aircraft contract to replace Air Mobility Command's (AMC's) C-141 Special

Fig. 1: C-17 Fleet List - with selcalls.

Selcall	Tail-numbers		
CE-LP	(87-0025)	98-0050	02-0100
CF-JR	88-0265	98-0051	02-0101
CF-PR	88-0266	98-0052	02-0102
CF-PS	89-1189	98-0053	02-0103
CF-QR	89-1190	98-0054	02-0104
CG-MS	89-1191	98-0055	02-0105
CH-ES	89-1192	98-0056	02-0106
CH-FR	90-0532	98-0057	02-0107
CK-GR	(90-0533)	99-0058	02-0108
CP-JS	90-0534	99-0059	02-0109
CP-KR	90-0535	99-0060	02-0110
CP-KS	92-3291	99-0061	02-0111
CP-LR	92-3292	99-0062	02-0112
CP-LS	(92-3293)	99-0063	
CP-MS	92-3294	99-0064	
CQ-AE	93-0599	99-0165	
CQ-DG	93-0600	99-0166	
CQ-DH	93-0601	99-0167	
CQ-DJ	93-0602	99-0168	
CQ-DK	93-0603	99-0169	
CR-DJ	93-0604	99-0170	
CR-JS	94-0065	00-0171	
CS-AF	94-0066	00-0172	
CS-BQ	94-0067	00-0173	
CS-FL	94-0068	00-0174	
CS-FM	94-0069	00-0175	
EJ-LQ	94-0070	00-0176	
EK-MS	95-0102	00-0177	
EK-PR	95-0103	00-0178	
EK-PS	95-0104	00-0179	
EM-AS	95-0105	00-0180	
EM-LP	95-0106	00-0181	
EP-QS	95-0107	00-0182	
EQ-FS	96-0001	00-0183	
EQ-GL	96-0002	00-0184	
EQ-JR	96-0003	00-0185	
EQ-JS	(96-0004)	01-0186	
EQ-KL	96-0005	01-0187	
EQ-KS	96-0006	01-0188	
EQ-LM	96-0007	(01-0189)	
EQ-LP	96-0008	01-0190	
EQ-LR	97-0041	01-0191	
EQ-LS	(97-0042)	01-0192	
EQ-MP	(97-0043)	01-0193	
EQ-PR	97-0044	01-0194	
EQ-PS	97-0045	01-0195	
ER-DP	97-0046	01-0196	
ER-LP	97-0047	(01-0197)	
ES-AJ	97-0048	(02-1098)	
ES-GR	98-0049	02-1099	

Fig. 2: The RAF Aircraft - also equipped with selcalls.

JK-ES	ZZ171	A number of C-17A aircraft have been given commemorative names and one enthusiast has produced a list of named aircraft.
JM-BQ	ZZ172	
KP-DF	ZZ173	
KP-DG	ZZ174	

Fig. 3: Aircraft Specifications.

Wingspan:	wings only: 50.29m (165 ft 0in) between winglet tips: 51.76m (169 ft 10in)
Length:	overall: 53.04m (174 ft 0in)
Height overall:	16.79m (55 ft 1in)
Tailplane span:	19.81m (65 ft in)
Operating weight empty:	122016kg (269,000lb)
Max payload (2.25g):	76657kg (169,000lb)
Normal cruising speed at 8535 m (28,000 ft):	Mach 0.77
Max cruising speed at low altitude:	350 knots (648km/h; 403 mph) CAS
Max range (nm):	2800

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- PC control capability
- Synchronous AM detection

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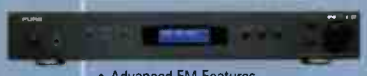

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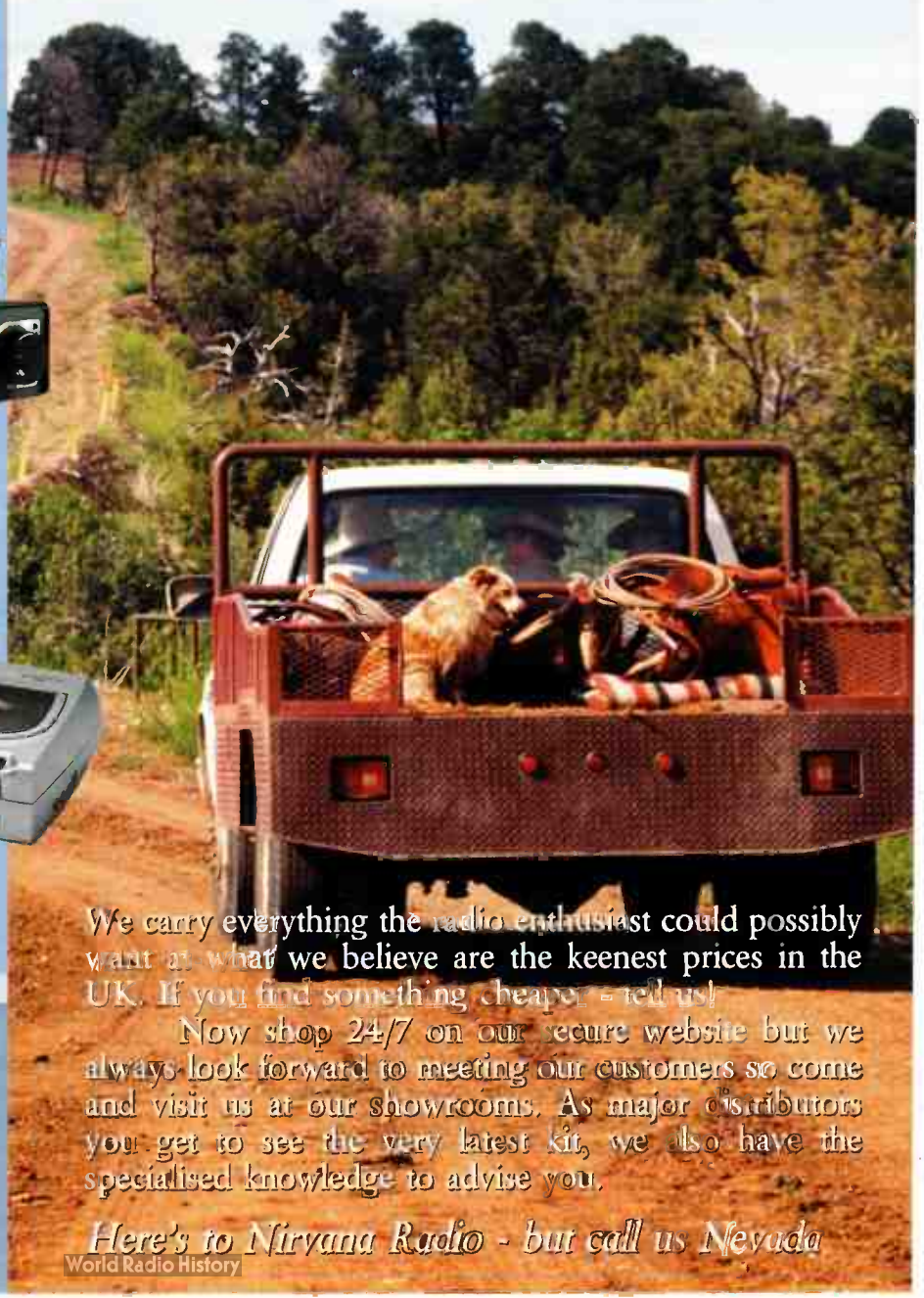

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Operations Low Level (SOLL) II aircraft and meet requirements not included in the original 120 aircraft program. In December 2001 Pentagon officials approved a plan to acquire a further 60 Boeing C-17 aircraft - bringing the total buy to 180 - under a multiyear contract running from 2003 and extending through 2007.

As of early 2002 US Transportation Command had identified a requirement for a further 42 C-17s. A contract for the additional 42 aircraft could be worth about $5 billion and extend production through 2011, resulting in a total buy of 222 aircraft.

As you may be aware, the Royal Air Force operates a small fleet of four C-17A Globemaster IIIs. These are based at RAF Brize Norton in Oxfordshire, where they are flown by 99 Squadron. The contract for the aircraft was finalised in September 2000 and all four aircraft had been delivered during the Summer of 2001.

The aircraft are actually leased from the US Air Force for a period of seven years, however the aircraft has been so successful within the RAF that there are strong indications that some more will be acquired in the next few years. Whether these will leased or purchased has not been announced and it is also not clear whether the new aircraft will replace the initial four aircraft or supplement them.

C-17A - Production & The Future

As mentioned above, the US Department of Defence has authorised the acquisition of 180 C-17As, with a possibility that later orders will take this total to beyond the 220 mark. Based on the original plan of 120 aircraft, the last C-17 delivery would be in November 2004. In December 2001 Pentagon officials approved a plan to acquire 60 more Boeing C-17A jets - bringing the total buy to 180 - under a multiyear contract running from 2003 and extending until 2007.

As of early 2002 US Transportation Command had identified a requirement for a further 42 C-17s. A contract for the additional 42 aircraft could be worth about $5 billion and extend production through 2011, resulting in a total buy of 222 aircraft.

Hearing A C-17

It is now very common to hear C-17 aircraft of the HF-GCS frequencies. When you first hear a flight working with one of the HF-GCS stations you can never be sure that it is a C-17A aircraft. Only when they make contact with a ground station and report their aircraft type can you be really certain. The flight will either report their aircraft type to a Command Post, or they will offer a MET report to a Metro station and this usually includes the aircraft type.

The other place where you are most likely to hear C-17As on h.f. is on the civil aeronautical routes, and for listeners in Europe the best place is on the routes across the North Atlantic (the NAT tracks). With events in Afghanistan and Iraq in the past 18 months, there has been an almost constant stream of transport flights across the North Atlantic, which gives plenty of opportunities to hear C-17As and other US Air Force transport aircraft. Vast fleets of aircraft have been shuttling troops and supplies via Frankfurt in Germany, Aviano in Italy and Moron in Spain.

It is not very common for military aircraft to report their aircraft types to the OACC, unless specifically requested. However, they do use their selcall codes with civil ATC agencies, which is one way of knowing if a flight is a C-17A.

Selcalls

It is worth pointing out that the US Air Force have acquired just 50 selcall codes for their entire fleet of C-17A aircraft. With just over 100 aircraft operational (as of early 2003) each individual code is allocated to at least two aircraft. When you hear a flight requesting a selcall check you can tell that it is a C-17A aircraft, but it could be either one of two aircraft. For example, the selcall code 'EK-MS' is used by the aircraft with tail-numbers 95-0102 and 00-0177. The codes used by US Air Force C-17As are not used by any other US Air Force aircraft, so it is a relatively easy task to tell if a flight is being operated by a C-17A or another type.

Some US Air Force flights use a callsign which is similar to a commercial flight-number, while some use a callsign which is a variation of their tail-number. An example of the 'flight-number' callsign is the 'Reach nnnY' series of callsigns which are currently being used for flights involved in Iraq and Afghanistan. When you hear such a flight you cannot tell what kind of aircraft is involved, or even if it is a US Air Force aircraft or a chartered civil airliner. However, once you have found the selcall code for the flight you can narrow down your search; you can tell if it is a C-17A if the flights selcall code is in the listing later in this article.

For those flights which use a variation of their tail-number as their callsign, you can tell it is a C-17A by either selcall code or tail-number. The numeric part of the callsign is constructed from the last digit of the Fiscal Year (the year in which the aircraft was ordered, which is usually two to three years before its actual delivery) followed by the last three digits of the aircrafts tail-number. An example of this is 'Reach 9168' - the '9' comes from the Fiscal Year of '99' (indicating 1999) and the '168' comes from the last part of the tail-number '0168'.

In fact, most of the selcall/tail-number tie-ups for C-17As have come from this later method of identifying an aircraft. So far, there are no examples of duplicated tail-numbers, although there is a good chance that it may happen later in 2003. If plans to acquire a total of over 200 C-17As come to fruition, then we could have the possibility of four or five aircraft all sharing a single selcall code!

In **Fig. 1** the tail-numbers in brackets are aircraft which have not been positively tied-up to specific selcall codes, but can be inferred as being correct based upon the sequence of tail-numbers and other selcall code tie-ups. Just a few days before sending this article to the editorial office, the selcall tie-up for tail-number '02-1100' was confirmed as being 'CE-LP', which almost confirms that the third set of 50 aircraft will be re-using the same block of 50 selcall codes.

The latest block of C-17A tail-numbers runs from '02-1098' to '02-1112' respectively, although there is a theory that aircraft '103' onwards will be renumbered so as to avoid the situation of having two aircraft with the same last three' digits in their tail-number. By the end of 2003 we should know one way or the other.

"Not what it seems - a composite photo of a landing C-17A and an aircraft carrier deck. I certainly wouldn't stand there if I was a Deck Officer!"

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Web Watch

AW badge - **http://www.globalsecurity.org/military/agency/usaf/images/437aw.gif**

Charleston - **https://www.charleston.af.mil/chasweb/index.htm**

McChord - **http://www.mcchord.af.mil/**

97th AMW - **http://www.globalsecurity.org/military/agency/usaf/97amw.htm**

Altus - **http://www.altus.af.mil/**

'Named' C-17As - **http://www.globemaster.de/c-17/serials.html**

Build A NAVTEX Decoder

Part 3

NAVTEX is a continual source of fascinating automated maritime information. Roger Thomas brings us the third and final part of his neat project which utilises both a programmed PIC microcontroller and some PC software to convert received audio to on-screen text.

Fig. 3.11: Pinouts l.c.d. and PIC interconnections.

Signal	Pin	Function	PIC Connection	PIC Pin
V_{ss}	1	Ground		
V_{dd}	2	+5v		
V_o	3	Contrast voltage		
RS	4	Register Select	RE0	8
R/W	5	Read/Write	RE1	9
E	6	Enable	RE2	10
DB4	11	Data bus	RD4	27
DB5	12	Data bus	RD5	28
DB6	13	Data bus	RD6	29
DB7	14	Data bus	RD7	30
V_{led}	15	Back lighting (optional)		
V_{led}	16	Back lighting (optional)		

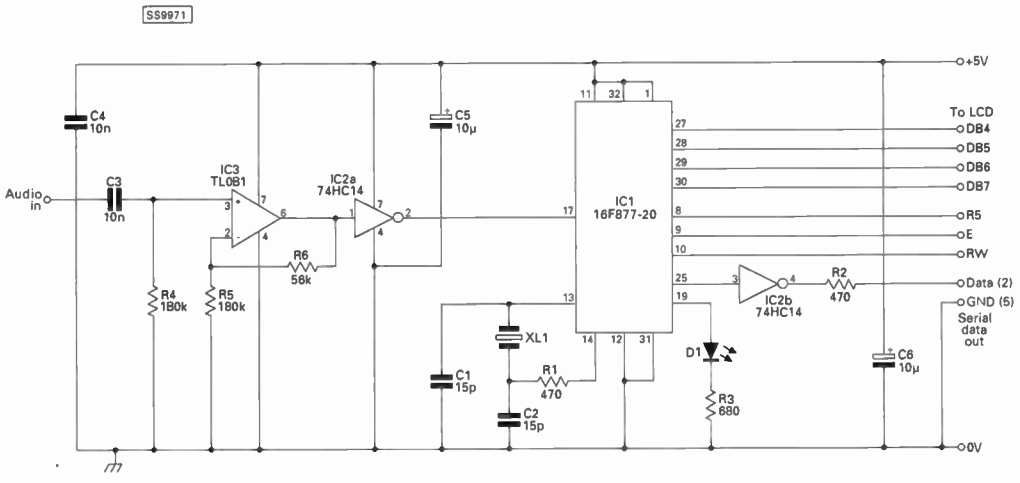

Fig. 3.12: NAVTEX Decoder circuit diagram.

In previous issues, we've covered the principal of NAVTEX operation and the basic operation of the decoder. This month we wrap up with the details of how the unit works.

PIC Software

The received NAVTEX audio is converted into a t.t.l.-level data stream by the single op-amp and the 74HC14 buffer. The decoder software is interrupt driven using the capture and compare feature of the PIC 16F877 microcontroller.

As the NAVTEX transmission does not have any start or stop characters, then the PIC has to synchronise with the incoming data. To achieve synchronisation the 16-bit 'Timer 1' is configured for free running operation, with the prescaler set to divide the clock frequency by four. 'Timer 1' frequency is running at 1.25MHz.

The PIC software waits for a low to high transition on the CCP1 (pin 17) input, this signal transition causes an interrupt to occur. Within the software interrupt handler, the value of the free running 'Timer 1' is stored. On the second interrupt, the program calculates the input audio frequency by using the new 'Timer 1' reading minus the last 'Timer 1' reading (edge-to-edge timing). If the frequency calculated is greater than 1360Hz then a mark frequency is assumed, conversely a frequency below 1360Hz is taken to be a space frequency. The PIC program then waits for the signal to change from a low to high frequency (NAVTEX signal changes from space to mark) to complete the synchronisation process.

Several times in each 10ms character period the PIC calculates the input frequency and decides whether it is a mark or space. For example, if the software finds six mark and one space frequency over this period then a mark frequency is assumed, but a small time offset is calculated and made to subsequent readings. This helps the PIC to track any small changes caused by receiver drift or if the receiver is not tuned exactly to 518kHz.

Measuring the input several times in each character, rather than once per character, also lessens the sensitivity to noise. For example, if the program only samples the input signal once per character period then this sampling could coincide with a short burst of noise which could give an incorrect reading. Sampling several times within each period effectively averages out a short burst of noise.

To check the 4:3 bit ratio, the character look-up table is used. The binary value of the received NAVTEX character is used as an index into the table and returns a character whatever the input value is. The look-up table is based on a 7-bit range, therefore the table range is 0 to 127.

ASCII text characters for a particular character value are stored in the appropriate places (obviously), but where there are no characters for a particular value an asterisk is used. However, some values are used as control characters (see **Fig. 2.6** last month), where this occurs, an underline is stored in the look-up table.

In this manner, the software can determine if a received character is valid, a control character, or if a receive error has occurred.

For example, if binary character '1000111' was received then this is converted to a number:

$$2^6 + 2^2 + 2^1 + 2^0$$
$$= 64 + 4 + 2 + 1 = 71$$

This value is used to return a character from position 71 in the table (character 'A' or '-'

depending on which character set is selected). If an asterisk character is returned from the table then the software knows that the character has failed the 4:3 ratio test without the need to explicitly analyse the received bit pattern. If an underscore is returned, then the software knows that this is a non-print control character. This table look up method is faster than using bit manipulation to check for the correct ratio.

The PIC software stores the last five NAVTEX characters received in a buffer. The value in the first and last buffer position is compared – provided these are not phasing signals they should be identical if there are no received errors. If they are not identical then the error count is incremented by one.

The software keeps an error count and if there are three sequential errors then the software assumes character synchronisation has been lost and starts the character synchronisation process again. If five wrong characters are received, i.e. all the values stored in this buffer have returned an asterisk character, then synchronisation has been lost and all the synchronisation routines need to be called again.

There is an additional buffer used for the ZCZC detection. When this text sequence is received the l.c.d. display is cleared and text (including ZCZC) starts from the first position top line.

The PIC software converts the NAVTEX audio signal into '0' for space frequency and '1' for mark frequency and sends this as ASCII characters to its serial port. One of the 74HC14 buffers is used to invert this serial data, output from the buffer is wired to the CN1 serial connector via resistor R2. The reason for this buffer is that I have not used a serial line driver as data is only flowing from the PIC and these drivers invert the RS-232 signal. The PC software will need to convert this binary sequence into a character for display.

PIC Programming

For those readers who have a suitable PIC programmer for the PIC 16F877-20 (40-pin) then the NAVTEX decoder hex code file (NAVTEX.HEX) is available free from the address below, please remember to enclose a blank 3.5in floppy disk and suitable s.a.e. Alternatively, send me your E-mail address so that I can send you the hex file as an attachment, the hex file is only 6KB. The file is also available from the *SWM* website **www.pwpublishing.ltd.uk/swm/NAVTEX/NAVTEX.HEX**

If the PIC programmer is being used in conjunction with the Microchip MPLAB software then select import (import to memory) option from the file menu. Find the directory where the navtex.hex file has been copied to and select this file.

To view the hex code that will be programmed into the flash PIC16F877 select from the Window menu (located at the top of the MPLAB form) the 'Program Memory' option to show the Program Memory Windows. Selecting the Hex Code Display option will show the character look-up table, located at the beginning of memory.

When programming the PIC microcontroller ensure that the PIC configuration options are - oscillator mode is set to HS (high speed), watchdog timer is off and power up timer is enabled.

If you already have a two line 16 character display available, and want to try out the PIC NAVTEX decoder before purchasing a more expensive 40 character 2-line l.c.d., then the PIC program will need to be changed as follows.

Load the PIC code into the MPLAB software and using the 'disassembler display' option, look out for H'28' or 0x28 (40 decimal) at address location H'036D' -

```
036D movlw 0x28
```

- this is the l.c.d. line length number subsequently used to test to see if the program has come to the end of the display line. Change this to the number of characters that your l.c.d. can display. If you are using a different PIC programmer then the options and syntax may not be the same.

Although the number of characters per line can be changed the PIC program assumes a two-line display and this cannot easily be altered.

PC NAVTEX Software

If you want to use a PC for display of the NAVTEX text then I have written suitable *Windows* software. The PIC software does some of the 'low level' bit processing before sending the data to the serial port, but the PC software has to do the character and text decoding.

The button marked 'text' switches off the text FEC de-interleaving so that all text is displayed as received (text becomes very confusing to read!). The button marked 'copy' only displays the copy character. The error l.e.d. flashes when either the software has detected a character error (received character has failed the 4:3 ratio test) and is using the second copy or if this fails and printing a '*' character.

If you want to write your own PC NAVTEX display software using data from the PIC microcontroller then the following information may be useful. The PIC transmits the data at 57,600 baud, no parity and one stop bit. There is no communications handshaking between the PIC and PC, consequently the incoming serial data will need to be stored in a buffer.

The method I have used to check for the correct 4:3 ratio for the PC software is the same as used in the PIC software. That is to convert the received 7-bit binary number into a decimal number and use this number to retrieve a character from a look up table (one dimensional array), as previously explained. Bit synchronisation is not necessary for the PC software as this is done within the PIC microcontroller software.

PC software will have to de-interleave the FEC text and

Fig. 3.13: CN1 serial communications wiring for 9 pin 'D' connector.

R2	-	CN1 pin 2 (data)
0V	-	CN1 pin 5 (gnd)

Fig. 3.14: 490kHz NAVTEX local weather transmission timetable (UTC).

NAVTEX Coastal Station	B1	Times	Coverage area – coastal waters
Cullercoats (NE England)	U	0720, 1920	Shetland Isles, east Scotland, east England.
Portpatrick (W Scotland)	C	0820, 2020	Lands End, Wales, west England, west Scotland, Northern Ireland, Shetland Islands.
Niton (Isle of Wight)	I	0520, 1720	St David's Head, Scilly Isles, Bristol Channel.

check to see if the received character is a control character or text. If the character is not valid then the copy character is assessed. If the copy is not a valid character then an asterisk is displayed. Also the PC software needs to determine which character table to use before displaying any received text.

The PIC software precedes each seven data bits by an ASCII 'S' character for synchronisation. This has nothing to do with NAVTEX synchronisation; it is there to ensure that the PC serial data stream is read correctly. If the NAVTEX decoder is already sending data before the PC serial communications port has been initialised then characters will be missed and all subsequent characters could potentially be mis-aligned and decoded incorrectly. The synchronisation prefix character ensures that this does not happen.

Receiving NAVTEX

If you are located inland and want to receive these maritime transmissions then it will not be immediately obvious which transmitters are likely to be available. Not surprisingly, all these transmitters are located on the coast, optimised for broadcast to sea. Therefore the nearest transmitter may not provide the best signal, particularly as the radio signal is travelling across open terrain rather than water.

Once you have found a NAVTEX transmission look out for the B1 letter which will identify the location of the transmitter and note the time. Assuming that this is a scheduled transmission then this station should transmit again in four hours time.

At my location - Aylesbury, Bucks - the NAVTEX transmitters located at Cullercoats (NE England), Imjuiden (Netherlands), Niton (Isle of Wight), Oostende (Belgium) and Portpatrick (W Scotland) can be received.

All the signal strengths are low, registering only 2 - 3 on the 'S'-meter of my Kenwood R-1000 receiver using a long wire antenna. It is a testament to the NAVTEX FEC signal that even with these weak radio signals error free text reception is possible.

Reception conditions can vary, although signal fading at this low frequency is not usually a problem, however the frequency can get noisy as it is prone to interference. To help prevent interference to other NAVTEX stations at night the transmitter powers are reduced. What stations you are able to receive will depend on your receiver, location and antenna.

If you do receive any DX NAVTEX stations then I would be very interested in seeing the received maritime text. If you are using my *Windows* software then place the mouse in the text window and select the relevant text by holding down the right mouse button and highlight the wanted text. Left click and select copy and then paste the text into a suitable document. I have seen examples of NAVTEX stations responding with a QSL verification card on receipt of a reception report.

NAVTEX Alternative Frequency

Recently an additional frequency of 490kHz has been used for NAVTEX transmissions. This frequency provides capacity for more local information to be transmitted, particularly for smaller craft. The limited 10 minute per transmission capacity on the main 518kHz frequency has in many areas been reached.

This NAVTEX frequency is intended for broadcasts in the national language (518kHz text is always in English) and local inshore weather reports. These weather reports are transmitted twice a day for 16 stretches of coastline around the UK and valid for up to 19km offshore. Also broadcast is a three day weather outlook and strong wind warnings (Force 6 or above) for waters up to 8km offshore.

The same transmitters sites are used but obviously the transmit times are different as there is no advantage of simultaneous NAVTEX being transmitted on two different frequencies. The transmit timetable is also based on a four hour rota but using a different B1 identification from that used on 518kHz see **Fig. 3.14**. Commercial NAVTEX receivers are becoming available that monitor both NAVTEX frequencies.

At my inland location it is not possible to receive these 490kHz transmissions and as this is a recent addition to the NAVTEX service, it is subject to change.

Building The Decoder

Building the decoder circuit is straightforward and the component values are not critical. The circuit can be built on strip-board. In the prototype an 8-pin TL081 op-amp was used; however any general purpose single rail op-amp should work. The circuit is designed to connect to the receiver's loudspeaker output. The TL081 op-amp turns the NAVTEX audio sine wave into a square wave and this output feeds a 74HC04 inverter which ensures a proper t.t.l. signal. This signal is fed to the PIC microcontroller for decoding. Additional op-amp band pass filters could be added to improve reception or further amplify the audio signal.

Decoder Setup

When receiving NAVTEX watch the l.e.d. flicker in time to the NAVTEX signal. Slowly alter the radio tuning to make the l.e.d. brighter. However if the signal is noisy or if there is interference then this will also show on the l.e.d. Providing the noise is not too severe, the PIC software should still be able to decode some of the NAVTEX signal. The l.e.d. should not be permanently on.

If the l.e.d. is hardly on then the audio volume will need to be adjusted. If the volume setting is too high this has the effect of overloading the op-amp and *reducing* the time the l.e.d. is on. Conversely the volume may be too low which would have the same effect on the l.e.d. brightness. Audio volume level will need to be altered to find the optimum level.

Remember that after character synchronisation the software needs to store five characters before it can start decoding text, so there is a short time delay between acquiring the signal and text appearing. Also the phasing signal will not produce any text on the display.

After receiving many NAVTEX transmissions you will be able to recognise from the sound the various parts of the message, i.e. the difference between the phasing signal and message.

Computer Interference

If you are using the option of decoding NAVTEX on a computer then care will need to be taken as computers can generate significant amount of radio frequency interference. This interference can come from the switched mode power supply or the computer monitor or video card. Since the receiver does not need to be tuned once the NAVTEX signal is found, then the radio can be located some distance from the computer. This should help to keep any computer interference to the receiver at a minimum.

Using the l.c.d. for display may not be as convenient as using the computers' display but the possible reduction in radio interference when the PC is switched-off may mean that NAVTEX reception is improved. This should result in less text errors or more distant stations becoming audible.

SWM

A pre-programmed 16F877-20 PIC microcontroller and *Windows XP* decoder software is available for £25.00, the *Windows XP* software is available separately for £8.00 from author:

Roger Thomas
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This is our fastest selling scanner for a long time - we just cannot get them in fast enough! Covering 25-510MHz and 800-1300MHz AM/FM - plus it is the only CE approved desktop to offer the Trunk Tracker facility. Complete with DC lead, FREE PSU and Whip Antenna.

DEPOSIT 36 x £11.60

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The New Yaesu VR-5000 plus 3. This unit has the DSP module, Digital Voice Storage Unit and Voice Synthesiser fitted and is available for £729.00.

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A British company producing probably the worlds best DSP noise reduction speakers and modules. ML&S stock the whole range of BHi products offering excellent technical engineering, quality and reliability. You just wouldn't believe how much noise these units remove - SSB transmissions almost sound FM quality!

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This new low-cost receiver (intended for experimenting and hobby use) continues in the fine tradition established by WiNRADiO's successful range of wide-band PC-based receivers.

The WiNRADiO G303i: A ground-breaking shortwave receiver that will surely amaze you.

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grundig satellit

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Covers Shortwave, Airband and FM Broadcast. An ideal shortwave broadcast radio - suitable both the experienced or novice listener.

ML&S £549 ZERO DEPOSIT! 24 x £27.52

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This strange looking radio has stunning audio and a very lively receiver. It is one of the best broadcast band receivers available and an ideal radio for Broadcast DX chasers but is equally at home on SSB and CW. Even old Lynchy uses one of these! The Plus version is an enhanced version of 7030.

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The AOR 8600mk2 Plus is the fully loaded scanner from AOR. Coverage is 100khz-3000mhz all mode.

Star Sellers

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- *TE-8200 Tone Eliminator*
- *MF-2.5 Collins SSB Filter*
- *MF-6 Collins AM Filter*
- *PSU-8600*

AOR 8600mk2 PLUS
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Icom ICR8500

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ZERO DEPOSIT! 48 x £39.91

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MiniMag Scanning Antenna available with BNC fitting ***£32.95***
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Will also work on 2M & 70cms TX *(50 W)*

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Ideal for scanners and shortwave receivers. This Mini switch mode 2.5 amp PSU will power many scanners and SW receivers. About the size of 20 cigarettes and very light. Ideal for popping in your brief case or suitcase! *(State make and model of receiver when ordering)* Only ***£29.95***

UK Scanning Directory

In stock at last!
The 8th edition of this excellent frequency guide has just arrived *PRICED* ***£19.75***
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It's* BIGGER *than ever!

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This Amazing Antenna at only 50 inches long is an ideal companion for any receiver covering 800KHz - 460MHz

PRICED ***£129.99***

AVAILABLE NOW!

"Miracle whip received with thanks, had a test run on receive with an Icom 71E and Yaesu 7700 found it very good indeed reception was as good as with the outside long wire"

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APR	19.9%
PRICE	£599.00
Deposit	£00.00
48 Payments of	£17.72
Total purchase price	£850.56

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HOT NEWS!
New Radio from AOR!
CALL FOR DETAILS

In the Ed's Shack

With the soldering iron fired up once again, Kevin tackles a rather more complicated kit - the Ten-Tec 1254.

The urge to build another receiver was too strong to resist, so this month I'm constructing the rather nicely specified synthesised radio with a digital display, the T-Kit 1254 courtesy of Ten-Tec Direct. As this kit is pretty complicated, featuring two p.c.b.s and microprocessor control, my account of the build is split into two parts. Unfortunately, there's just too much to fit into two pages. This great little radio will resolve s.s.b., c.w. and a.m. signals. It is a terrific way to obtain a synthesised digital readout receiver for a reasonable sum. Plus you get to have the satisfaction of constructing it and then knowing all the time you're busy using it that it was you that made it work!

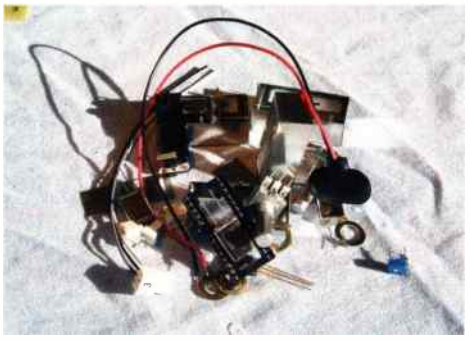
Everything you need to build the TT1254.

I just mentioned that the kit is complicated, I guess a fairer statement is that it comprises of many components so the build time is going to be quite long. My estimate is something along the lines of the 20 plus hours that it took to assemble the TT1340 single band transceiver back in the April issue.

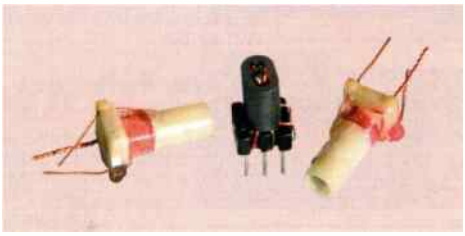
Getting Started

This kit, as with all the other Ten-Tec offerings I've seen, is presented in a way that it would be hard to beat. Ten-Tec really are to be congratulated for their excellent approach in this respect. All the metal case parts and the plastic moulded front panel parts are packed wrapped in protected foam packaging. The electronic components are bagged in logical sections and the mechanical hardware is too, logically bagged separately. I really continue to be impressed. There are two p.c.b.s to be assembled during construction of this kit, the double sided display come front panel control board and the main receiver p.c.b., which provides a home for the receiver circuits, microprocessor and ancillary hardware.

The 140 page manual takes you step-by-step through the entire assembly and

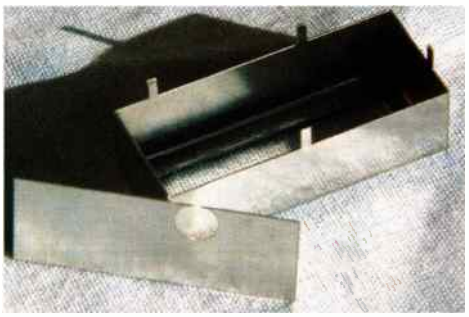


Here are the components required for the display board.

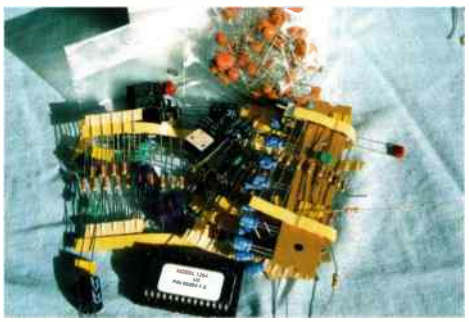


Pre-wound inductors - a real time saver.

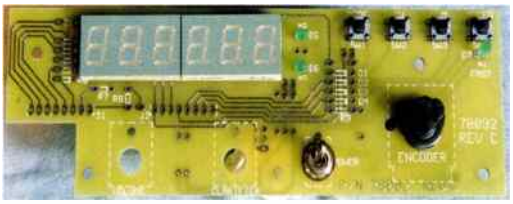
The unpopulated main p.c.b.



Individual screening cans to be fitted around the sensitive r.f. sections.



The main board components - how long did it take to fit these?



The partially completed display board.

Specifications (Manufacturers)

Frequency Coverage:	100kHz - 30MHz
Receiver Architecture:	Dual conversion superhet (synthesised)
IF Frequencies:	45MHz 1st i.f., 455kHz 2nd i.f.
Modes:	a.m., s.s.b. and c.w.
Tuning steps:	Slow - 2.5kHz s.s.b/c.w., 5kHz a.m. Fast - 100kHz
Clarifier:	±1.5kHz for s.s.b. and c.w.
Sensitivity:	0.5µV for 10dB SNR s.s.b./c.w. 2.5µV for 10dB SNR a.m. (30% modulation)
Selectivity:	4kHz at -6dB
Display:	Six digit 7-segment green l.e.d. plus mode
Memories:	15 locations
Audio:	1.5W with internal 8Ω speaker. 3.5mm headphone socket
Power Supply:	12-15V d.c. at 250mA via power lead supplied.
Antenna:	50Ω (phono socket)
Size:	165 x 57 x 165mm (w h d)
Price:	£169 + £8 P&P (UK)

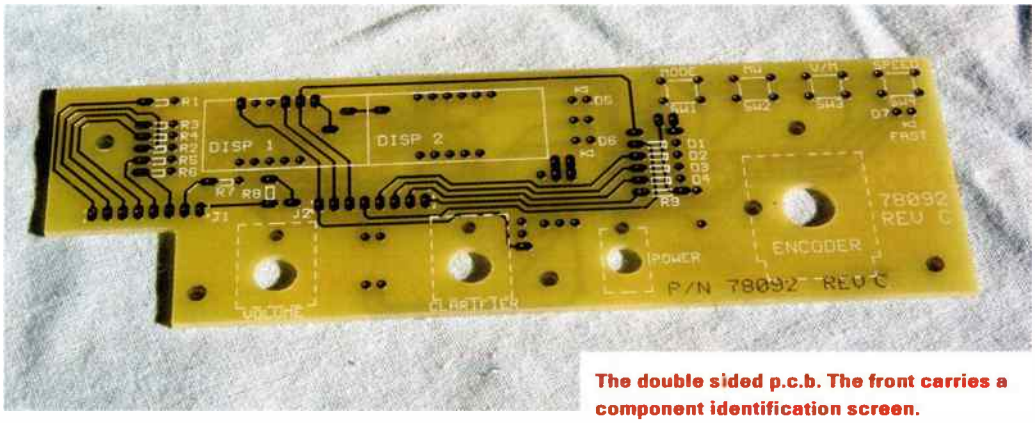
alignment process. I was pleased to note that Ten-Tec even expect those who have never built an electronics kit before to be tackling this build. There's a note on page four that refers builders who fit this category to pages 18 and 19 for special briefing on the exercise - well done Ten-Tec. This certainly bears out my own feelings that even the complete novice who is competent with a soldering iron can build these kits as long as they follow the methodical approach to the letter.

As with the other radio kits in the range, the manual includes all the component identification details and a matrix to guide you through the checking process to ensure that you have all you require. At this stage I sorted all the items and placed them on sheets of paper with their values written close by. I was ably assisted by my two sons Josh and Ben, who's superior eyesight was useful on occasion - I'll have to enlist their help during the assembly on the next kit build! Their help also speeded up the sorting process considerably.

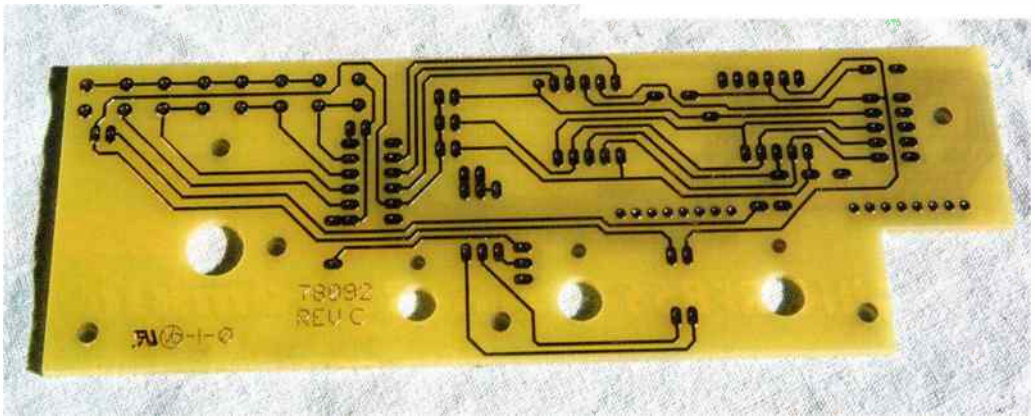
For the record, there are a total of 34 components for the display board and 308 items for the main board...quite a job.

The manual is broken down into three sections, 'Getting Started', 'Assembly' and 'Reference'. The all important 'Assembly' chapter which accounts for 72 of the total pages, is further broken down into seven stages. Which present the builder of the TT1254 with a very logical sequence to follow.

The initial assembly step is to complete the display board, the whole process comprises 40 steps and eases you in the rest of the build gently, the balance of which I'll cover next time. ***SWM***



The double sided p.c.b. The front carries a component identification screen.

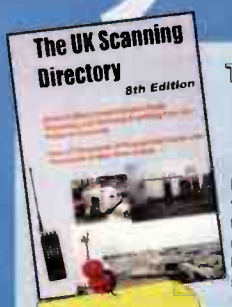


The completed synthesised receiver. It sure looks the job.

This is the very professional looking rear panel prior to fitting.

30th ANNIVERSARY

UK SCANNING DIRECTORY



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THE LARGEST LIST OF FREQUENCIES EVER PUBLISHED!

Britain's most comprehensive frequency list for the UK covering thousands of frequencies and users from 26MHz to 1.8GHz. Handy for anybody that owns a scanning receiver. Supplied to the Police, Ministry of Defence, MI5 and GCHQ. Paperback book not spiral bound.

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The only published Great Circle map that is centred on the UK! Ideal for knowing the direction you need to aim your antenna, plus HF beacon lists and locations etc.

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SPECIAL OFFER

- 66-1000MHz *with gaps*
- NFM, AM
- 200 memories
- 100 Pass channels
- 5 tuning steps
- Descrambler
- 4xAA Ni-Cds
- Flexible Antenna
- Earpiece
- Size 59 x 152 x 32mm
- Weight 215g

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Japan's professional manufacturer, NRD, has produced this fabulous receiver covering 100kHz to 29.999MHz. A dedicated high performance design that has the latest DSP microprocessor built-in. It offers SSB, AM, CW and FM reception with tuning steps down to 10Hz and precise digital display. The amazing digital filter provides continuous IF bandwidth control and the auto tracking notch filter removes hetrodyne interference. Size 330 x 130 x 285mm. Weight 7.5kg. 240V PSU built-in

WINRADIO G-303i-PD

A Very Special Computer Integrated Comms Receiver.

£439.95B

The G-303i sits inside your computer and offers you supreme short wave reception that beats even Collins classic receivers! Covering 9kHz to 30MHz, it teams up with your PC to provide an amazing package. Full info www.winradio.com

SWM Review John Wilson says:-

"If I had to choose between a Collins 95S-1 and the G303i I would take the G303i. That's a statement I thought I would never make!"

SONY ICF-SW-100E

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Pocket Size Short Wave Receiver with SSB!

Plus full stereo broadcast on phones

This amazing Sony receiver offers true short wave reception including SSB. Just 111 x 24 x 73mm, it folds down to pocket size, yet keeps you in touch with the world of both ham radio and broadcast. Covers 150kHz - 30MHz plus 76-108MHz AM, SSB, CW, and FM (Stereo). Has 50 memos, built-in speaker. Uses 2 x AA cells (not supplied).

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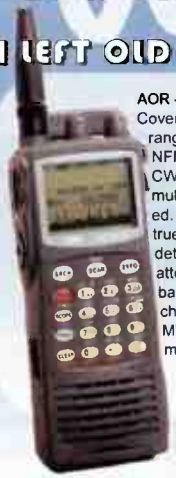
Panasonic RFB55 - LW, MW, SW, FM Portable Receiver

- Frequency range: LW: 153-513kHz, MW: 522-1710kHz, SW: 1.711-29.999MHz • Auto Tuning System (ATS)
- Scan tuning • Dual clocks • Power 3x AA 4.5V DC
- Size 150 x 92.5 x 33mm • Weight 334g

c/w Case, stereo earphones, instruction manual

AR-8200mkII

4 LEFT OLD MODEL TO CLEAR



AOR - AR-8200 All Mode Scanning Receiver

Covers a wide 500kHz to 2040MHz frequency range with a selection of modes: WFM, NFM, SFM, WAM, AM, NAM, USB, LSB & CW. Tuning steps programmable in multiples of 50Hz, 8.33kHz airband supported. Other features include1,000 memories, true carrier re-insertion in SSB modes. Has detachable MW bar antenna, noise limiter, attenuator and versatile band scope with bar signal meter. Supplied with Ni-Cads, charger, cigar lighter lead, whip antenna, MW bar antenna, belt hook and instruction manual.

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ICOM IC-R2

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This palm size handy offers great performance.

- 500kHz - 1310MHz
- FM, WFM, AM
- 400 memories
- 25 scan pairs
- 11 tuning steps
- CTCSS decode
- Duplex monitoring feature
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UNBEATABLE PRICES !!!

PDA 188

This ultra compact PDA can store contact details and text notes, perform calculations, provide date, time and calender, scheduler, memos, To Do List, world time etc. It comes with PC link cable and software to backup and transfer data. The two easily replaceable batteries can last for over six months. Full instructions and carry case included. An amazing bargain.

£19.95A

RADIO SHACK

SCANNER PREAMPLIFIER

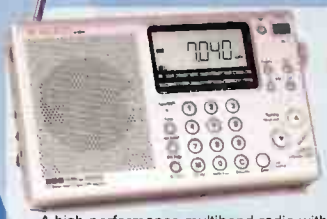
20-0041 Handheld Scanner Pre-Amp * Frequency range 100 - 1000MHz * Gain variable 0 - 20dB * Bypass switch * Requires PP3 battery (Batt life 21 hours) or ext. 9V DC 100mA min. * Input/Output connectors BNC * Input/Output impedance 50 Ohms * Size 40 x 95 x 35mm * Weight 100g This Preamplifier is specifically designed for handheld scanning receivers and is equipped with BNC connectors (male/female) for ease of connection. The gain is controlled with a knob on the back of the ampifier, which is adjustable 0 to 20dB.

£29.95A

~~£49.95~~

ROBERTS

R-9914 MULTIBAND



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With SSB!

A high performance multiband radio with digital display that pulls in even the weakest of signals. It has full LW, MW and FM broadcast coverage for domestic use. Plusshort wave from 1.7MHz to 29.99MHz. with SSB, CW and AM reception. There is a large LCD readout, 45 pre-set station memories, manual or auto tuning, clock/alarm, whip antenna, tone adjust, built-in speaker, stereo headphone socket, etc.

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STEEPLETONE MBR-747

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Special Purchase!

A complete receiver set-up for short wave and VHF, plus normal broadcast bands. Covers 150 - 300kHz, 530 - 1600kHz. 2.3 - 22MHz, 87.5 - 175MHz. This covers long distance broadcast, domestic broadcast, marine, police, amateurs etc. The rotatable direction finding antenna also helps with low band reception and the telescopic whip offers convenience for long distance and VHF reception. The unit is even supplied with AC supply or internal dry cells (not supplied) can be used.

SRX-50

SHORT WAVE PORTABLE

SPECIAL OFFER

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Portable short wave receiver with digital readout plus AM and FM broadcast. Ideal for travelling abroad or bedside use. Covers 153 - 280kHz, 531 - 1602kHz, 5.9 - 15.5MHz and 87.5 - 108MHz. Has 20 memories, stereo decoder and built-in speaker. Needs 3 x AA cells or external supply

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CORDLESS HEADPHONES

Enjoy the freedom of cordless listening, across the room or in bed! This amazing package includes soft padded phones, plus IR receiver and AC adaptor, and 3.5mm audio cable. Offered below cost price! Very limited stocks.

Below Cost!

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VR-120

SPECIAL OFFER

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This compact little receiver is offered at well below the price of the VR-120D. The only difference is that there is no external DC socket for external supply. The stock is brand new from Yaesu UK with full 2-year warranty.

100kHz - 1.3GHz!
AM FM WFM
Adjustable steps
Over 600 memories
Skip channels
Smart Search
Alpha Numeric Tags
Requires 2 x AA cells

Also in stock VR-120D £159

ICOM IC-446S

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Licence Free
UHF Handheld
Range approx 3km

A chance to purchase Icom's high quality, water-resistant PMR-446 Handheld radio. It offers full coverage of the UK PMR-446 band with no licence requirements. The LCD display and fold-down antenna make it easy to use and very compact.

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The FC-130 Frequency Counter has an extended range that covers 1MHz to 3GHz. It has a 10-digit LCD readout providing accurate frequency readings, a 16-segment bargraph signal strength meter and low battery indicator. Built-in Ni-Cads operate up to 6 hours and are rechargeable through the external charger. Supplied complete with Ni-Cads, charger and telescopic whip.

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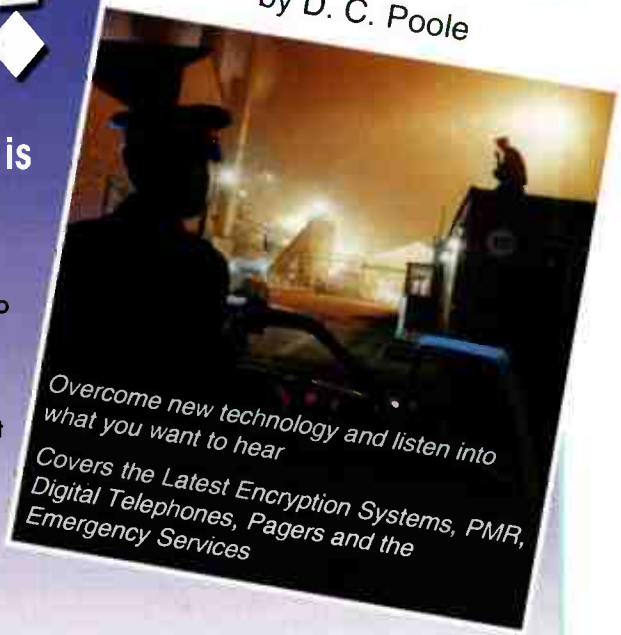
Scanner Busters 3

by D. C. Poole



New to the *SWM* Book Store this month is the just launched *SCANNER BUSTERS 3*

With the introduction of trunking systems and even more scrambled frequencies, it is increasingly harder to eavesdrop on communications, plus there are more and more strange noises heard on the bands. To overcome these new technologies, the new edition of *Scanner Busters 3* guides you, the reader, through the maze, showing you how to deal with these systems and tune into what you really want to hear. *Scanner Busters 3* explains in simple terms the workings of new radio systems, p.m.r., digital telephones, encryption, paging and Tetra (the new digital communication system for the Police and other emergency services). It also includes the decoding of transmissions from Pagers with a PC and SmartZone trunked system.

Of great use to both new scanner owners and veterans, order your copy of *Scanner Busters 3* from the *SWM* Book Store now on (01202) 659930 for just £5 and learn how to get more from your scanner.

Practical Wireless

THE UK'S BEST AND ONLY INDEPENDENT AMATEUR RADIO MAGAZINE

Next Month in *Practical Wireless*, the magazine that brings you Amateur Radio & So Much More

REVIEW **Tex Swann G1TEX/M3NGS** has been busy in his shack building an Antenna Matching Unit from the Walford Electronics Kit range.

IT'S A CLASSIC! Eddystone radios are loved by Radio Amateurs everywhere so this month **Rob Mannion G3XFD** looks at one of his favourites the 750 model.

BUILD Have a go at building a 1.8MHz receiver - **Ron Hague G3ZQV** shares his design.

PROBLEM SOLVING Solving TVI can be tricky and as a newly licensed M3 you may be puzzled. So to help you out **Rob G3XFD** offers some good advice.

LOG IT! Recording your QSOs in your log book correctly is important, so as a reminder of what's what...**Walter Johnson** offers some timely reminders.

Plus all your regular favourites including:

● *Amateur Radio Waves* ● *Bargain Basement* ● *Club News* ● *Keylines* ● *News* ● *Radio Scene* ● *Valve & Vintage*

and much, much more!

• contents subject to change

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Amateur Bands

A couple of months ago, the Blackmore Vale ARS held a 'Valve Day' in Dorset's Shaftesbury, a town probably most well known for Gold Hill of Hovis and many other advertisements. The event was organised almost 'on spec' with limited publicity and absolutely no certainty that anyone would be interested and turn up. Wrong! The best part of 20 exhibitors were there with some fascinating bits of historical hardware. An interesting mix of domestic, commercial and amateur gear and archive material.

All Of A Glow

During the day over 100 visitors came along, some from the far side of the globe. Lectures about various aspects of valve use were well attended, and the tea and cakes were excellent! The idea of the meet was to enable old hands with heads full of knowledge and experience to share their memories, and I think that it achieved that in spades. The atmosphere was relaxed and friendly. Small event, big success. If warm radio is your thing, look out for their next Valve Day.

Green Comms

Amongst the items on show were some old military radios, which prompted some discussion about where some of the wartime sets were lurking these days. A few years ago when trying to obtain a 19 set (the classic WWII allied radio with coverage from 2 to 8MHz) I was often told that many were in the hands of military vehicle preservationists who didn't use them as radios, but fitted them in their wagons to ensure accurate appearances.

Recently I met with some members of a local military vehicle group and we discussed how much easier it is to get onto the amateur bands these days. Some are now thinking about having a crack at the Foundation licence as a prelude to taking the Intermediate licence which they'll need to use old army gear like the 19 Set. So perhaps we'll hear some noisy a.m. comms on the bands as the military vehicle boys start to operate those h.f. radios in their vehicles and add even more authenticity to their activities. Yet another facet of amateur radio!

If you've an interest in this kind of stuff, listen out around 3.610 give or take several kilohertz at 0830 (clock) on Saturday mornings for the Vintage Military Amateur Radio Society 'net. The use of a.m. mode adds a nice time warping dimension to the experience.

EC Standards

Readers of April's *SWM* might have noticed a difference of views between the Editor and me over what radio equipment can be used by Foundation licence holders. The regulations say that transmitting equipment must conform to EC standards. So what radios can M3s use? Although not the same as conforming to EC standards I, and others, thought the equipment had to be CE approved.

Based on a telephone conversation he'd had with a Radiocommunications Agency official, Kevin thought otherwise. As one who believes a verbal contract isn't worth the paper it's written on, I made my own enquiries by E-mail. An initial enquiry with the RA came up with the answer that equipment used by M3s 'must be CE (approved) for amateur use'. But that's not what you told Kevin! What about amateur gear supplied before the days of CE approval? This time the answer was 'As long as the equipment has been made and supplied for amateur use it is fine'. There we have it. M3s don't have to use CE marked equipment. Final score:- Editor, One - Your Scribe (and retail outlets who are telling M3s that they have to buy brand new CE marked radios) Nil. Nice result.

A point that needs to be made is that M3s aren't restricted to using radios that are only capable of producing 10W or fewer. It's down to the amateur, whatever the licence, to ensure the output power is no more than the licence permits.

19 Set.

FT-847.

Little Oomph - Big Distance

Yet another example of little power going a long way. **James Boag MM3KKT** in Dundee has a Yaesu FT-847 connected to a 20m Windom antenna. Due to severe space restrictions, about half the antenna is inside the loft, and the rest hangs out of the loft window. Not surprisingly, with the antenna so close to the domestic television antenna cable and the house wiring, interference to the TV is often caused if all of the permitted 10W transmit power is used. With the wick turned down to only 3 or 4W to avoid problems, James still managed to work **Leo RA0AM** in Krasnoyarsk, deepest Siberia on 21MHz. That works out at about 1600km per watt. Not bad for a semi indoor antenna!

Callsign Re-hash In The Offing?

The idea that the UK system of amateur radio callsigns could do with a shake up has been resurrected again. **Paul Thompson GM6MEN** has been the prime mover behind this latest manifestation of the 'Great Callsign Improvement Scheme', which basically suggests that the numeric part of the callsign is used to designate the country of operation rather than the class of licence. Why he bothered I know not. Entertainment value from raising a few hackles? High. Hot air produced and time wasted on writing letters of objection? Lots. Likelihood of it catching on? Nil. If you want to read about it send an E-mail to **bookseeker@scone18.fsnet.co.uk** with 'Request R A P' in the subject field.

Island Activities

After his activities as 3D2LB from Beachcomber Island Fiji from the 26th to the 30th May, **Andre GM3VLB** will have the assistance of another Brit **Alex G0DHZ** and Falkland Islander **Niall VP8NJS** in operating from various British Columbia islands from the 4th to the 15th June. They will use VE7/ own call from Malcolm, Campbell, Denny and Thetis Islands. Several **Grantham Amateur Radio Club** members including **Alan G0RCI** are off to a Danish Island for the first week in June. Which island? Could be one of the small islands of Fur or Livoe in Limfjord or on Vendsyssel-Thy which forms the northern part of the country. Listen out for them on all bands using c.w. and s.s.b. modes, with SSTV also a possibility. The call will be OZ/G0GRC.

■ ROGER BUNNEY, 35 GRAYLING MEAD, FISHLAKE, ROMSEY, HANTS SO51 7RU

Satellite TV News

The rapid progress of the coalition forces from crossing the Iraqi borders to the concluding skirmishes in Baghdad have taken less than three weeks and the UK media has extensively covered progress with quite dramatic footage, particularly Sky News. Live pictures from a tank turret as it traversed the desert heading North via 'videophone' and the entry into Baghdad April 5th shooting up enemy vehicles and attempted rammings - again a tank turret mounted camera - were dramatic and illustrates how media technology had advanced. Though videophones were used in the Afghanistan conflict, the latest versions used by both CNN and Sky have 'locked-on tracking' to the Inmarsat satellite via a downlink beacon allowing the video/audio uplink to maintain good signal contact during useage.

The very long advance warning for the Iraqi conflict allowed all the major TV and radio networks to prepare for extensive reporter coverage. The main Coalition military headquarters for 'official' media news was at Doha, in addition broadasters established uplink sites in Kuwait City, Saudi, Qatar, Turkey, Cyprus, Amman, Baghdad and at various sites in Kurdistan. Sat-zapping enthusiasts quickly found various downlink frequencies which in turn were communicated to others over enthusiast sites such as **www.telestellite.com/frequences** and **www.dxmonitoring.com** plus **www.groups.yahoo.com/groups/feedhunters** and others.

The mass of downlink frequencies used during the Iraqi conflict are far too numerous to list here, but a rundown of satellites in use may be illustrative...

72°E *PamAmSat-4* and *Eutelsat W5* @ 70.5°E, both over the UK horizon but provided links for Al Jazeera and Emirates TV. 62°E, *Intelsat 902* - links for Fox, Sky, ex Kuwait, Iraq. *Europe*Star-1* @ 45°E - numerous feeds for Reuters, ATN, BBC, etc. mainly in Telecom band. 36°E *SESAT* - links for Fox, popular for French TV. 28.5°E *Eurobird* - ABC-TV and German TV. 21.5°E *Eutelsat 2F3* - inclined orbit craft, but carried many BBC feeds ex Baghdad, Amman, UK feeds from RAF Fairford, etc. 16°E *Eutelsat W2* - very active for most broadcasters, CNN, ABC, CBS, Fox, 'Army/Navy News', ex Gulf, Amman, Kuwait, Kurd. 13°E 'Hot Bird' - occasional Globecast feeds (10.949GHz-V). 10°E *Eutelsat W1* - this the most active satellite carrying dozens of downlinks from all major broadcasters and networks. 7°E *Eutelsat W3* - mainly EBU traffic ex Baghdad/Kuwait. 1°W *Intelsat 707* - CNN, ABC, CBS - minority useage. 5°W *Atlantic Bird-3* - extensive use by ITN. 12.5°W *Atlantic Bird 1* - a few ABC, Globecast, French feeds. 12.5°W, 15°W *Telstar 12*, 21.5°W *NSS-7*, 43°W *PanAmSat 3R* - carried many feeds back into Europe ex USA from the White House, Pentagon, Camp David, etc., plus reverse 2-way interviews. *Hispasat* 30°W carried a few Spanish news feeds relating to their support of the Coalition moves into Iraq. *Eutelsat* 10°E were seen 15-17 March with several live feeds out of the Azores during the 'North Atlantic Summit' meetings.

Most of the Baghdad city news up-linkers were established on the top floor of the Palestine Hotel across the Tigris from the city centre, their dishes atop the roof. Early in the bombing, an Arabic broadcast satellite up-link truck set up their dish across the river next to a Saddam palace and ministry building uplinking a Baghdad sky at night picture over 10°E - coincidentally these buildings were targetted that same night by Cruise missiles! A locked-off camera shot showing building and palm tree. Suddenly TV monitor flashes peak white, a whooshing noise and crack - that was the first Cruise' exploding, followed by a succession of missiles into the same site. Panic by Arabic uplinkers as a large mushroom of red flame, white sparklies and smoke rise over them. They weren't there the next night!

A curious sighting by yours truly UK morning of March 23rd, over *Eutelsat W2*, 16°E, 11.164GHz-H (SR5632 + FEC 3/4). Signal with ident 'KTU-HOL 157F' appears showing pictures of a very long bridge - blocked - over a ravine in a mountainous region. Local Kurd types are clearly amused by TV camera, waving AK47s in a group shot. Interest is shown by large machine gun Kurd examining the far side of ravine and the road winding up and over the distant hillside. Camera zooms in to show a small figure - perhaps it's the Turks [?] - who in turn is watching the Kurds. Kurdish TV reporter hurriedly completes his live update into the local TV news and satellite truck derigs and switches off, obviously moving out prior to any shooting!

During the past weeks, monitoring the 'Iraq Satellite Channel' on *Arabsat* 26°E, 11.747GHz-V (27500+3/4) has been 'interesting' - certainly to students of media propaganda! Despite all adversity and violence inflicted upon Baghdad and the hinterland - and clearly seen on the TV screens of the West - the propaganda machine of Iraq TV continued to pump out falsehoods coupled with stirring military rhetoric encouraging the population to continue their fight against the American infidels. And Iraqi TV refused to die, off for hours it would re-appear, martial music, military news readers interspersed with video montage of Saddam, even mounted on a white stallion galloping out of an ethereal mist with loud hoof effects on cobblestones!

Whilst scanning over the many Gulf war uplinks on 10°E that morning, I came across the complete contrast to desert warfare and aggression, a choir is singing in the open air of the Italian Alps, a church service being carried live into RAI-TV, preceded with colour bars and 'ITA 102 LIVE'. As the Coalition troops battled things out across Iraq, the World elsewhere tries to continue as normal a life as possible.

Whilst scanning over the 10° airwaves, I noted a couple of facility company frequencies that may well be semi permanent features! 'GLOBECAST EUROPE' seems to be active at 11.154GHz-H (5632+3/4) carrying interview feeds and at 12.736GHz-V (5632+3/4) can be found 'APTN AD HOC CHANNEL' originating from 'APTN London Studio 2' - a still is carried during 'downtime' with a view of the River Thames.

The Brazilian *Grand Prix* over the April 5/6th weekend and pictures from Sao Paulo are being carried over *Eutelsat W1*, 10°E, mainly the pit area with a portable TV camera covering refuelling/tyre changing action on 11.164GHz-V (5632+3/4). Ice hockey is a popular weekend transmission in recent times on the Globecast multiplex - 11.104GHz-H, (20145+3/4), *Atlantic Bird-1*, 12.5°W - March 23rd relayed the Pittsburg v. Chicago match. The same multiplex carried PGA golf switching between Orlando and Ponte Fedra Beach Florida greens.

Encouraging reports from a number of satellite enthusiasts with computers suggest that the 'Technisat SkyStar 2' board is capable of 4:2:2 reception - the TechniSat Digital World site confirms details and **www.sateuropa.co.uk** site nearby sells the board at £59. I checked with Simon Docker at Sat Europa Direct - Southampton, Tel: **(02380) 334258** and he confirms that the SkyStar-2 board will handle MPEG-2, 4 and 4:2:2. Further investigation found that Wizard Satellite, see **www.wizardsatellite.com** - Tel: **(01455) 444404** also sell the card. A suggestion is that the board has auto SR, a decided advantage for sat/feed-zapping if true, the PC board is in effect a satellite tuner with conventional F-type socket input. More info when known...

The last known live TV interview with Saddam and Dan Rather for CBS.

Ident for the CBS News/Saddam live interview.

The face of chemical warfare, a reporter wears his face mask prior to his broadcast (10°E).

Bang!...this Cruise missile missed the Arab satellite uplink truck! (10°E).

Saturday March 22, smoke rises over Baghdad after night-time bombing, as seen from the Palestine hotel (10°E).

The Iraqi Satellite Channel 'towards the end' featured military news presenters (Arabsat 26°E).

This test card popped up during the Azores 'Atlantic Summit Talks'.

The satellite dish of 'HAM Radio' - SM6CKU (Astra-1A).

■ GRAHAM TANNER, 64 ATTLEE ROAD, HAYES, MIDDLESEX UB4 9JE
■ E-MAIL: ssb.utils@pwpublishing.ltd.uk

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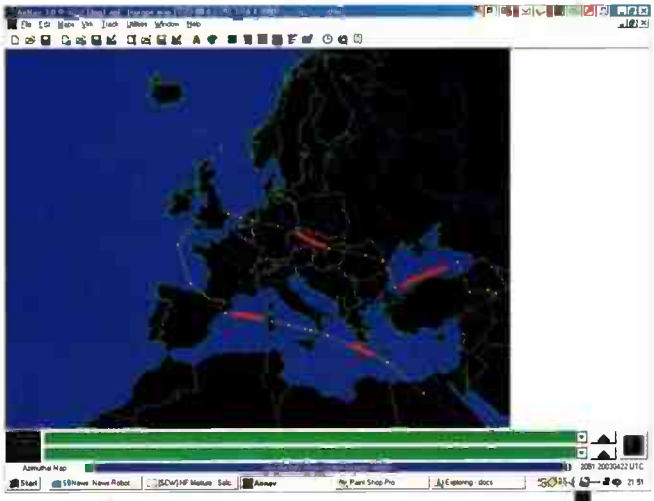


B-52s at Fairford

Last month I wrote about the detachment of US Air Force B-52Hs at RAF Fairford in Gloucestershire. By the time that these words are read in late May there is a very good chance that their operational flights to Iraq will be over and done, and the aircraft may even have returned to the USA. By mid April a number of the original 14 aircraft had returned home after being replaced by new aircraft from the USA.

The first operational mission for the aircraft was (quite surprisingly) not on the first day of the war. The initial bombing attacks were undertaken by B-2As operating from Diego Garcia in the Indian Ocean and direct from their home base at Whiteman AFB in the USA, and also by B-1B Lancers from Diego Garcia and Andersen AFB in Guam. The B-2As were heard crossing the Atlantic while working Santa Maria ATC and using the callsign RACOON. I understand that the callsigns used by the B-2As were based upon native US wildlife, however this series of callsigns did not last too long.

The first operations from RAF Fairford were on March 21 when eight aircraft flew off to Iraq under the full glare of TV and media. Their start-up and take-off was covered live by various satellite and terrestrial news organisations. The callsigns used by these aircraft was RATTLER, and their supporting tanker flights were using the callsign QUID (from RAF Mildenhall) and CACTI. Their departure that morning was not really a surprise to those of us who heard the refuelling tankers heading out to the south-west approaches on v.h.f. and u.h.f., but that's another story.

On the 21st, the aircraft headed out to the southwest approaches where they met their tankers, and then down towards Spain. I have been told that they were heard working Shanwick on **5.616MHz** however I was listening to another frequency so I missed them. They crossed overhead northern Spain and entered the Mediterranean Sea where they made their first refuelling. As expected, they were heard on **6.761MHz** calling for the tankers who were using the callsign QUID. Towards the eastern end of the Mediterranean Sea they met another flight of tankers (the CACTI aircraft mentioned above) for a second refuelling. Following this fuel 'top off' the aircraft went to their operational areas to release their weapons.

After their 15 hour mission to Iraq, the aircraft all returned to RAF Fairford around midnight, again covered live by various TV stations.

The refuelling tankers on the return leg were using the callsign TERRY. This was the only day in which they flew *en-masse*, as all the other flights have been as just one or two aircraft together.

The next set of flights that I heard were on the 23rd, when two aircraft departed from Fairford late in the evening, using the RATTLER callsign again. On this occasion the first aircraft flew across to the North Sea where it joined-up with its tanker aircraft operating from RAF Mildenhall (callsign TERRY). The pair of aircraft then turned south and flew across France to their refuelling track just north of Corsica. Meanwhile, the second B-52 departed from Fairford and turned directly south across France to take a more direct route to the refuelling track. Once again the B-52s and tankers were heard on **6.761MHz**.

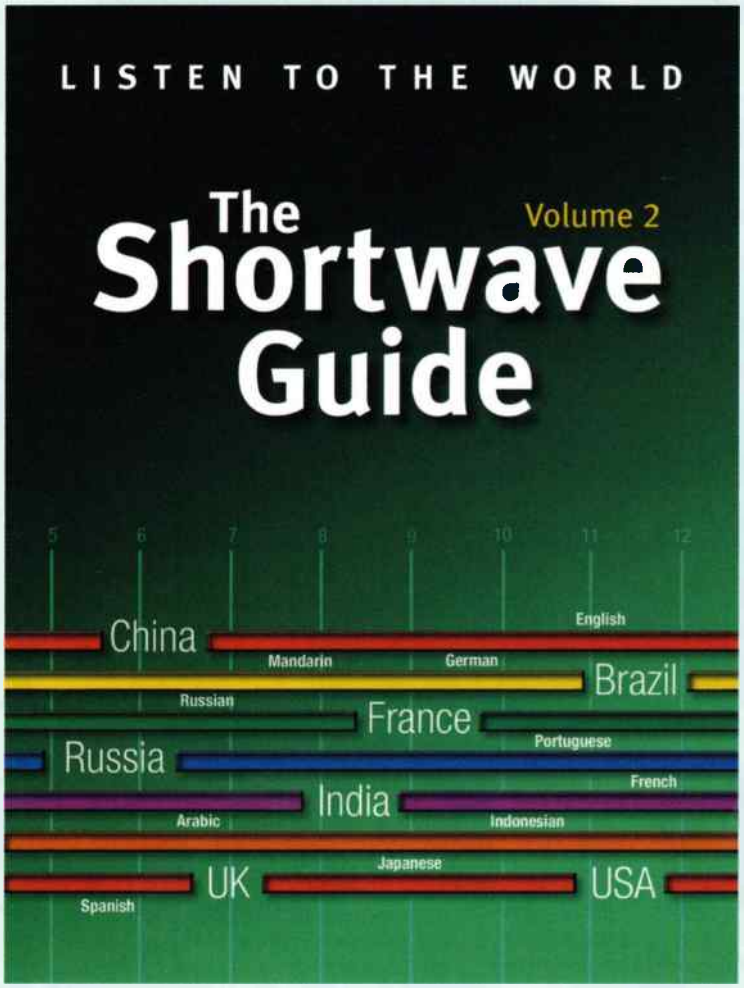
The RATTLER callsign remained in use until the 25th, when it changed to GURU. The pattern since then has been to use a callsign for one or two days, and then change to something else. Another change since the 25th March was the routing for the aircraft. After take-off from Fairford the B-52s flew across to the North Sea, and then over The Netherlands, Germany, Slovak Republic and Bulgaria and over the Black Sea. Their first refuellings were overhead the Czech Republic, and when the reached the Black Sea north of Turkey they were refuelled for a second time. A fleet of US Air Force KC-10 aircraft stationed in Bulgaria undertook the refuelling over the Black Sea.

That has been the general pattern of the flights over the next few weeks. I have heard a number of different callsigns used by the B-52s, including GURU, WILCOX, MIZOU, TOGA, WAGER, ETHAN, DICAS, WALT and CEFOX. One constant in all this flying has been the use of **6.761MHz** for refuelling operations. This has been particularly busy during the evenings when I have been listening, and I suspect that it is equally busy at other times too. Unfortunately, there have been times when it is very difficult to hear the aircraft because of interference from digital signal on 6.760MHz. The French have a station at St Assisse south of Paris which seemed to have lots of digital messages to send just about the same time as the US aircraft were at their busiest. There have also been a lot of encrypted transmissions from the aircraft - no doubt the receivers and tankers have been passing mission information to one another. The pilots refer to these transmissions as "in the green".

To give you an idea of the routes flown, I have included a screen capture from the *Airnav* program showing the approximate routings of the flights. I have marked the approximate positions where the aircraft refuellings took place, based upon listener loggings and information heard on 6.761MHz.

While all this was happening, another large armada of aircraft appeared on **6.761MHz**. Initially I had no ideas as to who they might be, but I was certain they were something to do with the Iraq war. Over five consecutive evenings at the end of March and early April I heard VEJAY, TABOO, BOBBY and TOWER callsigns. Some of these were the KC-10s operating from Bulgaria, and some were transport aircraft. Within hours of hearing these callsigns it became fairly obvious what I had heard - on the night of 26/27 March the US forces parachuted a large number of troops and supplies into northern Iraq, and the following nights flights were re-supply flights into the same area. On the first night of the mass parachute drop 15 C-17A Globemaster IIIs departed from Aviano AB in northern Italy using SONIC callsigns. These appear to have flown under strict radio-silence, as I have seen no reports of these aircraft on h.f. However, in the days following, once the parachute drop had been revealed in the press and on TV there was less need to keep the flights a secret, so most of the refuelling communications were made 'in the red'. It was possible to discover quite a lot about these flights by simply listening - where they were refuelling, which was the tanker aircraft and which was the receiving aircraft, which u.h.f. frequencies were being used, where the tanker aircraft were operating from, and how some tanker aircraft were changing callsigns in mid-flight.

The new edition of *The Shortwave Guide* published June 2003



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from the publishers of *WRTH*

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Scanning Scene

Poor old Umesh Bharakada I say. For those of you who have never heard of Umesh (and I must admit that I hadn't until five minutes ago), he is the bloke who was well and truly busted to the tune of a £4000 fine plus costs and confiscation of all his technical kit.

Why...because Umesh was manufacturing and knocking out illegal bugging devices, that's why. The feds reckoned that Umesh was making around forty thou a year by building and flogging illegal bugging devices. Operating from the bungalow near Leicester that he shares with his mum, Umesh had an estimated turnover of around £100,000 a year and was supplying bugging gear to other sellers and to private detectives. It seems that the equipment that Umesh was turning out was operating on frequencies in the civil airband. The Radiocommunications Agency put the heat on someone who had bought gear off him and hey presto... Umesh had his door knocked.

This kind of equipment is sold widely via the Internet with the major retailers hawking their wares on fancy web pages. None of the equipment sold to the public is legal in the UK.

Much of it operates in airband or sometimes the satellite communications bands. Even if the bugs were legal, their use certainly isn't. One wonders why Umesh was nicked when the larger fish in the pond continue to put on weight.

I'm sure that most people will have at least seen some of these items. They come in many guises. They are sometimes built into calculators and those power plugs that allow extra outlets from one 13A power socket. The item pictured here is a disassembled device built into a Parker pen. This requires a 12V battery and a small label on the side announces that it transmits on 135.480MHz. This is an f.m. unit. The pen actually writes too. Many of the small manufacturers turned out all their units on the same frequency and in the past it was possible to identify the maker by the frequency that the bugs were on.

In my experience, the very worst thing in which to build a bugging device is a pen. If you leave it lying around on a desk it gets pinched. As soon as any red blooded male gets to use a pen they firstly scribble with it to check that it works and then in idle moments they dismantle it thereby discovering the true purpose of the thing. No, pens are definitely not a good idea. If you must dump a bug on someone, try and install it in something with which they are already familiar. TV remote controls are great for this. They are normally far enough away from the TV to be able to pick up conversations and they have the added advantage that if the batteries go flat the victim always replaced them for you.

To listen out for bugs, firstly trawl the f.m. radio broadcast band. You'll be surprised just how many are operating there. These are the units that operate on a free running oscillator and are sold by some retailers and have also been made by the last two generations of schoolboys. This one works on a PP3 battery although variations have been made that hook up to a 'phone line in series and draw their power from the 50V d.c. found there.

Bugging devices are, by nature, short range and so you'll have to be pretty close to hear one. Another favourite band to search through is the 300MHz range to find these little beasts, although they can be made to operate almost anywhere.

You could always invest in a dedicated unit to detect and hear bugs, these are not aimed at the hobbyist and the costs are therefore rather prohibitive although you may occasionally find something like this old Scanlock 2000 being sold at a rally or on the net. The Scanlock 2000 is described in H. Keith Melton's *Ultimate Spy Book*.

The Scanlock2000 anti bugging unit.

A cheaper option would be to acquire one of the r.f. near field receivers such as the Watson WR5001 or WR5002 - both of which I found to be more than adequate for this purpose when I reviewed them for the December 2001 issue of *SWM*. You are unlikely to hear 'professional' units used by governments as many of them use spread spectrum or digital technologies. There are specialists that will supply equipment to monitor FAX and Internet communications, even the G4 digital FAX standard.

A chap in Florida was making this equipment a few years ago and his customer base was expanding exponentially. It was very expensive, but if you have a client prepared to pay for the equipment and for the operators who have to plant the equipment in the target's premises, then I guess it's worth it.

It is, however, usually cheaper and easier to tap the line direct from the nearest telephone junction box, although this may mean that staff have to spend long hours in manholes in the road with a van parked overhead for protection - not a pleasant job.

By the way Umesh had the registration plate A15BUG on his Wolls Woyce!

Batteries

It was really pleasing to receive a letter from **Bernt Skjeggestad** in Trondheim, Norway. Bernt had read the article on Batteries that appeared in the January 2003 *SWM* and kindly sent me the results of his experiences with many types of rechargeable battery. Bernt has not had a tremendous amount of luck with the Reusable Alkaline Manganese (RAM) types which he has discovered to be of varying quality and some have leaked.

He has been 'refreshing' standard manganese alkaline batteries that are generally thought to be non-rechargeable by using an 'Eco' charger made by a company called Saitec in Germany. He has a unit that 'charges' AAA, AA, C and D cells and one that just deals with AAA and AA sizes. Both will also charge NiCad batteries. Bernt is pleased with the results.

My understanding is that if you are going to 'refresh' batteries in this way, it's important not to ever run the battery completely flat otherwise it may never charge up again. For further info on Saitec chargers, check out the Internet, use the translate option on Google (if you are not fluent in German) and see **www.saitec.com** Thank you for your letter Bernt.

Exotic DX

If you are monitoring the PMR446 band be prepared for some exotic DX. It seems that some lateral thinkers are hooking up PMR446 equipment to the Internet using the excellent *EQSO* program written by Paul Davies M0ZPD. This allows voice traffic to be relayed via the Internet to a radio transmitter, in this case a PMR446 set. It seems that some 446ers in the UK are preparing to go down this route so don't be surprised to hear Family Radio Service (FRS) users from the USA popping up on PMR446 channels.

A bug utilising a 'free running' oscillator and transmitting on f.m. broadcast band.

This thing actually writes too. Battery is not shown because I don't have one for it.

Of Interest

The British *Grand Prix* is on Sunday 20th July 2003. If you are attending or are in the area you may hear items of interest. The new rules forbid encoded transmissions and so you may hear some interesting voice comms. Try searching 457 and 458MHz. In the past, the BAR team have used a repeater with output on 457.45625 f.m. with an input of 467.5625. The BAR engineering guys were on 450.275.

Renault have used 458.13125 as the repeater output at Silverstone in the past with input of 468.000. These are just two of the teams frequencies, but a methodical searching will reveal more. Of course nearly everyone at Formula 1 racing events seems to be carrying a radio, maybe that's another reason for a near field receiver. ***SWM***

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■ **E-MAIL:** enigma@pwpublishing.ltd.uk

Attention-123!

We've now covered Morse stations and English, German and Slavic language voice stations, which leaves only the remaining languages, all grouped together under the 'V' prefix. Numbers stations in this section have used languages such as French, Romanian, Hungarian, Spanish, Arabic, Chinese and Korean. Excluding the far-eastern based stations (Chinese and Korean), only four are presently active. They are:

Family	Ref	Brief Description	Morse Equivalent
XVIII	**V2**	Spanish f 5f ID ends *final final*	M8
Ia	**V6**	Spanish f 3f ID, 3f ID, ends 00000	M14
Ib	**V7**	Spanish m 3f ID, 3 or 4f DK, ends 000 000	M12, XP
XII	**V8**	Arabic f/m musical intro	none

V2, run by the DGI (Cuban Intelligence) is by far the most active of these stations, however, the two Russian stations (V6 and V7) still operate various weekly and monthly schedules. V8, run by Egyptian intelligence, can be rather erratic, and only uses two frequencies, 6.647 and 11.292MHz, unlike the other three, which use very many frequencies.

We must remember that, just because a particular station is heard in a certain language, this needn't give us any clue as to who is operating the station. Some intelligence services, notably British and US, seem reluctant to use any language, but English, although the CIA formerly also used Spanish (to Cuba and S. America) and German (to East Germany). Also Mossad, which we'd expect to use Hebrew, actually only ever uses English.

The Russians, especially, whose numbers operations have always been the most flexible, will use any language at all, depending on that spoken by the recipients. As well as Russian, English and Spanish, which they still regularly use, they have used in the past, German, French, Chinese, Farsi, and no doubt others too. The old Eastern block countries are also the greatest users of Morse.

ENIGMA 2000

The ENIGMA 2000 group's website has disappeared without trace, and they can provide no explanation for this. They have replaced it with an egroup 'enigma2000 - Number Station Monitors', which can be found at **http://groups.yahoo.com/group/enigma2000/**

The ENIGMA 2000 newsletter can be downloaded from the files section, as can their current ENIGMA control list and supporting information. Their contact details have also been changed to **enigma2000-owner@yahoogroups.com**

Some Questions Answered

We have been asked by several people whether the war in Iraq has produced greater Numbers activity. We are sure that it will have done, but this will probably not be evident by monitoring. It is MI6's **E3a** ('Lincolnshire Poacher') which would have almost certainly increased its traffic, but owing to its 'opaque' message delivery system, there's no way of knowing this. Schedules appear to remain unaltered.

Keith Warren of Oxford has asked for more details on frequency use by various stations. He particularly wants to know why stations choose the frequencies that they do. This is a difficult question to answer, for the various agencies have very different ideas about frequency usage. First and foremost, of course, the frequencies used must be suitable for good reception at the target location at the relevant time of day and season of year.

In this respect, Numbers Stations follow the habits of all other h.f. transmissions - using higher frequencies during daylight hours and for longer distances than they would at night and over shorter distances. Like broadcast stations, some of their transmissions are beamed in a particular direction, whilst others (fewer) are omni-directional, either by design or because beam antennas are not available. As a rough guide, transmissions during daylight hours above say, 8 or 9MHz, would suggest a distant target, maybe in another continent. Many stations restrict their operations to frequencies below 7MHz at any time of day or night, we can be sure that their target countries are nearby, and probably adjourn the country where the transmitters are based.

Parallel frequencies are used by several stations (such as E3, E10, M10 and M23) as a choice of frequencies is more likely to ensure better reception. Up to five parallels have been used by certain stations simultaneously. (E3a, for example, always uses three). If these channels are widely spaced (by several MHz) the likelihood is that the target area is very large. Narrowly-spaced channels (say, 1MHz apart) imply a specific small target area - and probably a single recipient agent. In unusual cases, parallels can be very close to one another, for example, E16/G16 had a special schedule ('Alpha Uniform') which used 4.821 and 4.888MHz in parallel, that's only 69kHz spacing.

Repeat transmissions, which can take place at any time from five minutes later to a week or more later (depending on the station), may occur on the same frequency or on a different frequency. A second scheduled (habitual) repeat may also be sent. Depending on the time of day, the repeat frequencies (if different to the original) may be higher or lower than that used for the first sending. The spacing between these frequencies depend on the time of the repeat. If it is sent soon after, say within an hour or two, or at the same time of day, the repeat frequency is likely to be quite close to the original (say, less than 1MHz). G4 and M29 always send their repeats (within the same schedule) half an hour later, on a frequency which is always spaced 100kHz lower or higher than the original. This takes place regardless of whatever else may be using that channel! Other stations may show more flexibility than this. Many schedules of Family Ib actually incorporate frequencies into their Schedule Numbers in a specific way, e.g. A station calling 347 may send its first transmission and two repeats on 11.**3**13, 12.**4**13 and 13.**7**13MHz. respectively - the kHz hundreds placings in each case making up the ID used.

That's all for now. As usual, the ENIGMA booklets are still available at £7.50 the pair, including postage. Good listening!

■ LAWRENCE HARRIS, 55 RICHVILLE ROAD, SHIRLEY, SOUTHAMPTON SO16 4GH
■ E-MAIL: info.orbit@pwpublishing.ltd.uk ■ WEB SITE: http://www.astronomer.plus.com

Info in Orbit

Early spring has seen a mushrooming interest in weather satellite (WXSAT) reception as a result of the unanticipated events following in the wake of the testing of *MSG-1* (METEOSAT Second Generation). Realising the consequences of this new situation, I contacted **John Tellick**, the secretary of **RIG (Remote Imaging Group)** to seek his comments on EUMETSAT's plans. I also contacted **David Taylor**, the WXSAT software writer, to ask for his experiences in setting up his 'MSG-1 data from *Hotbird-6*' reception equipment and **Dave Cawley** of Timestep to arrange delivery of a satellite television system for Hotbird - the new medium for the transmission of *MSG-1* data. This month's edition is a 'Special' on the *MSG-1* data situation, and I shall be writing a review of the hardware and software for a future edition. Meanwhile, I want to express my thanks to John, David and Timestep for their valuable contributions.

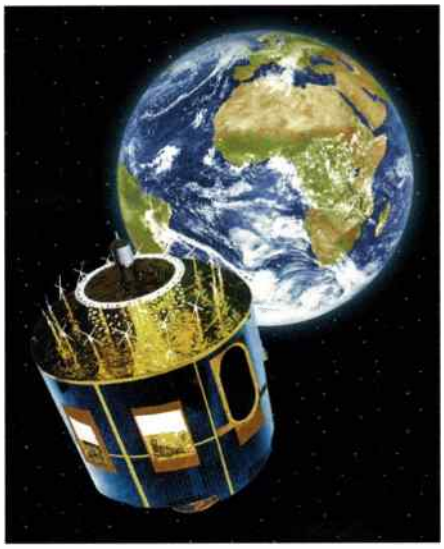

Fig. 1: *MSG-1*.

When I moved from Plymouth in 2001, I left my satellite television system with a friend, believing that I would not be likely to take an interest in it again. How things change!

MSG-1 - A Change Of Plan

The new European WXSAT *MSG-1* was launched in August 2002 - see **Fig. 1**. Commissioning began in late September with equipment and house-keeping checks. Testing of the downlinks followed, and on 15 and 16 September, **John Tellick** monitored a signal on the LRIT downlink channel. LRIT is the Low Rate Information Transmission; LRIT images were planned to be transmitted to a wide audience directly from *MSG-1*. LRIT - from *MSG-1* - would require equipment for reception and decoding, priced within the means of amateur hobbyists. John was advised by EUMETSAT that the signal that he had monitored was "an unmodulated carrier of 67dBW from the PGS antenna at the nominal level of the LRIT channel"; (PGS - Primary Ground Station - see **Fig. 2**). John had anticipated the start of test transmissions and was ready to monitor them.

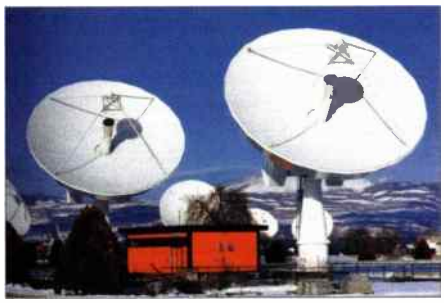

Fig. 2: The Primary Ground Station.

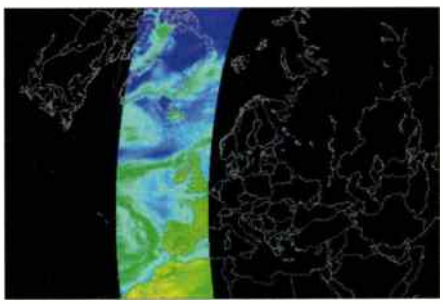

Fig. 3: A sample of ATOVS data (AMSU-B) image from David Taylor.

John writes: "Many RIG members will now know that (on 17 October), an SSPA (solid state power amplifier) suddenly switched off and EUMETSAT was unable to switch it back on. All commissioning was halted for a while and an Enquiry Board set up to investigate this failure, its consequences and to determine a safe mode in which to operate the satellite in the future". MSG satellites carry four of these amplifiers, of around 10W output, for the three main dedicated service downlinks - HRIT, raw data, LRIT and DCP (Data Collection Platforms). There is a 4:3 redundancy scheme, but with the failure of one SSPA there is no longer any built-in redundancy, so it is not yet known whether the other SSPAs can be operated as planned for data dissemination.

The SEVIRI Imager on *MSG-1* was switched on around 27 November, and the first image was received the next day. Further imaging tests have taken place and EUMETSAT are working on the parameters for image rectification. These images show that the imager and imaging chain appear to be operating well. However, since the raw data chain would also carry the LRIT stream, the priority is to maintain the raw data downlink.

And So To Hotbird

With the continuing uncertainty about the outcome and operational recommendations of the MSG Failure Enquiry Board, EUMETSAT began considering other options for the dissemination of *MSG-1* image data. They already operate a dedicated data dissemination link using *Hotbird*-6; this was set up for ATOVS (Advanced TIROS Operational Vertical Sounder - atmospheric sounding data from the NOAA WXSATs) and RSS (Rapid Scanning Service - a half-hourly scan of Europe by *METEOSAT-6* at 10°E, to warn of quickly - changing, or severe weather). Unfortunately, the *Hotbird* signal footprint is only receivable in Europe, so EUMETSAT are also considering C-band satellite transmissions to cover dissemination outside Europe. Deutsche Telekom operate EUTELSAT's *Hotbird-6* at 13°E, and bandwidth and data rates available with this 'satellite television' link make it easy to add additional data from MSG. Tests have now been carried out successfully to confirm this ability, so EUMETSAT now plans to have HRIT dissemination (the high resolution, 12-channel SEVIRI data) transmitted via Hotbird by the end of April and LRIT (the reduced, 5-channel SEVIRI data, together with foreign satellite relays and meteorological products) by the end of August 2003. Both services would be subject to interruption due to ongoing *MSG-1* commissioning.

John points out that having to adopt these methods of dissemination has considerable implications for professional users, since the front ends of many systems are already installed and will require modification. In the short term, this is to the advantage of RIG members in Europe since the hardware currently in use for ATOVS is fairly cheap and easily available. Signal processing is another matter. "The MSG Data Access Policy will still apply, as will, I'm sure, encryption," commented John, "The overwhelming priority is HRIT dissemination".

Hardware Requirements

I described these last month. To summarise, the new service from Hotbird is called EUMETCast and requires a 0.85m dish for most of Europe, with a

universal digital LNB and a TechniSat SkyStar 2 PCI DVB computer card. A fairly high specification computer is also required.

Software Requirements

TQ-TELLICAST: To receive this service and obtain the software and licence one must first register with EUMETSAT. Further software will be required to display the images.

Access to the data via Hot Bird will be granted depending on personal user category eligibility. Conditions of access to this data through the EUMETSAT Data Access Policy may vary from country to country.

EUMETSAT web site for continuing information: **www.eumetsat.de**

I am very grateful to John Tellick of RIG for providing me with direct information from EUMETSAT for inclusion here. I am also grateful to the EUMETSAT Helpdesk for responding quickly to my own enquiries about registering for these services.

Receiving DVB Data

Hotbird-6 provides an alternative way to direct reception from *METEOSAT-7*, or using the Internet to download the data. At present, two EUMETSAT services - **EARS** and **RSS** - are available this way.

EARS (*EUMETSAT ATOVS Retransmission Service*) provides a retransmission of the thermal and microwave sounder data not normally available to a.p.t. WXSAT users. This comprises 20 channels of thermal imaging data, and 20 channels of microwave data for each pixel in the image. The channels are carefully chosen; pixel size is bigger than h.r.p.t. or a.p.t. data; together these are called ATOVS data - see **Fig. 3**.

RSS is the *Rapid Scanning Service* using *METEOSAT-6* to get scans of Europe every ten minutes. This provides a much better view of changing weather events.

Data Acquisition - First The Paperwork!

We have to do more than set up a satellite television system and tune to the correct channel; software and reception permission are needed. You have to complete a form available at EUMETSAT's web site; separate forms are required for ATOVS and RSS data. You can ask to receive data either from the Internet or from the satellite (via DVB). Alternatively, you may just want HRIT data when it becomes available.

Assuming that EUMETSAT accept your application for DVB data, they send your details to T-Systems in Germany who provide specialised receiving software to enable your computer to receive EUMETSAT data. T-Systems then inform you of the cost; they not only offer the software, but can also supply receiving systems. The software cost is about £40. You place an order with T-Systems for the software, and it arrives a few days later.

Satellite TV

My new system from Timestep comprised the DVB card, dish with feed and LNB (low noise block) - see **Fig. 4**. The LNB converts the 11GHz satellite signal down to 1GHz, and amplifies it to overcome the cable loss of a nominal run. I used my METEOSAT WEFAX cable that was already fitted in the correct run. My cable is terminated with F-Type connectors; these connect the LNB to the DVB card. You can purchase these from various suppliers, though a package deal is available from Timestep.

Fig. 4: Grandson Joseph inspects the hardware.

Software

Your DVB card comes with *TechniSat* software, enabling the card to receive data and TV broadcasts, allowing you to monitor channels from *Hotbird-6*. The T-Systems' Tellique software replaces components of the *TechniSat* software when you install it. It turns the DVB card into a channel through which files are received from EUMETSAT, and stored on your computer.

To view ATOVS or RSS data, you need suitable software. Although most professional software is for UNIX systsms, *Windows* software, costing about £19 per single amateur user, is available from David Taylor via his web site: **www.satsignal.net**

Fig. 5: David Taylor's Hotbird dish.

Configuring The System

You may receive your hardware before you receive the Tellique software (and EUMETSAT user name and password), so testing the system can be done in TV reception mode. After installing the DVB card and the *TechniSat* software, transponder data is already set up for the ASTRA satellite. The disk-based manual describes how to set up the software and a detailed description is provided on **Hugh Marnoch's** site: **www.marnoch.org/msg/skystar.html**

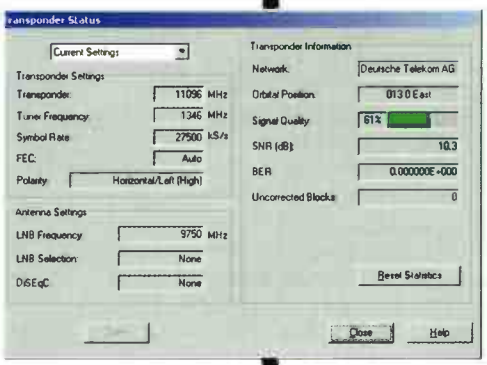

Fig. 6: Dish alignment set-up screen.

The dish comes with an assembly sheet. I assembled the LNB clamp, though a small adapter appeared to neither fit, nor be needed. The cable can be passed through the LNB mounting arm, and the plastic clamp fitted. My cable already had connectors so I did not pass it the cable through the conduit. Clamps mount the dish to the mast, and were easy to fit. Then I fitted them the correct way up!

Dish Alignment

Pointing at *Hotbird-6* is a critical process. When you have set the frequency correctly, you adjust the dish in elevation and azimuth until you locate the signal - displayed on the screen. You need help: Marion and grandson Joseph shouted from the

Fig. 7: Mike Long's new roof-mounted QFH.

computer when the signal changed from red to green - see **Fig. 6**. This 'search' process was not difficult, though it could take you some time. The first shriek from your helper(s) tells you that the system works. Have patience!

The Tellique software should be installed and set up according to EUMETSAT's instructions. They provide a user name and password, and designate a folder to receive the output data. Ensure there is plenty of disk space. Start the program; a new icon appears on the taskbar, with a white rectangle and a purple 'T' if everything is working correctly. If not, check the log file, and the web browser control panel. The 'Active Channels' page should show the announcement channel as always active, and the data channel as occasionally active as data files are received.

The Latest News From EUMETSAT

John Tellick has just confirmed (mid-April) from discussions with EUMETSAT, that Hot Bird dissemination of *MSG-1* HRIT data is to commence 23 April on a trial basis. The E Token (dongle) will not be required during this period, but will be when the service becomes operational. Trials for Hot Bird LRIT dissemination will take place around August, but could be sooner if the HRIT trials go well. *METEOSAT-7* will remain at 0°W disseminating PDUS (high resolution Primary Data) and WEFAX until the end of 2005. *MSG-1* commissioning should not have an impact on *METEOSAT-7* reception.

John has had discussions with EUMETSAT about a cheaper, less cumbersome way for UK users to pay for the tq(R)-TELLICAST software and dongle. He is also in contact with T Systems to see if something can be worked out. I am sure that everyone is grateful to John for pursuing these discussions on our behalf.

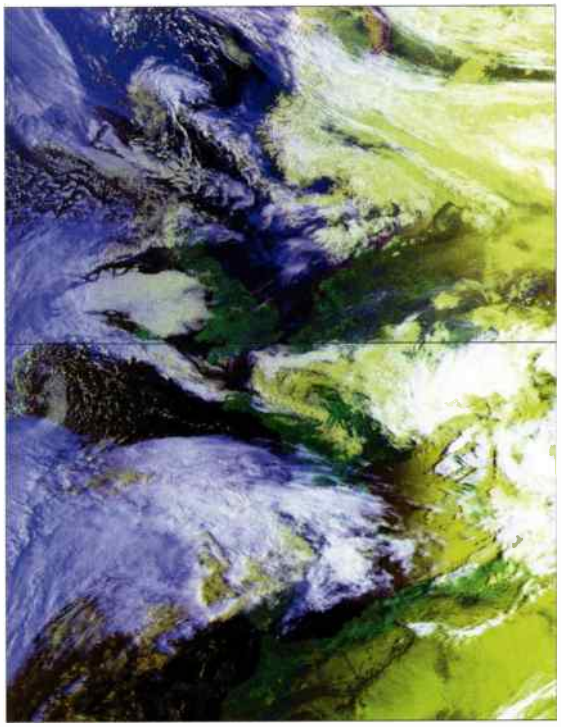

Fig. 11: *NOAA-14* 0724 12 April received in Southampton.

Mike's Antenna Installation

I finally got my crossed dipole fitted to the chimney after experiencing problems finding a local antenna installer. The installer was helpful and tested the antenna using an oscilloscope - sending signals up the cable. He reported that the system appeared to be working well. **Mike Long** of Truro commented "in Truro a very helpful professional antenna rigger first installed my discone, then a trial QFH, and last week my final home brew QFH. Although he deals in satellite and terrestrial reception of television I think he was impressed at what my receiving set-up could achieve and is happy to help me in my antenna projects. My new set-up is proving its worth with increased range".

Figure 8 shows a low elevation pass from a south-bound *NOAA-17*. Mike had spoken to his sister-in-law who lives in eastern Canada on the Friday evening and she had mentioned a severe snow warning of an impending storm. Mike received the image of Newfoundland on the Saturday and posted it. "Conditions were just right to get Newfoundland", he wrote. "Considering the distance, I was really surprised; previous attempts to get the eastern seaboard of Canada have been fruitless".

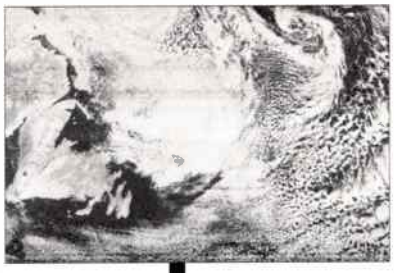

Fig. 8: *NOAA-17* 1330 5 April Newfoundland from Mike Long.

Mike told me that he had been reading 'Info in Orbit' for ages and was wondering if he could "receive these intriguing pictures myself", so about a year ago he programmed his Icom PCR1000 with WXSAT frequencies. Eventually he heard a signal. "Then I downloaded *wxsat* (good for a beginner as the picture is displayed as the signal is received) and a tracking program. Now I was getting results. Thanks to the web I found plans for a crossed dipole which was duly built and put in the attic. Results now far better! A couple of weeks ago I decided to do a proper job and am really pleased with my new QFH. So that's how I got into satellite reception - all thanks to *SWM* and this column". My thanks to Mike for his kind comments.

Mike's web site is: **www.amateurweather.com/images.htm**

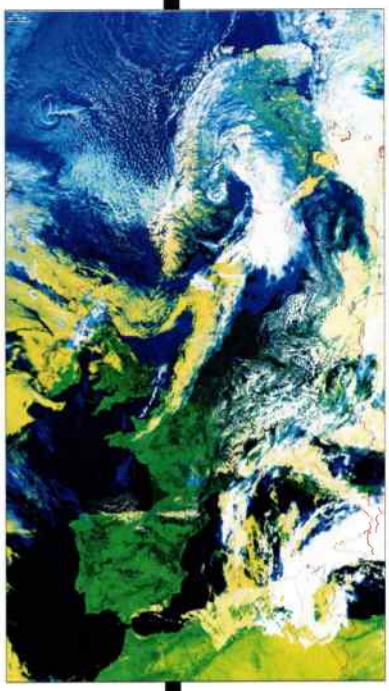

Fig. 9: *NOAA-17* 4 April from Mike Long.

Fig. 10: *INSAT-3A* - Indian communications satellite with weather imager on board - launched 10 April.

Frequencies - a.p.t.

NOAA-12 and *NOAA-15* transmit a.p.t. on 137.50MHz.
During overlap periods, *NOAA-12*'s a.p.t. is switched off.
NOAA-17 transmits a.p.t. on 137.62MHz.
METEOR 3-5 has failed.

WEFAX: *METEOSAT-7* (geostationary) transmits WEFAX on 1691 and 1694.5MHz.

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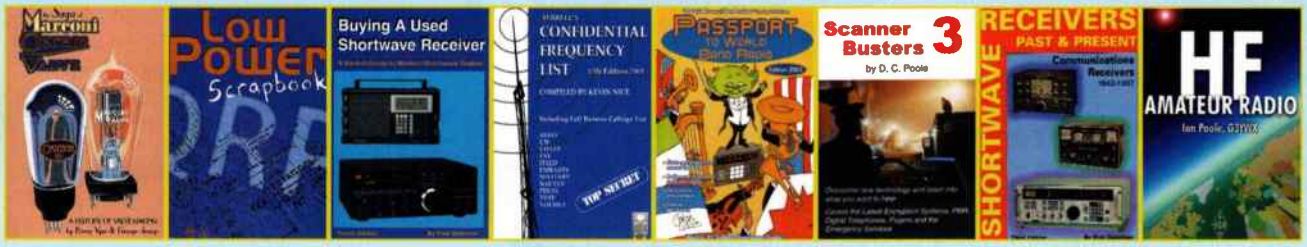

BRIAN ODDY G3FEX, THREE CORNERS, MERRYFIELD WAY, STORRINGTON, WEST SUSSEX RH20 4NS

LW Maritime Radiobeacons

The listeners who searched the band at night on a regular basis during January, February and March sometimes encountered enhanced propagation conditions which enabled them to log beacons they had not heard for some time. Others were disappointed by their findings during the nights they were able to search the band.

Two of the Faeroe Is beacons at Akraberg (AB) on **381.0kHz** and Nolso (NL) on **404.0** were received during some nights in February by **Peter Pollard** in Rugby but no others were detected. They were also received after dark by **Fred Wilmshurst** in Northampton along with another Faeroes beacon at Myggennaes (MY) on **337.0**. From a southerly direction he picked up the sky waves from three beacons located along the north and north-west coast of Spain - Cabo Machicharo (MA) on **284.5**; Estaca de Bares (BA) on **292.5** and Cabo Mayor (MY) on **289.5**.

A beacon located along the south coast of Spain at Cabo Palos (PA) on **301.0** was heard at night for the first time by **Fred Pallant** in Storrington. He also received at night the idents from the beacons at Estaca de Bares (BA) and Cabo Machicharo (MA); also Nolso (NL) on the Faeroes.

The beacon at Cabo Palos (PA) was also heard for the first time by **Victor Robb** in Belfast. He also picked up the idents from Mahon, Minorca (MH) on **293.5**; and Cala Figuera, Majorca (FI) on **294.0**. From the north coast of Spain he received the beacons at Cabo Machichaco (MA); Cabo Mayor (MY) and Estaca de Bares (BA). During daylight he logged the three beacons on the Faeroe Is (MY, AB, NL) and after dark he heard the Dalatangi Lt, Iceland (DA) on **305.7**; also the Prins Christian Sund beacon (OZN) on **372.0**, which is located at the most southerly point of Greenland.

In Kilkeel, Co.Down **Robert Connolly** compiled his log mainly at night - see chart. Commenting upon his findings he says "The Spanish beacon (O) at Tarifa on **303.0** was heard here on several occasions with a fairly strong signal. The Israel beacon (HA) at Haifa on **287.3** was heard a couple of times recently. The Spanish beacon (IA) has been heard occasionally on **287.0** but requires careful listening due to an aero beacon in France (TA) being stronger and on **286.5**."

Further to the impending closure of all of the Italian maritime radiobeacons (see page 48, *SWM* December 2002) Robert says "A recent sweep of frequencies by my European contacts failed to show any Italian beacons and it looks as if they closed on schedule at the end of 2002." He strongly suspects that all of the beacons along the coast of Tunisia have been closed down as none of his European contacts have received any of them for several months.

When searching for beacons such as BT and BK on **312.5** Robert says it is worth remembering that they are remnants of former beacon chains and therefore it is advisable to listen carefully on some frequecies for up to six minutes. Such frequencies are **315.5** (Lithuania); **312.5** (Baltic & Ukraine); **309.5** (Ukraine); also **300.5** (Ukraine). He also mentioned that some chains still exist in Artic Russia on other frequencies but they are not normally heard in the UK.

Robert has just completed the preparation of the eighth edition of his popular and inexpensive radiobeacon guide. It now extends to about 60 pages and details almost 3000 aero and maritime radiobeacons! It is available now in printed format, and it can also be obtained as a pdf file for use with *Acrobat Reader* or as an *Excel* workbook. If you would like an information sheet about his guide please send an s.a.e. with your request to Robert via me at the above address.

Maritime Beacons Chart

kHz	C/S	Station Name	Location	DXer
283.5	NA	Punta Lantailla	Canaries	A*
284.5	MA	Cabo Machicharo	NE.Spain	A,D*,B*,E*
287.0	IA	Llanes Lt	N.Spain	A*
287.3	HA	Haifa Lt	Israel	A*
289.5	MY	Cabo Mayor	Spain	A,D*,E*
292.5	BA	Punta Estaca Bares	N.Spain	A,B*,D,E*
293.5	MH	Mahon, Minorca	Balearic Is	A*,D*
294.0	FI	Cala Figuera	Majorca	A*,D
296.5	FI	Cabo Finisterre Lt	NW.Spain	A*
297.0	NO	Cabo de la Nao Lt	S.Spain	A*
300.5	VI	Cabo Villano Lt	N.Spain	A*
301.5	PA	Cabo de Palos Lt	S.Spain	A*,B*,D*
303.0	O	Tarifa	S.Spain	A*
305.0	KA	Klaipeda Rear Lt	Lithuania	A*
305.7	OA	Dalatangi Lt	Iceland	A*,D*
312.5	AT	Mys Aytodorskiy	Ukraine	A*
312.5	BK	Baltijsk	Balt.Russia	A*
312.5	BT	Mys Taran Lt	Balt.Russia	A*
314.0	SN	Cabo San Sebastian	S.Spain	A*
331.0	FH	Frederikshab	Greenland	A*
337.0	MY	Myggenaes	Faeroe Is	A,D,E*
372.0	OZN	Prins Chris's Sund	Greenland	A*,D*
381.0	AB	Akraberg	Faeroe Is	A*,C,D,E*
404.0	NL	Nolso	Faeroe Is	A*,B*,C,D,E*

Note:
Entries marked * were logged during darkness.
All other entries were logged during daylight or at dawn/dusk.

DXers:-
(A) Robert Connolly, Kilkeel.
(B) Fred Pallant, Storrington.
(C) Peter Pollard, Rugby.
(D) Victor Robb, Belfast.
(E) Fred Wilmshurst, Northampton.

APPENDIX - List of equipment used:-

Robert Connolly, Kilkeel: JRC NRD-525 + Timewave DSP9+ filter + Datong AD370 active antenna.

Fred Pallant, Storrington: Trio R-2000 + a.t.u. + inverted L antenna erected outdoors.

Victor Robb, Belfast: Lowe HF-150 + home built loop - for guidance he referred to the loop article in *SWM* April '89 and modified it using the ideas in the October '93 issue.

Fred Wilmshurst, Northampton: Icom IC-R70 + Global AT-1000 a.t.u + random wire antenna in loft.

■ MIKE RICHARDS G4WNC, 49 CLOUGHS ROAD, RINGWOOD, HANTS BH24 1UU
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Decode

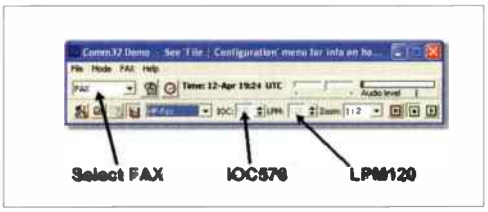
Tutorial Time

Looking back through previous 'Decode' columns, I seem to be giving FAX scant coverage - time to put that right! When I first started decoding I always remember FAX as being the mode that could be used to really impress your friends. Back in those days there were stacks of FAX on the l.f. and h.f. bands with a mix of material from weather charts right through to AP press photographs.

One of my favourite and most reliable stations was the AP press transmissions from Buenos Aires. However, times have moved on and most, if not all, the press stations have moved onto other transmission systems. Don't let that put you off, because there are still lots of FAX transmissions out there just waiting to be captured. The bulk are weather transmissions ranging from all manner of charts through to the occasional processed satellite image.

How It Works

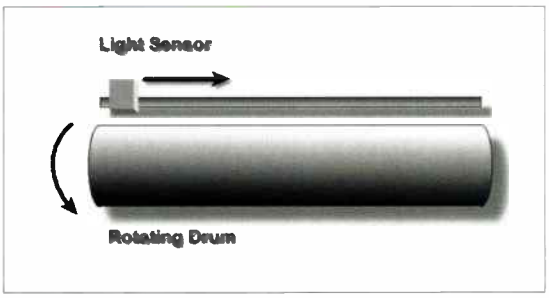
Let's start with a look at the technology behind the FAX system that's commonly employed on the h.f. bands. The first point to note is that the system is nothing like the modern office FAX machine - it has its roots firmly back in the very early days of analogue FAX machines. The analogue roots of the h.f. FAX system are an advantage in practice because the nature of h.f. propagation lends itself quite well to this approach. This is one of the reasons why this apparently outdated system has survived for so long.



How to set up *JVComm32* for h.f. FAX reception.

I'll run through the process from start to finish so you can see exactly how it works. The first stage is to convert the paper FAX chart, photo or other document into a format that can be handled by a typical h.f. transmitter and receiver. This process starts with a cylindrical drum around which the document is wrapped. Closely associated with the drum is a scanning mechanism. This would normally comprise a motorised worm gear with a carriage that houses a small light sensitive detector.

When the scanner starts, the main drum will spin whilst the light sensitive detector slowly tracks along the entire length of the document driven by the motorised worm gear. In effect, the light sensor scans a really thin section of the document at every spin of the drum. The electrical output of the detector comprises a voltage or current that tracks the light to dark changes in the document. When this signal is applied to a radio transmitter, it is used to vary the carrier frequency of the transmission.



Basic principles of h.f. FAX operation.

In a real system, the change would be +400Hz for black and -400Hz for white. This modulation is commonly known as Frequency Shift Keying or f.s.k. At the receiving end, the varying r.f. signal is converted back into a variable voltage/current and applied to a mechanism just like the original scanner, except that the light sensitive detector is replaced by a pen or other marker that can be electronically controlled.

As you can see, the basic principles of the system are really quite straightforward and this simplicity allows the system to work quite effectively on the h.f. bands. In order to receive a good facsimile (that's where the word FAX came from) of the original document, there are a few basic parameters that need to be aligned between the transmitter and receiver. The first and most obvious is the speed of rotation of the scanning and receiving drums - if the drums are running at different speeds, the receive image will be slewed across the paper.

Next in-line is the start of the transmission - if the starts are not exactly aligned, the received image will start part way across the page rather than at the edge. To keep the received image properly scaled so that it doesn't appear either squashed or elongated, the tracking speeds of the light sensor and pen need to be very closely linked. As you would expect, a set of international standards have been developed to handle all these variables.

Drum speeds in typical h.f. systems are most commonly 120r.p.m., but you will also find some running at 60 and 90r.p.m. Linking the movement of the light sensor/pen is defined by the Index of Cooperation or IOC. Common values for this are 288 and 576. The problem of synchronisation is a little more complex because the system needs to be able to both match the drum speed and spot the start point for the scan. In a practical system, this is done by transmitting a synchronisation phase before the real image starts. This synchronisation comprises repeated transitions between black and white with the changeover occurring at the point where the real image will begin. This simple system enables a suitably adjustable FAX machine to sync-up and so produce an accurately aligned image.

Automatic Picture Transmission

The development of h.f. weather FAX is at a very advanced stage and most modern systems feature Automatic Picture Transmission (APT). This is a really neat system that enables the receive system to detect all the important parameters of the signal from the signal itself. Here's how it works.

At the start of the transmission, a tone is sent by rapidly swinging the carrier between full black and white. The frequency of this tone is used to convey the IOC of the transmission that will follow. For an IOC of 576 a 300Hz tone is used whilst 288 uses 675Hz. This tone is followed by the synchronisation pulses I described earlier then the image itself.

Once the image has been sent and 450Hz tone is sent to indicate that the image is complete. As you

can see, this is a really neat system. Although the systems may appear complex, receiving FAX at home is really easy thanks to the availability of a number of well proven FAX programs.

One of the easiest to get going is *JVComm32* which is readily available in demo version from Pervisell at **www.pervisell.com** One of the attractions of this package is that you just need the software and a receiver - there's no special interface as the soundcard is used to process the signal. Once you've downloaded *JVComm32*, here's a quick run through the steps required to get your first FAX picture.

With the program installed and running, go to the box at the top left of the main panel and set the mode to FAX. Next move along to the IOC and LPM boxes and set them to 576 and 120 respectively. You can leave the zoom level at 1:2 as this is a good compromise. At this point, you should find that the spectrum display is looking pretty lively with the display dancing around. If not, make sure your receiver's turned on and the audio lead connected to the appropriate input on your soundcard. If this doesn't fix the problem, you need to refer to the excellent Quick Start and Troubleshooting file that you'll find in the *JVComm32* folder.

Once all is running ok, tune to Hamburg Met on 7.88MHz and you should hear either a steady tone (FAX station at rest) or the cyclic grating of a FAX signal in progress. Northwood is currently running increased coverage of the Middle East and the FAX transmissions go out on a mix of the following frequencies: 6.834, 10.5765, 14.356 and 18.261MHz. If you want to know more about FAX and see the full range of software and stations, Marius Rensen runs an excellent site that can be found at **http://www.hffax.de**

Complex ALE Listing

Knowing that lots of readers enjoy ALE monitoring, here's an extract from Day Wason's latest complex list showing a selection of ALE loggings.

MHz	Service
1.5043	USAF
1.8000	Aircraft
2.5310	DAF Aalborg
3.1370	USAF
3.5910	UK Mil
4.6250	Algerian
5.0190	UK Mil
5.7860	R+S Net
6.8000	Turkish
6.8400	Israeli Mil
7.5270	US Customs Albuquerque
7.6110	US FAA
7.6120	Unid
7.9300	Ethiopian PTT Addis Ababa
7.9612	Unid US Mil
8.3340	Moroccan Oil
8.5000	Unid
9.0250	Aircraft
9.0850	Guardi Di Finanza
9.2590	Algerian MOI
10.2380	MFA BERN
10.2440	Alg O+G Hassi R'Met
10.2750	Alg O+G Ohanet
11.1110	Tunisian MIL/MOI
11.4275	Algerian Emb Tunis
11.4660	Alg O+G Hassi R'Mel
11.4750	Algerian Emb Tunis
12.1330	Tunisian MIL
12.1750	Guardia Di Finanza
12.3350	Chinese Diplo
13.2150	Aircraft
13.4518	Swiss Diplo
13.4520	Swiss Diplo
14.4200	Slovakian Emb Cairo
14.5500	Algerian MIL/MOI
14.5800	UK MIL/DIPLO Ascension
14.8120	MFA Bratislava
15.0430	Richmond
15.9000	Romanian Embassy
16.1000	MFA Bratislava
16.1240	MFA Bern
16.2670	MFA Prague
16.2700	MFA Prague
16.6400	UK MIL/DIPLO Ascension
18.0030	USAF Sigonella
18.3200	MFA Bratislava
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21.8670	UK MIL/DIPLO Kuwait
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23.4710	055 Net
23.8220	UK MIL/DIPLO KUuwait
24.1000	MFA Prague
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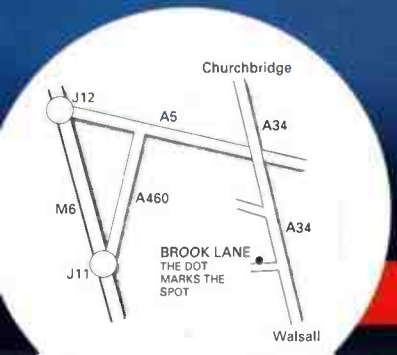

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AOR	AR-3000A WIDE RECEIVER	£475
AOR	AR-3030 HF RECEIVER	£399
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AOR	AR-7030 TOP RECEIVER	£550
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YAESU	VR-500 HANDHELD SCANNER	£149
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YUPITERU	MVT-9000mkII MULTIBAND HANDHELD RECEIVER	£275
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■ JACQUES D'AVIGNON VE3VIA ■ E-MAIL: jacques@pwpublishing.ltd.uk

Propagation Forecasts

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.

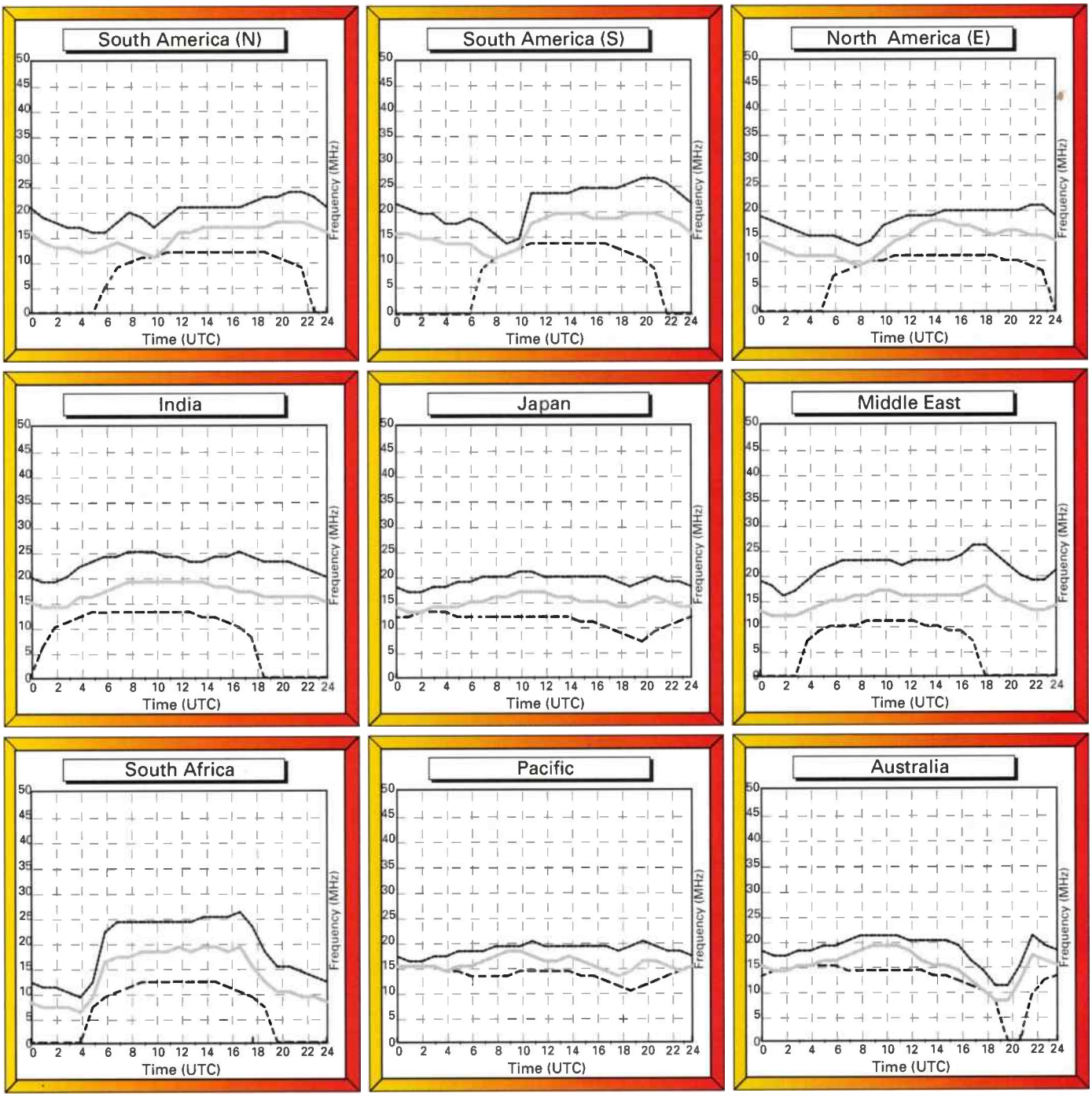
The middle line indicates the optimum working frequency (OWF) with a 90% probability of success for the particular path and time.

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.

June 2003
Circuits to London

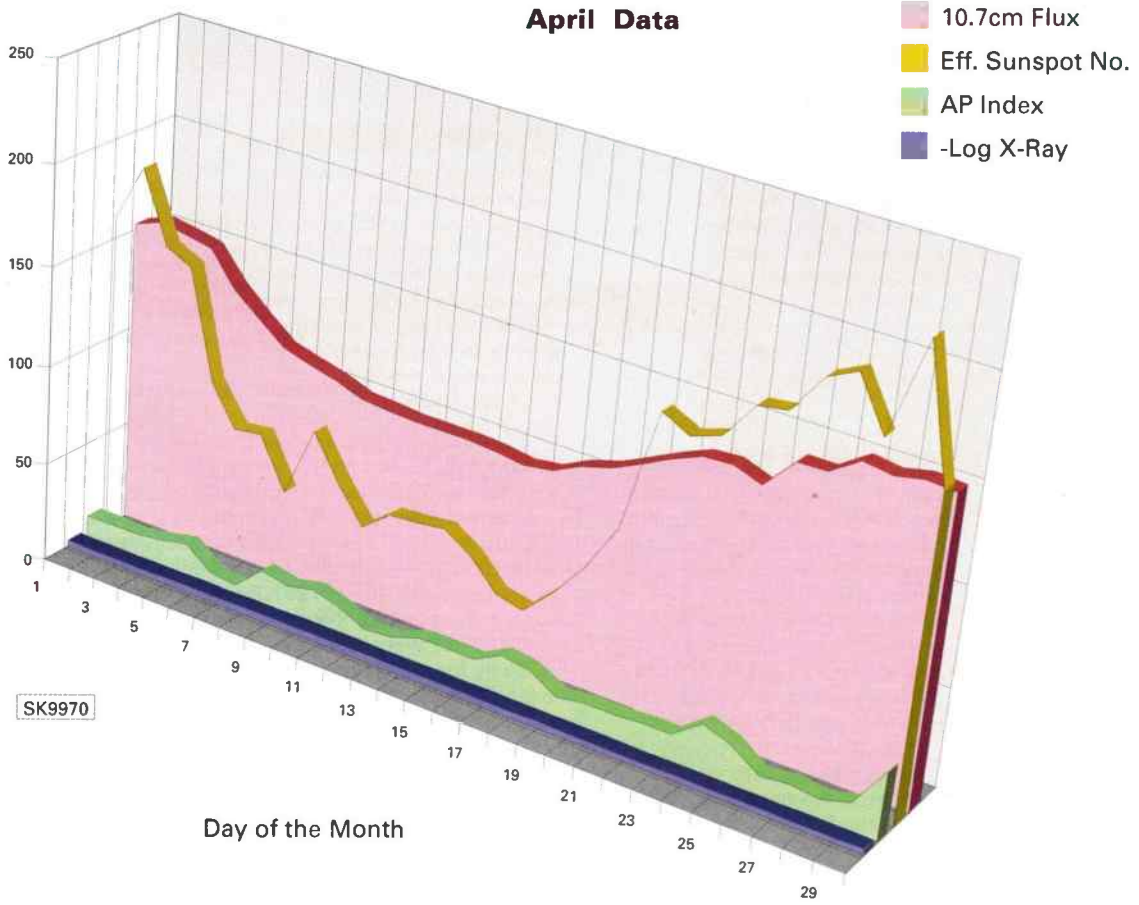


SK9969

■ KEVIN NICE G7TZC/M3SWM, SWM EDITORIAL OFFICES, BROADSTONE ■ E-MAIL: kevin.nice@pwpublishing.ltd.uk

Propagation Extra

Ron Ham's barometric pressure chart, taken at Storrington, W. Sussex, April 2003.



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.

■ **PETER BOND, c/o EDITORIAL OFFICES, BROADSTONE**
■ **E-MAIL:** skyhigh@pwpublishing.ltd.uk

Sky High

Having waited for months for the political wrangling to end and commencement of operations against Iraq to start, the bulk of the air war was more or less over in under four weeks. By April 13, air operations had been noticeably scaled down with the B-2s, F-117s and one aircraft carrier being withdrawn from the operational front-line. They were followed a few days later by RAF 617 Squadron. Some of the TV coverage was to put it mildly, quite dramatic, with the bombing of Baghdad on some nights being unbelievable. Many things stand out in my mind, but one especially was the attack by an A-10 on a government building using its GAU-8 Gatling gun. Anyone who has witnessed a live firing of the GAU-8, (as I have), will never forget the amazing 'Brrrrrrt' sound the gun makes as it unleashes hundreds of rounds in a few seconds burst, (the maximum firing rate is 4200 rounds a minute) - simply awesome!

Whilst most of us monitored the large build-up of coalition forces in the Gulf, I doubt whether many in the Iraqi regime or their armed forces could have been ready for the 'Shock and Awe' assault that was to be unleashed against them. Irrespective of what your views were regarding the commencement of Operation *Iraqi Freedom*, thank goodness it was not the prolonged Vietnam style war that some had predicted. The town of Tikrit was the last major stronghold to fall a couple of days ago and with sporadic fighting now reducing by the day, hopefully the final liberation of Iraq from this regime will not be far away. What the future will hold is another matter.

You would have thought that lessons of the past would have been learnt, but sadly the coalition troops once again suffered from friendly fire. That, coupled with the lives lost through aircraft accidents, lead to a totally unacceptable number losses and injuries through non-combat incidents. In these days of high tech radio and other equipment you would have thought that the friendly fire problem would have been eradicated. They have had twelve years since the 1991 Gulf War to perfect the Patriot missile system, but to date, this system still seems to have accounted for the losses of three coalition aircraft in the past few weeks!

On to the UK aircraft movements - the B-52s deployed at Fairford have so far used the callsigns following, the dates listed are those that the callsign first noted, some callsigns were used on more than one day. I believe this is a fairly complete listing, but any additions or corrections are welcome especially as there are some different interpretations of the B-52 communications. I listened to a recording of one day's mission more than 10 times and still couldn't decide on the final callsign, but I was fairly confident it was DUNLOP. It was only when the operator spelt it that I knew it was DUNLAP. It just goes to prove the problems that certain types of microphone give to not only airband listeners but also to ATC. I have lost track of the number of times that London Military asked the B-52s to repeat or spell their callsign!

It is now the 20th April and it appears that the last full B-52 mission was flown on the 14th. The two missions on the 15th and 16th were apparently both recalled and had to hold for ages to burn off fuel. The final mission on the 17th was airborne for some time but was also recalled.

Callsign	Status	Date
RIPPER	Arrival	3/4 March
CHOIR	Exercise	13 March
RANCY	Exercise	14 March
BRAHM	Exercise	14 March
TENOR	Exercise	15 March
PRIM	Exercise	17 March
CHOOSE	Exercise	18 March
RATTLER	Mission	21 March
GURU	Mission	25 March
WILCOX	Mission	26 March
TOGA	Mission	29 March
MIZOU	Mission	30 March
ANNEX	Mission	31 March
RAGU	Mission	1 April
LOPEZ	Mission	2 April
DUNLAP	Mission	3 April
FACET	Mission	4 April
WAGER	Mission	5 April
THROW	Mission	6 April
LOPEZ	Mission	7 April
ETHAN	Mission	9 April
DIECAST	Mission	10 April
TEMPER	Mission	12 April
WOMP	Mission	13 April
SEFOX	Mission	14 April
WOOKY	Mission	15 April
BORAX	Mission	16 April
SNOOP	Mission	17 April

Notes: RANCY also noted as RAMSEY and RANTY. CHOOSE also noted as CHEWS. FACET also noted as BASET. WIGIT was also reported to me on 5 April, but other sources have cast doubt on this callsign. PASSION was reported in use on 11 April, but again there is some doubt as to the accuracy of this callsign. A B-52 departed for the USA on the 10 April using the standard five BW callsign CHILL in this case CHILL 69.

One thing I didn't mention last month was that the first operational B-52 mission on the 22nd March, (RATTLER), routed out of the UK Westbound due to the over flight ban by Turkey. The aircraft headed for Land's End and were clearly visible from my home in the Southwest. The B-52s met up with their tankers at Land's End and Air Refuelling was carried out using the UK Secondary frequency 299.6 as their main air-to-air with 297.75 as the standby. It was interesting to note that radio communications for RATTLER 82 were made by a female Pilot or Co-pilot. Sadly for me the ban was revoked the following day and most of the other flights routed Eastbound on Tacan Route 1 and left our airspace at NAVPI.

In addition to the B-52 Command Post on 249.975, (FORTRESS CONTROL) a second new frequency has been noted in use at Mildenhall. According to my records 249.75 was originally the operations frequency used by the Bravo rotation C-130s some years ago and when they left became an standby operations frequency. I had not seen it

This month's photo is an E-3 AWACS which will have provided much of the Command and Control operations over Iraq. This example is from the 18th Wing based at Kadena in Japan.

reported in use for a couple of years. (At one time it was also noted as an ops frequency at Fairford). It is now being used by the deployed tankers at Mildenhall reverting to its old callsign, BRAVO OPS. Reports indicate that 370.25 was installed as a Precision Approach Radar frequency at Fairford around March 27. This is perhaps an unusual choice as it is also Mildenhall Tower so they must have had it on a fairly low transmission power to prevent any interference.

Confusion

A couple of over flights provoked some E-mails to me and also confusion on a couple of news groups. JAYHAWK 51/52 were heard on 31 March and were widely reported as B-1Bs and again on 11 April when JAYHAWK 51 to 53 were noted. This Kansas Air Guard unit, (127th ARS), used to operate the B-1 but are now equipped with KC-135Rs which had been on deployment to Geilenkirchen. An anonymous reader reports that on 31 March JAYHAWK 51 tested the Selcall KL-QR with Oceanic and **Jim P** reports that he heard the flight on 11 April handed off to Shanwick Oceanic where JAYHAWK 51 was given a Selcall check on JS-HM, (presumable a different lead aircraft). This was interesting to note as very few KC-135 Selcalls are noted even on the Selcall News groups.

I am sure that many of you watching the advance of the ground forces on their various targets will have noted some of the interesting radio equipment. The Hummers and other communications vehicles had an amazing array of different antenna available to them. Small half metre high discones were prevalent for v.h.f. and u.h.f. communications as were small directional antennas similar to a Log Periodic. Not being an antenna expert, I have to admit there were several types I could identify, but perhaps the most amazing was an armoured vehicle which had a diagonal boom reaching up for about three metres from each corner of the vehicle with what appeared to be an h.f. long-wire suspended in a square from the top of each boom. Mobile h.f. - now I wonder if the wife will let me convert our Honda?

Lastly, I would like to finish this section in a sombre way but also to raise spirits on a comical note. Whilst we all enjoy the hobby of airband listening in peace times, we should not forget that our armed forces sometimes have to put their lives on the line in the defence of freedom and democracy around the world. So we should take a moment to remember those service personnel and their families who suffered a loss or injury during the conflict. On the brighter side, it is good to see that Hans Christian Anderson is alive and well and living in Iraq, (well he was anyway!). Puzzled? Well the Iraqi Information Minister could only be accused of telling Fairy Tales from beginning to end. When he gave his last TV performance, (before disappearing), stating that US troops would be slaughtered on the approach to Baghdad and they would never occupy the city, it was a bit unfortunate when a US tank trundled past in the background on the far side of the river - Enough said! - more news next month.

News Groups

Last month I mentioned the self imposed censorship of Airband and Aviation news groups regarding reporting 'live' operational missions during the conflict. Much has been said on these groups regarding the validity of this type on censorship and I have recently had two E-mails from **Brian P** and **Jon T** commenting on this subject and also asking my opinion. I am sure I am about to open the proverbial can of worms but here goes. Basically, whilst I think that this type of censorship is admirable, I believe it is a complete waste of time. I am quite certain that if the powers that be felt that the information on news groups could in any way compromise the safety or operation of our armed forces, those news groups would be shut down from day one, (if not earlier!) Don't think for one moment that these news groups are not monitored by someone in the echelons of power!

The ATC callsigns used by aircraft operating out of the UK, the B-5s for example, would never be used for the attack element of the mission, they would revert to tactical callsigns possibly of an alphanumeric type. All communications between the aircraft and the AWACS or other control source, whether digital or analogue would be encoded in one form or another. Data links would be used primarily and most likely voice communications may not be used at all except perhaps for air-to-air when absolutely necessary.

56 Squadron To Leuchars

My thanks go to Brian who reports that on 28 March, 56 Squadron began their re-location from Coningsby to Leuchars. Apparently, WARLORD 4 (Tornado F.3), was operating on Coningsby Departure frequency 344.625MHz, when he was told to contact London Military on 279.3, the departure controller then wished him farewell and good luck. His reply, rather bizarrely was, "Smoke me a kipper, I'll be back for breakfast" *It must have been Ace Rimmer then...Peter is clearly not a* Red Dwarf *fan. - Ed.* Those 'Sky High' readers who monitor the Leuchars frequencies, please let me know if 56 Squadron are still using the same callsigns. Reported 2001 - 2003 were: CARBON, HORSEMAN, LUCKY, PHOENIX, SATURN, SCORCHER, SCORPION, TYPHOON, WARLORD. Not noted since 2001 were MALLET, RAMBO and SCOOBY. Also, have they taken their Air-to-Air and Ops frequencies with them or more likely, have they adopted new frequencies at Leuchars?

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DX Television

Throughout March, a large area of high-pressure was responsible for record temperatures and long sunny days in the United Kingdom. As a result, an intense tropospheric opening occurred around the 14th, creating spectacular reception conditions lasting for over a fortnight, particularly in the north-east. In addition, a few short-lived Sporadic-E openings brightened up an otherwise empty Band I.

Reception Reports: Tropospheric DX

A log arrived from **Peter Barclay** (Sunderland) which summed up the excellent period of tropospheric reception, the best day being the 19th when conditions were intense with dozens of u.h.f. log entries from Germany, Denmark, Sweden, the Netherlands, Belgium and Luxembourg. In addition, the German ARD network was present on every Band III channel from E5 to E11.

By 2200 it was evident that reception extended to the eastern borders of Germany and eventually a station using the Eastern European 6.5MHz sound spacing was co-channelling with the German MDR service on E30. This was identified as the Polish TVP-1 R30 outlet at Jelenia Gora with 200kW e.r.p. In the past, Peter has logged TVP-2 on this channel.

Another station with 6.5MHz sound was discovered on R31, but with severe co-channelling from ZDF and DR (Denmark DR-1). Pictures could not be resolved, but the language sounded Czech. At 2335 Peter heard the start of a country music programme and by referring to the Czech TV programme schedule on their website, CT-1 seemed the likely contender. Peter adds that Plzen, close to the German border, is the most likely CT-1 outlet even though it is only 20kW e.r.p. CT-1 is quite a catch these days. The network was once transmitted in Band I until the channels were handed over to NOVA TV a decade ago.

Tom Crane (Hawkwell) turned in an excellent u.h.f. log with a full complement of Dutch national and local u.h.f. channels. **Tony Jones** (Langdon Hills, Essex) is not too far away from Tom and with an excellent take-off over the Thames estuary, Continental DX is assured, even during the slightest lift.

Band I DX

On March 9th, **Peter Barber** (Coventry) encountered a welcome Sporadic-E opening at 1034 on E3 with a cartoon from Portugal. Fade-out occurred around noon. Ukrainian signals from the YT-1 network were visible on R2 on the 12th between 1017 and 1020, with a presenter followed by cookery hints and tips. Using a scanner, a Channel R1 video carrier at 49.740MHz was periodically heard until 1150. On the 14th at 1100, Tom Crane (Hawkwell) located an R1 Russian video carrier at 49.739MHz. Peter also encountered Spanish E2 signals from Madrid between 1902 and 1908 on the 28th. Italian state TV RAI UNO was identified by its logo during a Meteor-Shower ping on Italian Channel B at 1706 on the 15th.

US Transmitters In Iraq

Radio Netherland's 'Media Network' reports that in northern Iraq, US international broadcasters began TV and f.m. transmissions by the 10th. 'Towards Freedom TV' is broadcast from an airborne transmitter circling over Iraq. In Sulaimanya and Erbil, 'Radio Sawa' operates around-the-clock on 101.7 and 100.5MHz respectively. In Erbil, 'VOA Kurdish' transmits on 104.5MHz while 'Radio Free Iraq' uses 104.5MHz. Both stations air for up to two hours per day.

Fig. 1: An early test card used by Ceskoslovenská Televize.

Mobile Equipment

C. Hibbard (Swansea) advises that the UK caravan and leisure retailer 'Towsure' stock a variety of multi-system TV receivers, video recorders, antennas and even self-seeking satellite systems. Some of the products will appeal to the mobile DXer. The company has superstores located at Sheffield, Southampton and Halesowen and their website is **www.towsure.com**

Fig. 2: Traditional graphics from the former Czechoslovaki an TV service, CST. This shows an identification caption used by the studios in Prague.

FM Reports

Throughout the period March 10th to 21st **Stephen Michie** (Bristol) and **Simon Hockenhull** (Bristol) logged various stations from Croydon, Crystal Palace, Mendlesham and Chillerton Down. On the 14th, **George Garden** (Edinburgh) heard NRK outlets on 91.1 (NRK P3) and 91.8MHz. On the 19th, stations on 89.7, 95.6 and 101.4MHz were identified.

A copy of the *Radio Listener's Guide 2003* arrived from George Garden. It is a mine of information about which receivers are available, reviews, useful station lists and lots of details about the DAB network. At £5.45 it is highly recommended. The guide is available from the *SWM* Book Store, see page 58.

Simon Hockenhull (Bristol) tells us that a new student f.m. station is now operating on 106.80MHz from Bath University.

Fig. 3: A logo used by All India Radio or perhaps Doordarshan TV? No, it's one of the latest totally baffling Identification Symbols used by BBC-1! This one is called 'Bollywood'. Whatever happened to the good-old-fashioned Globe Symbol?

Troublesome STL

For over twenty years, Italian pirate stations have used Band I for their studio-to-transmitter links (STLs), even though these fall within TV channels in some areas. In the UK, many illegal stations and RSLs use Band I for STLs. **Nick Brown** (Rugby) has recently discovered a local STL operating dangerously close to the E2 vision carrier, thus creating an interference problem. The STL operates at 48.33MHz at 5W e.r.p. and links Rugby FM studios to the town centre transmitter site which outputs on 107.1MHz with 100W e.r.p. A notch filter is out of the question as the interfering carrier is too close to the E2 vision frequency, so phase cancellation seems the only option.

Keep On Writing!

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

Our DXTV and Archive TV website can be found at: **www.test-cards.fsnet.co.uk**

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FOR SALE

Alinco DR112E mobile v.h.f. transceiver, high/low power, CTCSS scans-band-memory, freq. range-priority freq. rev function, used infrequently, £100. Copies of *SWM/PW* from Oct 1984 to date - most in binders, offers. Bob G0DYB/G4IAV, Wigan area. Tel: (01942) 870954.

AOR AR1000 hand-held wideband scanning receiver, 8-1300MHz, a.m., f.m., w.f.m., box, charger, NiCads, civil/mil airband marine, amateur, h.f. and v.h.f. broadcast, £99 including postage. Tel: Mid Wales (01654) 712350.

AOR AR2001 desktop scanner, £100. Yupiteru MVT-9000 MkII hand-held scanner, unused, £275. Yaesu FRG-7 h.f. set, original read out, improved filters, £125. All boxed, inc. manuals, v.g.c. Graeme Wilson, Stoke on Trent. Tel: (07767) 248205.

AOR AR3000A base station scanner, little used, with original packing and manual, but duff p.s.u., hence only £400 + carriage. Alan, Scarborough. Tel: (01723) 582796 or E-mail: aburge@btinternet.com

AOR AR3000A communications receiver, immaculate condition, £420 o.n.o. Phil, Leicester. Tel: 0116-212 1817.

AOR AR7030 short wave receiver, excellent condition, just been serviced and upgraded by AOR, also AT-1000 tuner coupler and various listening directories, £450 o.v.n.o. Tel: Portsmouth (02392) 592818.

Clear out: SEM QRM eliminator, £25. Datong v.l.f. converter, £10. PO loudspeaker amplifier, £25. Cossor Mod 234 for restoration, offers. Palstar active antenna, £35 plus receivers, a.t.u., etc., postage extra. Vic Prier, E. Devon. Tel: (01297) 22307 evenings.

Eddystone 1650/4, added mouse tuning and b.f.o., 10kHz-30MHz, Redifon R500 with internal a.t.u., 1.6kHz-30MHz, both are 19in rack 1980s professional receivers with manuals, £300 each - both are clean and complete. Tel: Prestatyn (01745) 854410 after 1800 please.

FRG-100 receiver, v.g.c., keypad, f.m. board, p.s.u., Datong FL3 filter, bhi noise eliminating speaker, £390 the lot. Gordon, Scotland. Tel: (01540) 662112.

Hitachi WorldSpace Satellite portable radio, boxed, as new, unwanted gift, £100. Mr Shea, N. Wales. Tel: (01650) 531423 after 1700 and before 2100.

Icom IC-R71E h.f. receiver, 100kHz to 30MHz, very good condition, £300. Icom IC-R72 h.f. receiver, 30kHz to 30MHz, as new, £350. WiNRADiO WR-1550i PC ISA card receiver with *Digital Suite* software, as new, £300. Tel: Aberdeen (01464) 831689 or E-mail: wardmj@btinternet.com

Lowe HF-150 with keypad, £120. NEIM1031 d.s.p., the new NR unit, £75. Tel: (07960) 029004.

Signal 535 airband receiver, u.h.f., v.h.f., dedicated mil/civil frequencies, 60 memories, p.w.r. supply, battery pack, manual, plus extras, desk or mobile use, £195 - v.g.c. Tel: Derbys (01332) 880633.

Silent key sale: Drake R8 communications receiver, c/w antenna and a.t.u., little used, boxed, £550. Yupiteru MVT-7100 hand-held scanner, wideband, plus pre-amp, boxed as new, £170. Hazel, Chesterfield area. Tel: (01246) 432776.

Yaesu VR-5000 receiver, 100kHz to 2600MHz, boxed, as new, £400. Yaesu VR-120, boxed as new, £100. brian@lyttleton.fslife.co.uk or Tel: (01782) 838916.

WANTED

Icom IC-R8500 receiver, must be in excellent condition, with manual, etc., cash waiting. Please call with details. Tel: Woking (01483) 502410.

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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

CARLISLE & DARS, G4ARS. Meets at the Morton Community Centre, Wigton Road, Carlisle. Details from Mr J.A. Ennis G3XWA. Tel: (01228) 27463.

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 Mosses Centre, Cecil Street, Bury, Lancs BL9 0SB. Details from Steve Gilbert G3OAG. Tel: 0161-881 1850.

DOUGLAS VALLEY ARS, G3BPK. Meets at the Wigan Sea Cadet HQ, Training Ship 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 Hamson 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 Bamfield & Fieldhouse, Cricket Club, Bamfield 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, G0TRC, 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, Mealy 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 Mark Procter G1PIE.

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, Burnley 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, Scansbrick, Lancs. Details from Don Atkins M1BUL.

WIRRAL & DARC, G4MGR. Meets at the Irby Cricket Club, Mill Hill Road, Wirral. Details from Brian Black.

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 Mr D.J. Barclay MOBPM. Tel: 0191-388 8113.

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, G4EKT. 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 Alistair Butler M1ECF.

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DARLEY ARC, GOFOS.

HAMBLETON ARS, GOJQA. Meets at the Mencap Centre, Northallerton, 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 Manne Road, Scarborough, North Yorks YO12 2TJ. 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.

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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, Yambury (Horsforth), RUFC Grounds, Brownberne 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 Colendge 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, Rooskwood 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

DERBYSHIRE

BOLSOVER ARS, G4RSB Meets at the Blue Bell, High Street, Bolsover, Derbys. Details from Colin Morris G0RXT. Tel: (01246) B22856.

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 M0AQI.

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

NOTTS & DERBY BORDER ARC, G4NID. Meets at Mariipool United Reform Church, Chapel Street, Mariipool, 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 GOHDB. Tel: (01684) 7217B.

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 Adnan 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, Dortwich 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 at the Red Lion Inn, St. Anne's Road, Malvern, Worcs. Details from Dave Hobro G4IDF. Tel: (01905) 351568.

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. Adnan 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 GOHUW. Tel: (01827) 830437.

WELLAND VALLEY ARS, G4WVR. Meets at The Village Hall, The Green, Great Bowden, Leics. Details from The Secretary.

LINCOLNSHIRE

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, Tnton 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.

NORTHAMPTDN RC, G3GWB. Meets at the Bntish Timken, Social & Athletic Club, Cotswold Avenue, Duston, Northampton. Details from Norman Miller GOGBZ. Tel: (01327) 349188.

NORTHAMPTDN 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 DF NDTTINGHAM, G3EKW. Meets at the Haywood Road Community Association, Haywood Road, Mapperley Road, Nottingham NG3 6AD. Details from Ron Hague G4XDU. Tel: 0115-919 9177.

DUKERIES ARS, G4XTL. Meets at Ambleside Community Centre, Ambleside, New Dllerton, 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 GORDP. Tel: (01623) 631931.

NDRTH NOTTS DATA GROUP, GOWNN. Details from Tony Jenkins G8TBF.

SIEMENS ARC, G8ZK, G8IGQ. Meets at the GPT Sports Ground, Beeston, Nottinghamshire. Details from Chns Archer G4VFK. Tel: 0115-943 3387.

SOUTH NDTTS ARC, GOOAU. Meets at the Farnham Community College, Famborough Road, Clifton, Nottingham NG11 9AE. Details from Gary Bishop GOWUG. Tel: (01509) 672846.

WORKSOP ARS, G3RCW. Meets at the Club House, 59-61 West Street, Worksop, Nottinghan S80 1JP. Details from Terry Calvert G4GBS. Tel: (01302) 743130.

SHROPSHIRE

DSWESTRY & DARC, G4TTO, G1DRA. Meets at the Sweeney Hall Hotel, Sweeney, Oswestry. Details from Ant Astley GWOAJA. Tel: (01691) 860545.

SALOP ARS, G3SRT, M1AXW. Meets at the Telepost Club, Railway Lane, Abbey Forgate, Shrewsbury. Details from John Bumford GOGTN.

TELFORD & DARS, G3ZME. Meets at the Dawley Bank Community Centre, Dawley, Telford, Shropshire. Details from Mr M. Vincent G3UKV. Tel: (01952) 255416.

STAFFORDSHIRE

BURTDN-DN-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 ARC, 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-DN-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, MORAD. Details from Mr Peter Bradham GOWXJ. Tel: (01905) 724531.

MID WARWICKSHIRE ARS, G3UDN. Meets at the St. John Ambulance HQ, 61 Emscote Road, Warwick. Details from Bernard Prtaway. Tel: (01926) 420913.

RUGBY ATS, G4APD. Details from Tony Humphnes GOOLS. Tel: (01455) 552683.

STRATFORD-UPON-AVON & DRS, GOSOA. Meets at the Home Guard Club, Tiddingham, Stratford-upon-Avon, Warks. Details from Ron Horsley GOMRH. Tel: (07970) 148204.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC, GONEQ. Meets at the Aldridge Central Hall Community Centre, Middlemore Lane, Aldridge WS9 8AN. Details from Mr C.J. Baker GONOL. Tel: (01922) 636162.

COVENTRY ARS, G2ASF. Meets at the Binley Church Hall, Binkiow 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, GOSPM. 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 GOLAI. Tel: 0121-628 7632.

SANDWELL AMATEUR RADIO CLUB, GOCWC. Meets at Sandwell ARC, Broadway, Didbury, Warley, West Midlands B68 9DP. Details from Stuart Collins MOBTO. Tel: 0121-561 4663.

SIERRA HOTEL ARCG, GOOBS. Details from Warwick M. Hall G4WMH.

SDLIHULL ARS, G3GEI. Meets at The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. Details from Paul Gaskin G8AYY. Tel: 0121-783 2996.

SDUTH BIRMINGHAM RS, G3OHM. Meets at Hampstead House, Fairfax Road, West Heath, Birmingham. Details from The SBRS Secretary.

STDURBRIDGE & DRS, G6OI, G6SRS. Meets at the Old Swinford Hospital/School, Stourbndge, 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 GOPAI. Tel: 0121-561 2884.

WEST MIDLANDS POLICE ARC, GOCDP, G1WMP Details from Steven Jones G6LRL.

WILLENHALL & DARS, G4ETW. Meets at The Liberal Club, Villers Street, Willenhall, West Midlands. Details from Dave Bradbury. Tel: (01902) 411252.

WOLVERHAMPTDN ARS, G8TA. Meets at the Electncity Board Sports Club, St. Marks Road, Chapel Ash, Wolverhampton. Details from Mrs J. Smith. Tel: (01902) 751936.

WORDSLEY RC, G4WRA. Meets at the 8nck Maker's Arms, Mount Pleasant, Bnerley 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, Victona Road, Farnham Common, Bucks. Details from Mrs Eileen Chislett G8EIL Tel: (01628) 625720.

MAIDENHEAD & DARC, G3WKX. Meets at the Red Cross Hall. The Crescent, Maidenhead, Berkshire. Details from Neil Savin GOSVN. Tel: (01628) 626210.

NEWBURY & DARS, G5XV. Meets at the Rugby Club, Monk's Lane, Newbury. Details from Mark Slade MOCUK. Tel: (01488) 638985.

READING ARC. G3ULT. Meets at the Woodley Pavillion, Woodford Park, Haddon Dnve, Woodley, Reading. Details from Mamoch Standen GOJMS. Tel: 0118-972 3504.

BUCKINGHAMSHIRE

AYLESBURY VALE RS, G4VRS. Meets at the Harwick Village Hall, Aylesbury, Bucks. Details from Mr L.I. Cropley GODFC.

CHESHAM & DARS, G3MDG, G1MDG. Meets at the White Hill Centre, Chesham, Bucks. Details from Mr T.J. Thirlwell GOVFW. Tel: (01442) 832169.

CHILTERN ARC, G3CAR. Details from Roy Page G4YAN. Tel: (01494) 534216.

MILTDN KEYNES ARS, G3HIU. Meets at Bletchley Park Museum (The Green Room, B Block Annexe), Wilton Avenue, Vlechley, Milton Keynes. Details from Mrs J. Battersby M1EPL (Secretary) on (01908) 565636 or Frank Collins MORPM (Chairman) on (01234) 713148

MILTDN KEYNES SCDUT ARS, GOSMK. Meets at The Quarries, M.K. Scout Campsite, Cosgrove. Details from Mr P.A. Orchard GORYZ. 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 GOIQK. Tel: (01708) 474443.

BROMLEY & DARS, RS89030. Meets at the Victory Social Club, Kechill Gardens, Hayes, Bromley. Details from Alan G. Messenger GOTLK.

CLIFTDN 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, Pansh Rooms, Beulah Hill, London. Details from Bob Burns G3OOU. Tel: (01737) 552170.

DARENTH VALLEY RADID, GOKDV. 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 GOPQB. 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, Uxbndge 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 Chnsty GOKHC. Tel: 0208-504 2831.

MITCHAM & DISTRICT ARS. Meets at the ATC Hut, Commonside West, Mitcham, Surrey CR4 4HB. Details from Mr M. Knott GOWCR.

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 Maunce Fagg G4DDY. Tel: 0208-669 1480.

WEST LDNDON ARS, RS95599. Details from Robin Clay GOVJI.

WHITTDN ARG, GOMIN. Meets at the Whitton Community Centre, Percy Road, Whitton. Details from Ian Clabon GOOFN. Tel: 0208-894 9131.

HERTFORDSHIRE

BISHDPS STORTFORD ARS, G5ZG. Meets at the Royal Bntish Legion Club, Windhill, Bishop's Stortford, Herts. Details from Tony Judge GOPQF. Tel: (01279) 506933.

DACORUM ARTS, G7RIH, GOWIH. Meets at the Guide Meeting Rooms (next to the Royal Bntish Legion), Queensway, Hemel Hempstead. Details from Ian Hamilton GOTCD. Tel: (01442) 211925.

HDDDESDON RADID CLUB, GOTSN. Meets at the Rye Park Conservative Club, Rye Road, Hoddesdon, Herts. Details from Don Platt G3JNJ. Tel: 0208-292 3678.

MIMRAM CONTEST GP, MOABC. Details from Alan Holdsworth G8OO. Tel: (01707) 392950.

RADID SCDUTING TEAM, G8ZRST. 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.

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, GOVZS. Details from Derek Gilbert GONFA.

CATERHAM RG, GOSCR. 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 Bners GOKZT. Tel: (01737) 552139.

DORKING & DRS, G3CZU, G7DOR. Details from John Greenwell G3AEZ. Tel: (01306) 631236.

FARNBDRDUGH & 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 Whitboum GOSWE.

KINGSTDN & DARS, G3KIN. Details from Mrs Mary Ashdown GOBQV.

REIGATE ATS, G5LK, G7RAT. Details from Mr A.C. Embling G1LNT. Tel: (01883) 344723.

SUTTDN & CHEAM RS, G2XP, G7SAC. Meets at the Sutton United Football Club, Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Details from John Puttock GOBWV. 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 & DRS, G4GQR. Meets at the Roast Beef Bar, Brighton Racecourse, Elm Grove, Brighton. Details from Mr P.J. Fellingham.

CROWBORDUGH DARS, GOCRW. 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 MOCHW. Tel: (01435) 863020.

HAMPSHIRE

ANDOVER RAC, GOARC. Meets at the Village Hall, Wildhem, Andover, Hants. Details from Mr R.S. Coleman GOWYD.

BASINGSTOKE ARC, G3TCR, G8JYN. Meets at the GEMS Social Club, Lister Road, Basingstoke, Hants. Details from Bob Brown MOCJJ.

FAREHAM & DARC, G3VEF. Meets at the Portchester Community Centre, Westlands Grove, Portchester, Hants. Details from Andrew Sinclair GOAMS. 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 GOFYX. Tel: (01705) 472846.

ITCHEN VALLEY ARC, GOIVR. Meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh. Hants. Details from Sheila Williams GOVNI. 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 GOPPH. Tel: (01329) 232386.

THREE COUNTIES ARC, G4WWR. Meets at the Bramshott Pansh 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 GOLKG. Tel: (01703) 841794.

ISLE OF WIGHT

BRICKFIELDS ARS, GOBAR. Meets at Brickfields Horse Country Cent, Newnham Road, Binstead, Isle of Wight. Details from Mr Pebody.

ISLE DF WIGHT RS, G3SKY. Meets at The Old Cafe, Whitecliff Bay, Holiday Park, Bembndge. Details from Alan Reeves G4ZFQ. Tel: (01983) 294309.

OXFORDSHIRE

BANBURY ARS, GOBRA. Meets at St. John's Church Social Club, South Bar, Banbury, Dxon. 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.

DXFORD & DARS, G5LO. Meets at the Grove House Club, George Street, Summertown, Oxford. Details from Mr D. Walker G3BLS. Tel: (01865) 247311.

VALE DF WHITE HDRSE 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 GOWSD.

CRAWLEY ARC, G3WSC. Meets at the Tilgate Forest Rec. Centre, Hut 18, Tilgate Forest, Crawley, West Sussex. Details from Mr J.S. Spence GOFPI.

HDRSHAM 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, GOWVB. Details from Don Still GOOOC.

WORTHING & DARC, G3WDR. Meets at the Lancing Pansh Hall, South Street, Lancing, West Sussex.

WORTHING & DISTRICT VIDED 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 MOACM.

TROWBRIDGE & DARC, G2BQY. Meets at the Southwick Village Hall, Southwick, Trowbndge, Wilts. Details from Ian Carter GOGRI. Tel: (01225) 864698.

SOUTH WEST & CHANNEL ISLANDS

AVON

BRISTDL ARC, G3TAD. Meets at the Lodgeside Club, Lodge Road, Kingswood, Bnstol. Details from Dave Bendrey G7BYN.

GORDAND ARG, G6GRG. Meets at The Ship, Redcliffe Bay, Portishead, Avon. Details from Mr R.T. White G8SPC. Tel: (01275) 874001.

NDRTH BRISTDL ARC, G4GCT. Meets at the Self Help Enterprise, 7 Braemar Close, Northville, Bnstol. Details from David Coxon GOGHM. Tel: (01275) 790448.

SEVERNSIDE TV GROUP, GB3ZZ. Meets at NBARC, Filton, Bnstol. Details from Paul Stevenson GBYMM. 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.

SDUTH BRISTDL 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, Bnstol. Details from Stan Greenhill GORYM. Tel: (01454) 413177.

WESTON-SUPER-MARE RS, G4WSM. Meets at the Woodspnng Hotel, High Street, Worle, Weston-Super-Mare. Details from Stephen Cole G3YDL. 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 Trevigias School, Newquay. Details from Mrs Maggie Reed GOKEM. Tel: (01726) 882752.

POLDHU ARC, GB2GM. Meets at the Club House, Poldhu Cove, Mullion, Cornwall TR12 7JB. Details from Mrs Carolyn Rule MOADA. Tel: (01326) 240144.

SALTASH & DARC, G4GXK, G8SAL. Meets at the Toc H Hall, Warraton Road, Saltash, Cornwall. Details from Bnan Giles. Tel: (01752) 844321.

ST AUSTELL ARC, GOECC. 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 GOGHH. 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.

SOUTH DEVON ARC, G4SSD. Meets at the Hillhead, Kingswear, Devon. Details from John May G0CDB. Tel: (01803) 522995.

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 Alan Elliott G7RSU. Tel: (01643) 707207.

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, G4JXG. Meets at the Braintree Hockey Club, Church Street, Bocking, Braintree. Details from Keith Farthing 2E0ARS. Tel: (01376) 347736.

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 G3FIJ. 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, Clifftown Parade, Southend-on-Sea, Essex. Details from Alan Radley G0TTM. Tel: (01268) 741229.

STANFORD-LE-HOPE & DARC, G4SLH. Meets at the St Joseph Pansh Rooms, Scratton Road, Stanford-le-Hope, Essex. Details from Ken Thompson G4PAD. Tel: (01375) 671238.

VANGE ARS, G3YCW. Meets at the Barnstable 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. Details from Brian Hancock G4NPM. Tel: (01304) 821007.

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. Details from Mr K. Churchill M1CZA. Tel: 0208-301 5067.

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 Keith J. Martin G0GFQ. Tel: (01263) 588506.

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, G0TUQ. Meets at Leiston Town Athletic Assn., Victory Road, Leiston, Suffolk. Details from Sam Lydiate G4IFD. Tel: (01728) 832999.

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.

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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.

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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.

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ABERPORTH YMCA, GW4SZV. Meets at the Hut B17, The Airfield, Aberporth. Details from Mr G. Carruther GW4HGJ. Tel: (01239) B11205.

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PEMBROKESHORE RS, GW0EJE. Meets at Furzy Park Community Centre, Furzy Park, Haverfordwest, Pembrokeshire. Details from Ian M. Jones MW0CAB. Tel: (01437) 763028.

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ABERGAVENNY RS, GW4GFL. Meets at the Hill Residential College, Pen-y-Pound, Abergavenny, Gwent. Details from Glyn Hughes GW0DQY. Tel: (01633) 4B31B6.

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CENTRAL SCOTLAND FM GROUP. RS38728. Details from Thomas Stalker GM7TZU. Tel: (0169B) 816793.

DALRY ARG, MM0ARG. Meets at The Turf, In Dalry Court, Hill Street, Dalry. Details from Alex McKeeman MM0ABM. Tel: (01294) 823295.

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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: (0169B) 884803.

WEST OF SCOTLAND ARS, GS4AGG. Meets at the Multi Cultural Centre, 21 Rose Street, Glasgow. Details from Hon. Sec.

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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: (01B75) 811723.

LOTHIANS RS, GM3HAM. Meets at the Orwell Lodge Hotel, Polwarth Terrace, Edinburgh EH11 1NH. Details from Thomas G. Main, Sec.

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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.

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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

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NEWRY & MOURNE ARC, GI4MBO. Meets at the Shamrock Social Club, Newry.

ULSTER DX ARG, MI0UDX. Details from Mr P.G. Mercer GI4VIV.

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

If you want to meet with others with a radio passion, then please use this guide...

AMSAT-UK (G0AUK)
Information from Jim Heck G3WGM, Badgers, Letton Close, Blandford, Dorset BH11 7SS. E-mail: **g3wgm@amsat.or** or visit **www.uk.amsat.org**

British Amateur Radio Teledata Group (BARTG - G4ATG, GB2ATG)
Contact Membership Secretary Jenny Thompson, 73 Erlstoke Close, Eggbuckland, Plymouth, Devon PL6 5QN. Tel: **(01752) 202873**, E-mail: **jennythomp@eurobell.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
126 Bargery Road
London SE6 2LR

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 John Raynes, G16436/G0BWG, 267 Pelham Road, Immingham, Lincs DN40 1JU. E-mail: **iswl@ntlworld.com** 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.**

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 DT1 8RH. Tel: **(01258) 482814**, E-mail: **gensec@rsars.org.uk** or visit **www.rsars.org.uk**

The Medium Wave Circle
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Items are usually available from stock for immediate despatch, however please allow up to 28 days for delivery dependant upon demand, all delays greater than one week will be notified. Prices include VAT @ 17.5%. ***E&OE.***

The **LA350** is a compact active loop aerial specifically designed to provide good reception when away from the main monitoring location or when large external aerials are not practical. ***SEE THE DETAILED REVIEW IN THE NOVEMBER 2002 SWM.***
Compact, but achieving high performance, featuring an internal high-gain amplifier (13.5dB) and excellent overall strong signal handling (high IP^3 +30dBm). Very compact being constructed of metal loops and providing a quality finish, still the LA350 remains only half the diameter of other well known loop aerials.
Supplied with two loops, 3.0 - 9.0 & 9.0 - 30MHz ***£199.00*** *carriage £5.00*

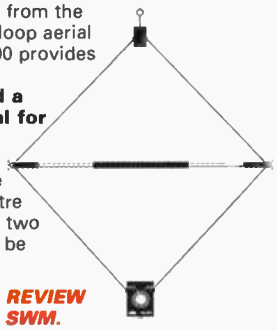
- **350L** Optional element 0.2 - 0.54 MHz for LA350, ***£49.00***
- **350M** Optional element 0.54 - 1.6 MHz for LA350, ***£49.00***

Carriage on optional elements £2.50 if ordered separately

DA3000 16 element discone aerial. Usable coverage is 25 MHz to 2,000 MHz (2GHz). Supplied with 15m of coaxial cable and terminated in a BNC plug. ***£69.00*** *carriage £5.00*

SA7000 Twin element 'passive' ultra wide band receive aerial 30 kHz to 2,000 MHz (2 GHz). Supplied with 15m of coaxial cable and terminated in a BNC plug. ***£99.00*** *carriage £5.00*

WL500: Following on from the success of the LA350 loop aerial (see above), the WL500 provides **a solution to those operators who need a good compact aerial for travelling around.** The loop is constructed of flexible cable braced by a centre pole which splits in to two sections so that it can be easily stored away.



SEE THE DETAILED REVIEW IN THE APRIL 2003 SWM.
When setup, the loop forms a diamond shape with an approximate diameter of 60cm. The loop covers 3.5 to 30MHz with a range switch mounted at the termination point of the loop (switching at 10MHz). A length of screened cable is supplied which is terminated in PHONO plugs to connect the loop to the control box. The control unit provides preselection and amplification terminated in a BNC socket for connection to the receiver. Excellent strong signal characteristics are achieved, typically 16dB gain with an IP^3 of +14.5dBm. The control unit can be powered from an internal 9V PP3 battery (current consumption is around 16mA), alternatively external 12V DC may be used. While the WL500 will operate below 3.5MHz, performance on the lower bands can be enhanced by the addition of the **optional 500LM bar element**. The bar has a selector switch for LW or MW operation and connects to the control box in place of the short wave loop.
£149.00 *carriage £5.00*

- **500LM** Optional LW/MW element ***£49.00***

Carriage on 500LM £5.00 if ordered separately

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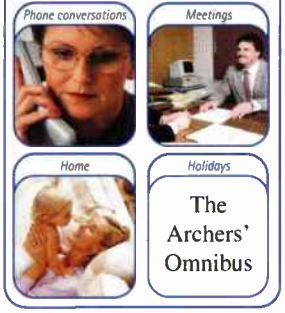

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